

**UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549**

**Amendment No. 2 to  
FORM S-1  
REGISTRATION STATEMENT UNDER THE SECURITIES ACT OF 1933**

**CHF SOLUTIONS, INC.  
(Exact name of registrant as specified in its charter)**

**Delaware**  
(State of Incorporation)

**3845**  
(Primary Standard Industrial  
Classification Code Number)  
**12988 Valley View Road**  
**Eden Prairie, Minnesota 55344**  
**(952) 345-4200**

**68-0533453**  
(I.R.S. Employer  
Identification Number)

(Address, Including Zip Code, and Telephone Number, Including Area Code, of Registrant's Principal Executive Offices)

**John Erb**  
**Chief Executive Officer**  
**CHF Solutions, Inc.**  
**12988 Valley View Road**  
**Eden Prairie, Minnesota 55344**  
**(952) 345-4200**

(Name, Address, Including Zip Code, and Telephone Number, Including Area Code, of Agent for Service)

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**Approximate date of commencement of proposed sale to the public: From time to time after this Registration Statement becomes effective.**

If any securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, check the following box:

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer  Accelerated filer  Non-accelerated filer  Smaller reporting company   
Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided to Section 7(a)(2)(B) of the Securities Act.

**CALCULATION OF REGISTRATION FEE**

Title of securities to be registered <sup>(1)</sup>	Proposed maximum aggregate offering price <sup>(1)</sup>	Amount of Registration Fee <sup>(2)</sup>
Class A Units consisting of:		
(i) Shares of common stock, par value \$0.0001 per share	\$ 2,450,000	\$ 318.01
(ii) Warrants to purchase common stock <sup>(3)</sup>		
Class B Units consisting of:		
(i) Series H Convertible Preferred Stock	\$ 5,600,000	\$ 726.88
(ii) Common stock issuable upon conversion of Series H Convertible Preferred Stock <sup>(3)</sup>		
(iii) Warrants to purchase common stock <sup>(3)</sup>		
Common Stock issuable on exercise of Warrants	\$ 8,050,000	\$ 1,044.89
<b>Total</b>	\$ 16,100,000	\$ 2,089.78 <sup>(4)</sup>

- (1) Estimated solely for the purpose of computing the registration fee pursuant to Rule 457(o) under the Securities Act of 1933, as amended (the "Act"). Pursuant to Rule 416 under the Act, the securities registered also include such indeterminate amounts and numbers of shares of common stock issuable to cover additional securities that may be offered or issued to prevent dilution resulting from stock splits, stock dividends or similar transactions. Also includes the offering price of additional units that the underwriters have the option to purchase.
- (2) Calculated pursuant to Rule 457(o) based on an estimate of the proposed maximum aggregate offering price of all securities being registered.
- (3) No separate fee is required pursuant to Rule 457(g) or Rule 457(i) under the Securities Act.
- (4) Of this amount, \$649.00 was previously paid with the original filing of this registration statement.

The registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment which specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the registration statement shall become effective on such date as the Securities and Exchange Commission, acting pursuant to said Section 8(a), may determine.

The information in this preliminary prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This preliminary prospectus is not an offer to sell these securities and it is not soliciting an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

SUBJECT TO COMPLETION, DATED JANUARY 3, 2020

PRELIMINARY PROSPECTUS



CHF SOLUTIONS, INC.

**1,627,907 Class A Units consisting of shares of common stock and warrants and 6,511,628 Class B Units consisting of Series H convertible preferred stock and warrants (and shares of common stock underlying such warrants)**

We are offering 1,627,907 Class A Units, with each Class A Unit consisting of one share of common stock, par value \$0.0001 per share, and one warrant to purchase one share of our common stock (together with the shares of common stock underlying such warrants, the “Class A Units”) at an assumed public offering price of \$0.86 per Class A Unit, the closing price of our common stock on December 31, 2019. Warrants included in the Class A Units have an exercise price of \$[ ] per whole share.

We are also offering 6,511,628 Class B Units to purchasers who prefer not to beneficially own more than 4.99% (or, at the election of the purchaser, 9.99%) of our outstanding common stock following the consummation of this offering. Each Class B Unit will consist of one share of Series H Convertible Preferred Stock, par value \$0.0001 per share (the “Series H Preferred Stock”), convertible at any time at the holder’s option into one share of common stock and a warrant to purchase one share of common stock at an exercise price of [ ] per share (together with the shares of common stock underlying such shares of Series H Preferred Stock and such warrants, the “Class B Units” and, together with the Class A Units, the “Units”) at an assumed public offering price of \$0.86 per Class B Unit.

The Class A Units and Class B Units will not be certificated and the shares of common stock, Series H Preferred Stock and warrants comprising such Units are immediately separable and will be issued separately in this offering.

The price of our common stock on The Nasdaq Capital Market during recent periods will only be one of many factors in determining the public offering price. Other factors to be considered in determining the public offering price include our history, our prospects, the industry in which we operate, our past and present operating results, the previous experience of our executive officers, the general condition of the securities markets at the time of this offering and discussions between the underwriters and prospective investors. The recent market price used throughout this prospectus may not be indicative of the final offering price. All share numbers included in this prospectus are based upon an assumed offering price and conversion price of \$0.86, the closing price of our common stock on December 31, 2019.

Our common stock trades on The Nasdaq Capital Market under the ticker symbol “CHFS”. See “Prospectus Summary—Recent Developments” in this prospectus for important information about the listing of our common stock on The Nasdaq Capital Market. We do not intend to list the warrants or preferred stock to be sold in this offering on any stock exchange or other trading market.

**Investing in our common stock involves a high degree of risk. Before making any investment in our securities, you should read and carefully consider the risks described in this prospectus under the section of this prospectus entitled “Risk Factors” on page 7 of this prospectus.**

	Per Class A Unit	Per Class B Unit <sup>(1)</sup>	Total	Total
<b>Public offering price</b>				
<b>Underwriting discounts<sup>(2)</sup></b>				
<b>Proceeds, before expenses, to CHF Solutions, Inc.</b>				

- (1) The public offering price and underwriting discount corresponds to (x) in respect of the Class A Units (i) a public offering price per share of common stock of \$[ ] and (ii) a public offering price per warrant of \$[ ] and (y) in respect of the Class B Units (i) a public offering price per share of Series H Preferred Stock of \$[ ] and (ii) a public offering price per warrant to purchase one share of common stock of \$[ ].
- (2) We have agreed to pay certain expenses of the underwriters in this offering. We refer you to “Underwriting” on page 84 for additional information regarding underwriting compensation.

**Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed on the adequacy or accuracy of this prospectus. Any representation to the contrary is a criminal offense.**

The underwriter has the option to purchase up to (i) 1,220,930 additional shares of common stock, and/or (ii) additional warrants to purchase up to 1,220,930 additional shares of common stock solely to cover over-allotments, if any, at the public offering price per share of common stock and the public offering price per warrant set forth above less the underwriting discounts and commissions. The over-allotment option may be used to purchase shares of common stock and/or warrants, or any combination thereof, as determined by the underwriter, but such purchases cannot exceed an aggregate of 15% of the number of shares of common stock (including the number of shares of common stock issuable upon conversion of shares of Series H Preferred Stock) and 15% of the warrants sold in the primary offering. The over-allotment option is exercisable for 45 days from the date of this prospectus.

The underwriters expect to deliver the securities to purchasers on [\_\_\_\_\_], 2020.

*Sole Book-Running Manager*

**Ladenburg Thalmann**

The date of this prospectus is [\_\_\_\_\_], 2020.

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**You should rely only on the information contained in this prospectus and any free-writing prospectus that we authorize to be distributed to you. We have not, and the underwriters have not, authorized anyone to provide you with information different from or in addition to that contained in this prospectus or any related free-writing prospectus. If anyone provides you with different or inconsistent information, you should not rely on it. We are offering to sell, and are seeking offers to buy, the securities offered by this prospectus only in jurisdictions where offers and sales are permitted. The information contained in this prospectus is accurate only as of the date of this prospectus, regardless of the time of delivery of this prospectus or of any sale of the securities. Our business, financial conditions, results of operations and prospects may have changed since that date.** You should also read and consider the information in the documents to which we have referred you under the caption “Where You Can Find Additional Information” in this prospectus.

We have not, and the underwriter has not, done anything that would permit this offering or possession or distribution of this prospectus in any jurisdiction where action for that purpose is required, other than in the United States. Persons outside the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to the offering of the securities and distribution of this prospectus outside the United States.

We obtained industry and market data used throughout this prospectus through our research, surveys and studies conducted by third parties and industry and general publications. We have not independently verified market and industry data from third-party sources.

## ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement on Form S-1 that we filed with the Securities and Exchange Commission (“SEC”). It omits some of the information contained in the registration statement and reference is made to the registration statement for further information with regard to us and the securities being offered hereby. You should review the information and exhibits in the registration statement for further information about us and the securities being offered hereby. Statements in this prospectus concerning any document we filed as an exhibit to the registration statement or that we otherwise filed with the SEC are not intended to be comprehensive and are qualified by reference to the filings. You should review the complete document to evaluate these statements.

You should read this prospectus, any documents that we incorporate by reference in this prospectus and the additional information described below under “Where You Can Find Additional Information” before making an investment decision. You should rely only on the information contained in this prospectus. We have not authorized any other person to provide you with different information. If anyone provides you with additional, different or inconsistent information, you should not rely on it. This prospectus is not an offer to sell these securities and it is not soliciting an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.

You should not assume that the information in this prospectus is accurate as of any date other than the date on the front of such document. Our business, financial condition, results of operations and prospects may have changed since those dates.

## WHERE YOU CAN FIND ADDITIONAL INFORMATION

We file reports, proxy statements and other information with the SEC in accordance with the Securities Exchange Act of 1934, as amended (the “Exchange Act”). Our reports, proxy statements and other information filed with the SEC are available free of charge to the public over the Internet at the SEC’s website at <http://www.sec.gov>. These documents may also be accessed on our website at [www.chf-solutions.com](http://www.chf-solutions.com). Information contained in, or accessible through, our website is not a part of this prospectus.

## PROSPECTUS SUMMARY

*This summary highlights information contained elsewhere in this prospectus and does not contain all of the information that you should consider in making your investment decision. Before deciding to invest in our securities, you should read this entire prospectus carefully, including our financial statements and related notes, the information in the section “Risk Factors” and “Where You Can Find Additional Information.” Unless the context otherwise requires, references in this prospectus to the “Company,” “CHFS,” “we,” “us”, and “our” refer to CHF Solutions, Inc.*

### Company Overview

We are a medical device company dedicated to changing the lives of patients suffering from fluid overload through science, collaboration, and innovative technology. The company is focused on developing, manufacturing, and commercializing the Aquadex FlexFlow® system for ultrafiltration therapy. The Aquadex FlexFlow® system is indicated for temporary (up to eight hours) ultrafiltration treatment of patients with fluid overload who have failed diuretic therapy and extended (longer than 8 hours) ultrafiltration treatment of patients with fluid overload who have failed diuretic therapy and require hospitalization.

#### *The Aquadex FlexFlow System*

The Aquadex FlexFlow system is designed to simply, safely, and precisely remove excess fluid (primarily excess salt and water) from patients suffering from fluid overload who have failed diuretic therapy. With the Aquadex FlexFlow system, medical practitioners can specify and control the amount of fluid to be extracted at a safe, predictable, and effective rate, in a process known as aquapheresis therapy. The Aquadex FlexFlow system has been shown to have no clinically significant impact on electrolyte balance, blood pressure or heart rate.<sup>1</sup> Unlike other forms of ultrafiltration, which typically require administration specifically by a nephrologist, the Aquadex FlexFlow system may be prescribed by any physician and administered by a healthcare provider, both of whom have received training in extracorporeal therapies.

#### *Benefits of the Aquadex FlexFlow System*

The Aquadex FlexFlow ultrafiltration system offers a safe approach to treating fluid overload and:

- Provides complete control over rate and total volume of fluid removed by allowing a medical practitioner to specify the amount of fluid to be removed from each individual patient;
- Aquapheresis therapy can be performed via peripheral or central venous access;
- Removes isotonic fluid (extracts sodium while sparing potassium and magnesium)<sup>2</sup>;
- Following ultrafiltration, neurohormonal activation is reset toward a more physiological condition and diuretic efficacy is restored<sup>3</sup>;
- Provides highly automated operation with only one setting required to begin;
- Utilizes a single-use, disposable auto-loading blood filter circuit that facilitates easy set-up;
- The console guides medical practitioner through the setup and operational process; and
- Decreased hospital readmissions and duration<sup>4</sup> resulting in cost savings at 90 days<sup>5</sup>.

<sup>1</sup> SAFE Trial: Jaski BE, et al. J Card Fail. 2003 Jun; 9(3): 227-231; RAPID Trial: Bart BA, et al. J Am Coll Cardiol. 2005 Dec 6; 46(11): 2043-2046

<sup>2</sup> Ali SS, et al. Congest Heart Fail. 2009; 15(1):1-4.

<sup>3</sup> Marenzi G, et al. J Am Coll Cardiol. 2001 Oct; 38(4): 963-968.

<sup>4</sup> Costanzo MR, et al. J Am Coll Cardiol. 2005 Dec 6; 46(11): 2047-2051.

<sup>5</sup> Costanzo MR, et al. Ultrafiltration vs. Diuretics for the Treatment of Fluid Overload in Patients with Heart Failure: A Hospital Cost Analysis.

The Aquadex FlexFlow system consists of:

- A console, a piece of capital equipment containing electromechanical pumps and an LCD screen;
- A one-time disposable blood set, an integrated collection of tubing, filter, sensors, and connectors that contain and deliver the blood from and back to the patient; and
- A disposable catheter, a small, dual-lumen extended length catheter designed to access the peripheral venous system of the patient and to simultaneously withdraw blood and return filtered blood to the patient.

The Aquadex FlexFlow blood set is proprietary and the Aquadex FlexFlow system can only be used with the Aquadex FlexFlow blood set. The dual lumen extended length catheter (dELC) is designed for use with the Aquadex FlexFlow system, although it is one of many potential catheter options available to the healthcare provider.

### **Corporate Information**

CHF Solutions, Inc. was incorporated in Delaware on August 22, 2002. We began operating our business in November 1999 through Sunshine Heart Company Pty Limited, which currently is a wholly owned Australian subsidiary of CHF Solutions, Inc.

Our common stock began trading on the Nasdaq Capital Market on February 16, 2012. Our principal executive offices are located at 12988 Valley View Road, Eden Prairie, Minnesota 55344, and our telephone number is (952) 345-4200. Our website address is [www.chf-solutions.com](http://www.chf-solutions.com). Our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to reports filed pursuant to Sections 13(a) and 15(d) of the Exchange Act will be made available free of charge on our website as soon as reasonably practicable after we electronically file such material with, or furnish it to, the Securities and Exchange Commission (“SEC”). The information on, or that may be accessed through, our website is not incorporated by reference into and should not be considered a part of this prospectus or the registration statement of which it forms a part.

We are, and will remain, a “smaller reporting company” as long as our public float remains less than \$250 million as of the last business day of our most recently-completed second fiscal quarter. A smaller reporting company may take advantage of specified reduced reporting and other requirements that are otherwise applicable generally to U.S. public companies. As long as our public float remains below \$75 million as of the last business day of our most recently completed second fiscal quarter, we are exempt from the attestation requirement in the assessment of our internal control over financial reporting by our independent auditors pursuant to section 404(b) of the Sarbanes-Oxley Act of 2002 but are required to make our own internal assessment of the effectiveness of our internal controls over financial reporting.

### **Recent Developments**

#### **Preliminary Q4 and Year 2019 Revenue Results and Cash Position (unaudited)**

For the three months ended December 31, 2019, we generated estimated revenue of \$1.367 million, a 9.4% increase over the quarter ended September 30, 2019. For the year ended December 31, 2019, we generated estimated revenue of \$5.508 million, a 10.2% increase over the year ended December 31, 2018. In the fourth quarter, our cash utilization was \$4.1 million and as of December 31, 2019, our cash balance was \$1.3 million.

#### **Nasdaq Notice**

On December 17, 2019, we received a letter (the “Notice”) from The Nasdaq Stock Market (“Nasdaq”) advising that for 30 consecutive trading days preceding the date of the Notice, the bid price of our common stock had closed below the \$1.00 per share minimum required for continued listing on the Nasdaq Capital Market pursuant to Nasdaq Listing Rule 5550(a)(2) (the “Minimum Bid Price Requirement”). The Notice has no effect on the listing of our common stock at this time, and our common stock continues to trade on the Nasdaq Capital Market under the symbol “CHFS.” Under Nasdaq Listing Rule 5810(c)(3)(A), if during the 180 calendar day period following the date of the Notice (the “Compliance Period”), the closing bid price of our common stock is at or above \$1.00 for a minimum of 10 consecutive business days, we will regain compliance with the Minimum Bid Price Requirement and our common stock will continue to be eligible for listing on the Nasdaq Capital Market, absent noncompliance with any other requirement for continued listing. If we do not regain compliance with the Minimum Bid Price

Requirement by the end of the Compliance Period (or the Compliance Period as may be extended) the Company's common stock will be subject to delisting. We intend to monitor the closing bid price of our common stock and may, if appropriate, consider implementing available options to regain compliance with the Minimum Bid Price Requirement under the Nasdaq Listing Rules.

### **Pediatrics**

On September 30, 2019, the Company submitted an application to the FDA requesting for 510(k) clearance of the Aquadex FlexFlow system to include pediatric patients who weigh 20kg or more. Currently, our Aquadex FlexFlow system is not recommended for use in pediatric patients. Therefore, we do not devote commercialization resources toward, nor promote, the use of the Aquadex FlexFlow system in pediatric patients. However, based on their clinical expertise and medical judgement, physicians are permitted to prescribe the Aquadex FlexFlow system for use in pediatric patients. We believe that Aquadex FlexFlow system is currently being prescribed by physicians to treat various conditions in pediatric patients, including heart failure, cardiac surgery<sup>6</sup>, extracorporeal membrane oxygenation (ECMO) therapy<sup>7</sup>, solid organ transplantation<sup>8</sup>, and kidney replacement therapy for neonatal patients. If we receive FDA clearance for an update to the product label, we intend to expand our commercialization efforts to include promotion to physicians and hospitals who treat this pediatric population. Subject to FDA review, the Company expects clearance for this pediatric population in early 2020.

### **Public Offering**

On March 12, 2019, we closed on an underwritten public offering of 455,178 shares of common stock, approximately 1.9 million shares of Series G Convertible Preferred Stock, and warrants to purchase approximately 4.7 million shares of common stock, which includes the full exercise of the underwriter's over-allotment option, for gross proceeds of \$12.4 million. Net proceeds totaled approximately \$11.0 million after deducting the underwriting discounts and commissions and other costs associated with the offering.

### **Registered Direct Offering**

On October 25, 2019, we closed on a registered direct offering of 575,830 shares of common stock, for gross proceeds of approximately \$660,000, prior to deduction of commissions and offering expenses. In a concurrent private placement, we agreed to issue to the investors in the registered direct offering, unregistered warrants to purchase up to 575,830 shares of our common stock. On November 6, 2019, we closed on a registered direct offering of 1,219,076 shares of common stock and pre-funded warrants, for gross proceeds of approximately \$1.36 million, prior to deduction of commissions and offering expenses. In a concurrent private placement, we agreed to issue to the investors in the registered direct offering, unregistered warrants to purchase up to 1,219,076 shares of our common stock. The unregistered warrants issued in each offering were subsequently registered pursuant to a registration statement on Form S-1 that was declared effective by the SEC on December 30, 2019.

### **Reverse Stock Split**

On January 2, 2019, we effected a 1-for-14 reverse split of our outstanding common stock. This reverse stock split did not change the par value of our common stock or the number of common or preferred shares authorized by the Company's Fourth Amended and Restated Certificate of Incorporation. All share and per-share amounts have been retroactively adjusted to reflect the reverse stock split for all periods presented.

<sup>6</sup> Hazle M, et al. *Pediatr Crit Care Med*. 2013 January; 14(1): 44-49. doi:10.1097/PCC.0b013e3182712799.

<sup>7</sup> Selewski DT, et al. *Crit Care Med*. 2012 September; 40(9): 2694-2699. doi:10.1097/CCM.0b013e318258ff01.

<sup>8</sup> Florescu DF, et al. *Pediatr Infect Dis J*. 2015 Jan; 34(1):47-51. doi: 10.1097/INF.0000000000000487

	<b>The Offering</b>
<b>Issuer</b>	CHF Solutions, Inc.
<b>Class A Units Offered</b>	We are offering 1,627,907 Class A Units. Each Class A Unit consists of one share of common stock and a warrant to purchase one share of our common stock (together with the shares of common stock underlying such warrants).
<b>Offering Price per Class A Unit</b>	\$0.86 combined price for each Class A Unit based upon an assumed offering price of \$0.86, the closing price of our common stock on December 31, 2019.
<b>Class B Units Offered</b>	We are also offering 6,511,628 Class B Units to purchasers who prefer not to beneficially own more than 4.99% (or, at the election of the purchaser, 9.99%) of our outstanding common stock following the consummation of this offering. Each Class B Unit will consist of one share of Series H Preferred Stock, par value \$0.0001 per share, convertible into one share of common stock and a warrant to purchase one share of common stock (together with the shares of common stock underlying such shares of Series H Preferred Stock and such warrants).
<b>Offering Price per Class B Unit</b>	\$0.86 combined price for each Class B Unit based upon an assumed offering price of \$0.86, the closing price of our common stock on December 31, 2019.
<b>Description of warrants</b>	The warrants will be exercisable beginning on the closing date and expire on the fifth anniversary of the closing date and the warrants underlying the Class A Units will have an assumed initial exercise price per share equal to \$[ ] per share and the warrants underlying the Class B Units will have an assumed initial exercise price per share equal to \$[ ] per share, subject to appropriate adjustment in the event of recapitalization events, stock dividends, stock splits, stock combinations, reclassifications, reorganizations or similar events affecting our common stock.
<b>Description of Series H Preferred Stock</b>	Each share of Series H Preferred Stock is convertible at any time at the holder’s option into one share of common stock. Notwithstanding the foregoing, we shall not effect any conversion of Series H Preferred Stock, with certain exceptions, to the extent that, after giving effect to an attempted conversion, the holder of shares of Series H Preferred Stock (together with such holder’s affiliates, and any persons acting as a group together with such holder or any of such holder’s affiliates) would beneficially own a number of shares of our common stock in excess of 4.99% (or, upon election by a holder prior to the issuance of any Series H Preferred Stock, 9.99%) of the shares of our common stock then outstanding after giving effect to such conversion. For additional information, see “Description of



	Securities—Description of Capital Stock—Preferred Stock—Series H Convertible Preferred Stock Being Offered Pursuant to this Prospectus” on page <a href="#">79</a> of this prospectus.
<b>Shares of common stock underlying the warrants</b>	8,139,535 shares.
<b>Shares of common stock outstanding before this offering</b>	4,674,068 shares as of December 31, 2019.
<b>Shares of common stock to be outstanding after this offering</b>	6,301,975 shares (12,813,603 shares on an as-converted basis, assuming the conversion of the Series H Preferred Stock in full).
<b>Shares of Preferred Stock outstanding before this offering</b>	We have no shares of Series H Preferred Stock outstanding prior to this offering; we have 535 shares of Series F convertible preferred stock (the “Series F Preferred Stock”) outstanding prior to this offering as of December 31, 2019.
<b>Shares of Preferred Stock to be outstanding after this offering</b>	6,511,628 shares of Series H Preferred Stock; 535 shares of Series F Preferred Stock.
<b>Over-allotment option</b>	We have granted the representative an option to purchase additional shares of common stock equal to 15% of the shares (including shares of common stock underlying the Series H Preferred Stock) in the offering and/or additional warrants equal to 15% of the warrants in the offering at the assumed public offering price per share of common stock and the assumed public offering price per warrant set forth on the cover page hereto less the underwriting discounts and commission. This option is exercisable, in whole or in part, for a period of 45 days from the date of this prospectus.
<b>Market for the common stock</b>	Our common stock is listed on The Nasdaq Capital Market under the symbol “CHFS”. See “—Recent Developments” above for important information about the listing of our common stock on The Nasdaq Capital Market.
<b>Use of Proceeds</b>	We intend to use the net proceeds of this offering for general corporate purposes, including for continued investments in our commercialization efforts. See “Use of Proceeds” herein.
<b>No listing of warrants</b>	We do not intend to apply for listing of the warrants on any securities exchange or trading system.
<b>No listing of Series H Preferred Stock</b>	We do not intend to apply for listing of the Series H Preferred Stock on any securities exchange or trading system.
<b>Risk Factors</b>	See “Risk Factors” beginning on page <a href="#">7</a> and other information included in this prospectus for a discussion of factors that you should consider carefully before deciding to invest in this offering.

Except as otherwise indicated, all information in this prospectus is based on 4,674,068 shares of common stock outstanding as of December 31, 2019 and excludes the shares of common stock being offered by this prospectus or issuable upon conversion of the Series H Preferred Stock or warrants being offered by this prospectus and also excludes the following:

- 405,730 shares of common stock issuable upon the exercise of outstanding stock options, having a weighted average exercise price of \$21.56 per share;
- 6,948,466 shares of our common stock issuable upon the exercise of outstanding warrants (other than the warrants offered hereby) with a weighted-average exercise price of \$7.06 per share;
- 538,210 shares of common stock issuable upon the conversion of the 535 outstanding shares of our Series F Preferred Stock (excluding additional shares of common stock that we may be required to issue upon such conversion due to the full ratchet anti-dilution price protection in the certificate of designation for the Series F Preferred Stock as described in the following bullet);
- 83,995 additional shares of common stock that we will be required to issue to the holders of our Series F Preferred Stock upon conversion thereof if the effective price per share of common stock in this offering is lower than \$0.9942, the current conversion price of the Series F Preferred Stock, as a result of the reduction of such conversion price to the per share price in this offering due to the full ratchet anti-dilution price protection in the certificate of designation for the Series F Preferred Stock (assuming a per share price of \$0.86, the closing price of our common stock on December 31, 2019); and
- 163,563 shares of our common stock reserved for future issuance under our equity incentive plans.

All share and per share amounts for all periods presented in this prospectus and the registration statement of which it forms a part have been retroactively adjusted to reflect the reverse stock splits we previously effected on January 12, 2017, October 12, 2017 and January 2, 2019.

## RISK FACTORS

*An investment in our securities has a high degree of risk. Before you invest you should carefully consider the risks and uncertainties described below and the other information in this prospectus. Any of the risks and uncertainties set forth herein could materially and adversely affect our business, results of operations and financial condition, which in turn could materially and adversely affect the trading price or value of our securities. Additional risks not currently known to us or which we consider immaterial based on information currently available to us may also materially adversely affect us. As a result, you could lose all or part of your investment.*

### **Risks Related to Our Business**

***We have limited history of operations and limited experience in sales and marketing, and we might be unsuccessful in increasing our sales and cannot assure you that we will ever generate substantial revenue or be profitable.***

Prior to our acquisition of the Aquadex FlexFlow system in August 2016, we did not have a product approved for commercial sale and focused our resources on developing and manufacturing our C-Pulse System. On September 29, 2016, we announced a strategic refocus of our strategy that included halting all clinical evaluations of the C-Pulse System to fully focus our resources on commercializing our Aquadex FlexFlow system, taking actions to reduce our cash burn in connection with such strategic refocus and reviewing potential strategic alliances and financing alternatives. In addition, our business strategy depends in part on our ability to grow our business by establishing an effective sales force and selling our products to hospitals and other healthcare facilities while controlling costs. In the third quarter of 2018, we announced our intention to expand our commercialization efforts in post-cardiac surgery, in addition to heart failure. We have limited prior experience with respect to sales or marketing of the Aquadex FlexFlow system in both heart failure and post-cardiac surgery. If we are unsuccessful at marketing and selling our Aquadex FlexFlow system, our operations and potential revenues will be materially adversely affected.

***We have incurred operating losses since our inception and anticipate that we will continue to incur operating losses in the near-term. The report of our independent registered public accounting firm issued in connection with its audit of our consolidated financial statements for the fiscal year ended December 31, 2018 expresses substantial doubt about our ability to continue as a going concern.***

We are an emerging company with a history of incurring net losses. We have incurred net losses since our inception, including net losses of \$17.0 million and \$13.4 million for the years ended December 31, 2018 and 2017, respectively, and \$13.7 million for the nine-months ended September 30, 2019. As of September 30, 2019, our accumulated deficit was \$213.1 million.

The report of our independent registered public accounting firm issued in connection with its audit of our consolidated financial statements for the fiscal year ended December 31, 2018 expresses substantial doubt about our ability to continue as a going concern. Prior to August 2016, we did not have any products approved for commercialization, generated only limited revenue from our clinical studies and had significant operating losses as we incurred costs associated with the conduct of clinical studies and our research and development programs for our C-Pulse System. We became a revenue generating company only after acquiring the business associated with the Aquadex FlexFlow system (herein referred to as the “Aquadex Business”) from Baxter International, Inc. (herein referred to as “Baxter”) in August 2016. We expect to incur additional losses in the near-term as we grow the Aquadex Business, including investments in expanding our sales and marketing capabilities, manufacturing components, and complying with the requirements related to being a U.S. public company listed on Nasdaq. To become and remain profitable, we must succeed in expanding the adoption and market acceptance of the Aquadex FlexFlow system. This will require us to succeed in a range of challenging activities, including training personnel at hospitals and effectively and efficiently manufacturing, marketing and distributing the Aquadex FlexFlow system and related components. There can be no assurance that we will succeed in these activities, and we may never generate revenues sufficient to achieve profitability. If we do achieve profitability, we may not be able to sustain it.

***We believe that we will need to raise additional capital to fund our operations beyond 2020. If additional capital is not available, we will have to delay, reduce or cease operations.***

We believe that we will need to raise additional capital to fund our operations beyond 2020. Changing circumstances may cause us to consume capital significantly faster than we currently anticipate and could adversely affect our ability to raise additional capital. Additional financing may not be available when we need it or may not

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be available on terms that are favorable to us. In addition, the risk that we may not be able to continue as a going concern may make it more difficult to obtain necessary additional funding on terms favorable to us, or at all. If we raise additional funding through the issuance of equity securities, our stockholders may suffer dilution and our ability to use our net operating losses to offset future income may be limited. If we raise additional funding through debt financing, we may be required to accept terms that restrict our ability to incur additional indebtedness, require us to use our cash to make payments under such indebtedness, force us to maintain specified liquidity or other ratios or restrict our ability to pay dividends or make acquisitions. If we are unable to secure additional funding, our development programs and our commercialization efforts would be delayed, reduced or eliminated, our relationships with our suppliers and manufacturers may be harmed, and we may not be able to continue our operations.

***Our near-term prospects are highly dependent on revenues from a single product, the Aquadex FlexFlow system. We face significant challenges in expanding market acceptance of the Aquadex FlexFlow system, which could adversely affect our potential sales.***

Our near-term prospects are highly dependent on revenues from a single product, the Aquadex FlexFlow system, and we have no other commercial products or products in active development at this time. The established market or customer base for our Aquadex FlexFlow system is limited and our success depends on our ability to increase adoption and utilization of the Aquadex FlexFlow system. Acceptance of our product in the marketplace by health care providers is uncertain, and our failure to achieve sufficient market acceptance will significantly limit our ability to generate revenue and be profitable. Market acceptance will require substantial marketing efforts and the expenditure of significant funds by us to inform health care providers of the benefits of using the Aquadex FlexFlow system and to provide further training on its use. We may not be able to build key relationships with health care providers to drive further sales in the United States or sell the Aquadex FlexFlow system outside the United States. Product orders may be cancelled, patients or customers currently using our products may cease to do so and patients or customers expected to begin using our products may not. In addition, market acceptance of the Aquadex FlexFlow system may require that we make enhancements to the system or its components. We cannot be sure that we will be able to successfully develop such enhancements, or that if developed they will be viewed favorably by the market. Our ability to achieve acceptance of our Aquadex FlexFlow system depends on our ability to demonstrate the safety, efficacy, ease-of-use and cost-effectiveness of the system. We may not be able to expand the adoption and market acceptance of the Aquadex FlexFlow system to both the inpatient and outpatient markets and our potential sales could be harmed.

***We depend on a limited number of customers, the loss of which, or failure of which to order our products in a particular period, could cause our revenues to decline.***

Our ten largest customers represented 54.1% and 48.7% of our revenues in the year ended December 31, 2018, and first nine months of 2019, respectively, with our largest customer representing 10.1% and 10.2%, respectively, of our revenues during such periods. Customer ordering patterns may vary significantly from quarter to quarter, or customers may discontinue providing therapies using our products. If one of our largest customers reduced its purchases in a fiscal period, our revenues for that period may be materially adversely affected. Further, if one of our largest customers discontinued the use of our products, our revenues may be materially adversely affected.

***We have limited commercial manufacturing experience and could experience difficulty in producing commercial volumes of the Aquadex FlexFlow system and related components or may need to depend on third parties for manufacturing.***

We have limited experience in commercial manufacturing of the Aquadex FlexFlow system. In connection with the acquisition of the Aquadex Business, we entered into a commercial manufacturing and supply agreement with Baxter, which required Baxter to manufacture Aquadex Flex Flow blood sets and Aquadex FlexFlow catheters for a period of 18 months following the acquisition. We notified Baxter that we intended to have it cease the manufacturing Aquadex product effective as of June 30, 2017. We completed the transfer of manufacturing equipment for the Aquadex Business that we purchased from Baxter to our manufacturing facility in July 2017. We began manufacturing Aquadex FlexFlow consoles and blood circuits in-house in the fourth quarter of 2017 and Aquadex FlexFlow catheters in-house in the third quarter of 2018. With the initiation of internal catheter production, we have completed the transfer of all manufacturing activities of the Aquadex FlexFlow system from Baxter. However, because we have limited prior commercial manufacturing experience, we may incur manufacturing inefficiencies, delays or interruptions. We may not be able to achieve low-cost manufacturing capabilities and processes that will enable us to manufacture the Aquadex FlexFlow system or related components in significant

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volumes, while meeting the legal, regulatory, quality, price, durability, engineering, design and production standards required to market our products successfully. If we experience difficulties with our manufacturing operations, we may experience delays in providing products and services to our customers, and our business could be harmed.

***We depend upon third-party suppliers, including single source suppliers, making us vulnerable to supply problems and price fluctuations.***

We will rely on third-party suppliers, including single source suppliers, to provide us with certain components of the Aquadex FlexFlow system. We have no long-term contracts with third-party suppliers that guarantee volume or the continuation of payment terms. We depend on our suppliers to provide us with materials in a timely manner that meet our quality, quantity and cost requirements. The forecasts of demand we use to determine order quantities and lead times for components purchased from outside suppliers may be incorrect. If we do not increase our sales volumes, which drive our demand for our suppliers' products, we may not procure volumes sufficient to receive favorable pricing, which could impact our gross margins if we are unable to pass along price differences to our customers. Our failure to obtain required components or subassemblies when needed and at a reasonable cost would adversely affect our business. These suppliers may encounter problems during manufacturing for a variety of reasons, any of which could delay or impede their ability to meet our demand. Any difficulties in locating and hiring third-party suppliers, or in the ability of third-party suppliers to supply quantities of our products at the times and in the quantities we need, could have a material adverse effect on our business.

***If we cannot develop adequate distribution, customer service and technical support networks, then we may not be able to market and distribute the Aquadex FlexFlow system effectively and our sales will suffer.***

Our strategy requires us to provide a significant amount of customer service, maintenance, and other technical services to our customers. To provide these services, we have begun, and will need to continue, to develop a network of distribution and a staff of employees and independent contractors in each of the areas in which we intend to operate. We cannot assure that we will be able to organize and manage this network on a cost-effective basis. If we cannot effectively organize and manage this network, then it may be difficult for us to distribute our products and to provide competitive service and support to our customers, in which case customers may be unable, or decide not, to order our products and our sales will suffer.

***We compete against many companies, some of which have longer operating histories, more established products and greater resources than we do, which may prevent us from achieving further market penetration or improving operating results.***

Competition from medical device companies and medical device divisions of health care companies, pharmaceutical companies and gene- and cell-based therapies is intense and expected to increase. The vast majority of patients with fluid overload receive pharmacological treatment (diuretics) as a standard of care. There are no direct competitors for the Aquadex FlexFlow system in the U.S., other than diuretics. Other systems, such as Baxter's Prismaflex, a filter-based device that is approved for continuous renal replacement therapy for patients weighing 20kg or more with acute renal failure and/or fluid overload, and Medtronic's Carpediem, a pediatric dialysis machine that has been approved in the European Union, represent indirect competitors, as they can also be used to conduct ultrafiltration.

Our ability to compete effectively depends upon our ability to demonstrate the advantages of ultrafiltration as compared to diuretics, a pharmacological treatment that is currently the standard of care. In addition, we need to distinguish Aquadex FlexFlow system from the indirect competition of other devices that can also be used to conduct ultrafiltration.

***The competition for qualified personnel is particularly intense in our industry. If we are unable to retain or hire key personnel, we may not be able to sustain or grow our business.***

Our ability to operate successfully and manage our potential future growth depends significantly upon our ability to attract, retain and motivate highly skilled and qualified research, technical, clinical, regulatory, sales, marketing, managerial and financial personnel. We face intense competition for such personnel, and we may not be able to attract, retain and motivate these individuals. We compete for talent with numerous companies, as well as universities and nonprofit research organizations. Our future success also depends on the personal efforts and abilities of the principal members of our senior management and scientific staff to provide strategic direction, manage our operations

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and maintain a cohesive and stable environment. We do not maintain life insurance on the lives of any of the members of our senior management. The loss of key personnel for any reason or our inability to hire, retain and motivate additional qualified personnel in the future could prevent us from sustaining or growing our business.

### ***Significant additional governmental regulation could subject us to unanticipated delays which would adversely affect our sales.***

Our business strategy depends in part on our ability to expand the use of the Aquadex FlexFlow system in the market as quickly as possible. To achieve expanded market use of the Aquadex FlexFlow system, we may develop enhancements to the system or its components. Depending on their nature, such enhancements may be subject to review by the FDA and regulatory authorities outside of the United States under the applicable regulations. Any regulatory delay in our ability to implement enhancements to the Aquadex FlexFlow system or its components could have an adverse effect on our potential sales.

In addition to potential enhancements to the system or its components, we submitted an application to the FDA requesting for 510(k) clearance of the Aquadex FlexFlow system to include pediatric patients who weigh 20kg or more, in September 2019. Currently, our Aquadex FlexFlow system is not recommended for use in pediatric patients. Therefore, we do not devote commercialization resources toward, nor promote, the use of the Aquadex FlexFlow system in pediatric patients. However, based on their clinical expertise and medical judgement, physicians are permitted to prescribe the Aquadex FlexFlow system for use in pediatric patients. Because we submitted our application in September 2019, we anticipate receiving clearance from the FDA in early 2020. However, it is possible that the FDA requires additional testing prior to clearance of the modification to our indication for pediatric use or does not clear the modification at all. A failure to obtain the expanded indication could have a negative impact on our potential sales.

Health care laws in the United States and other countries are subject to ongoing changes, including changes to the amount of reimbursement for hospital services. Additional laws and regulations, or changes to existing laws and regulations that are applicable to our business may be enacted or promulgated, and the interpretation, application or enforcement of the existing laws and regulations may change. Legislative proposals can substantially change the way health care is financed by both governmental and private insurers and may negatively impact payment rates for our system. We cannot predict the nature of any future laws, regulations, interpretations, applications or enforcements or the specific effects any of these might have on our business. However, in the United States and international markets, we expect that both government and third-party payers will continue to attempt to contain or reduce the costs of health care by challenging the prices charged, or deny coverage, for health care products and services. Any future laws, regulations, interpretations, applications or enforcements could delay or prevent regulatory approval or clearance of our Aquadex FlexFlow system and our ability to market our Aquadex FlexFlow system. Moreover, changes that result in our failure to comply with the requirements of applicable laws and regulations could result in the types of enforcement actions by the FDA and/or other agencies as described above, all of which could impair our ability to have manufactured and to sell the affected products.

In the United States, the Aquadex FlexFlow products are purchased primarily by customers, such as hospitals or other health care providers. Customers bill various third-party payers for covered Aquadex FlexFlow therapies provided to patients. These payers, which include federal health care programs (e.g., Medicare and Medicaid), state health care programs, private health insurance companies and managed care organizations, then reimburse our customers based on established payment formulas that take into account part or all of the cost associated with these devices and the related procedures performed.

While the agency responsible for administering the Medicare program, the Centers for Medicare and Medicaid Services, has not issued a favorable national coverage determination under its Investigational Device Exception Studies Program for ultrafiltration using the Aquadex FlexFlow system, a number of private insurers have approved reimbursement for Aquadex FlexFlow products for specific indications and points of service. In addition, patients and providers may seek insurance coverage on a case-by-case basis. We are exploring the ability to increase the range of coverage for uses of Aquadex FlexFlow therapies, such as use in the outpatient setting and use for decompensated heart failure and other indicated uses under its approved labeling, although we may not be successful in doing so.

### ***Product defects, resulting in lawsuits for product liability, could harm our business, results of operations and financial condition.***

The design, manufacture and marketing of medical devices involve certain inherent risks. Manufacturing or design defects, unanticipated use of a product or inadequate disclosure of risks relating to the use of the product can

lead to injury or other adverse events. These events could lead to recalls or safety alerts relating to a product (either voluntary or required by the FDA or similar governmental authorities in other countries), and could result, in certain cases, in the removal of a product from the market. Any recall of our Aquadex FlexFlow system or any related components could result in significant costs, as well as negative publicity and damage to our reputation that could reduce demand for our products. Personal injuries relating to the use of our products could also result in product liability claims being brought against us. In some circumstances, such adverse events could also cause delays in new product approvals.

We may be held liable if any product we develop or commercialize causes injury or is found otherwise unsuitable during product testing, manufacturing, marketing, sale or consumer use. The safety studies we must perform, and the regulatory approvals required to commercialize our products, will not protect us from any such liability. We carry product liability insurance with a \$6 million aggregate limit. However, if there are product liability claims against us, our insurance may be insufficient to cover the expense of defending against such claims or may be insufficient to pay or settle such claims. Furthermore, we may be unable to obtain adequate product liability insurance coverage for commercial sales of any approved product. If such insurance is insufficient to protect us, our business, results of operations and financial condition will be harmed. If any product liability claim is made against us, our reputation and future sales will be damaged, even if we have adequate insurance coverage. Even if a product liability claim against us is without merit or if we are not found liable for any damages, a product liability claim could result in decreased interest in our registry studies, decreased demand for our system, if approved for commercialization, injury to our reputation, diversion of management's attention from operating our business, withdrawal of study participants, significant costs of related litigation, loss of revenue or the inability to commercialize our products.

***We may face significant risks associated with international operations, which could have a material adverse effect on our business, financial condition and results of operations.***

We market our products globally. Our international operations are subject to a number of risks, including the following: fluctuations in exchange rates of the United States dollar could adversely affect our results of operations, we may face difficulties in enforcing and collecting accounts receivable under some countries' legal systems, have our products serviced or conduct other operations, political instability could disrupt our operations, some governments and customers may have longer payment cycles, with resulting adverse effects on our cash flow, and some countries could impose additional taxes or restrict the import of our products. In addition, regulations in individual countries or regions may restrict our ability to sell our products. Most countries, including the countries in the European Union (EU), require approval or registration to import and/or sell our products in the country.

In the EU, we are required to hold a Conformité Européene, or CE, Mark to import our product into the EU. To hold the CE Mark, we must demonstrate compliance with the essential requirements of the European Union Medical Devices Directive (93/42/EEC). Recently, the European Union replaced the Medical Devices Directive with the new European Medical Devices Regulation, or MDR. The MDR will apply after a transitional period of three years ending on May 26, 2020. Manufacturers have the duration of the transition period to update their technical documentation and processes to meet the new requirements in order to obtain a CE Mark or to issue a EC Declaration of Conformity. After May 26, 2020, medical devices can still be placed on the market under the provision of the MDD or the Active Implantable Medical Devices Directive ("AIMDD") 90/385/EEC (hereafter referred to together as "MDD/AIMDD") until May 27, 2024; provided the CE Mark was issued prior to this date, the manufacturer continues to comply with either one of the directives, and that no significant changes are made in the design and intended purpose of the applicable medical device. By May 27, 2024, all medical devices entering the EU will need to have a new CE Mark under the MDR, even if they have been on the market previously under the MDD/AIMDD

The CE Mark for the Aquadex FlexFlow system had previously expired. We received renewal for the Aquadex FlexFlow circuit in the second quarter of 2019 and expect to receive renewal for the Aquadex FlexFlow console in the first quarter of 2020. We cannot import addition console inventory into the EU until the CE Mark is received. While we believe that we currently have sufficient inventory of consoles already available for sale in the EU market and the timing of the receipt of the CE Mark will not have a material impact on our revenue, a delay in receipt of the CE Mark could cause a shortage in product availability in the EU.

Any one or more of these factors associated with international operations could increase our costs, reduce our revenues, or disrupt our operations, which could have a material adverse effect on our business, financial condition and results of operations.

***If we are not able to maintain sufficient quality controls, then the approval or clearance of our products by the European Union, the FDA or other relevant authorities could be withdrawn, delayed or denied and our sales will suffer.***

Approval or clearance of our products could be withdrawn, delayed or denied by the European Union, the FDA and the relevant authorities of other countries if our manufacturing facilities do not comply with their respective manufacturing requirements. The European Union imposes requirements on quality control systems of manufacturers, which are inspected and certified on a periodic basis and may be subject to additional unannounced inspections. Failure to comply with these requirements could prevent us from marketing our products in the European Community. The FDA also imposes requirements through quality system requirements, or QSR, regulations, which include requirements for good manufacturing practices, or GMP. Failure to comply with these requirements could prevent us from obtaining FDA approval of our products and from marketing such products in the United States. In 2019, our manufacturing facility was inspected by a worldwide testing and certification agency (also referred to as a notified body) that performs conformity assessments to European Union requirements for medical devices. A “notified body” is a group accredited and monitored by governmental agencies that inspects manufacturing facilities and quality control systems at regular intervals and is authorized to carry out unannounced inspections. We cannot be sure that our facilities or the processes we use will continue to comply with their respective requirements on a timely basis or at all, which could delay or prevent our obtaining or maintaining the approvals we need to market our products in the European Community and the United States.

To market our products in the European Community, the United States and other countries, where approved, manufacturers of such products must continue to comply or ensure compliance with the relevant manufacturing requirements. Although we cannot control the manufacturers of our products, if we choose to subcontract manufacturing to a contract manufacturer, we may need to expend time, resources and effort in product manufacturing and quality control to assist with their continued compliance with these requirements. If violations of applicable requirements are noted during periodic inspections of the manufacturing facilities of our manufacturers or we fail to address issues raised by the FDA in these inspections, then we may not be able to continue to market the products manufactured in such facilities and our revenues may be materially adversely affected.

***If we violate any provisions of the Federal Food, Drug, and Cosmetic Act (“FDC Act”) or any other statutes or regulations, then we could be subject to enforcement actions by the FDA or other governmental agencies.***

We face a significant compliance burden under the FDC Act and other applicable statutes and regulations which govern the testing, labeling, storage, record keeping, distribution, sale, marketing, advertising and promotion of our medically approved products.

If we violate the FDC Act or other regulatory requirements at any time during or after the product development and/or approval process, we could be subject to enforcement actions by the FDA or other agencies, including: fines, injunctions, civil penalties, recalls or seizures of products, total or partial suspension of the production of our products, withdrawal of any existing approvals or pre-market clearances of our products, refusal to approve or clear new applications or notices relating to our products, recommendations that we not be allowed to enter into government contracts and criminal prosecution. Any of the above could have a material adverse effect on our business, financial condition and results of operations.

***We cannot assure you that our products will be safe or that there will not be serious injuries or product malfunctions. Further, we are required under applicable law to report any circumstances relating to our medically approved products that could result in deaths or serious injuries. These circumstances could trigger recalls, class action lawsuits and other events that could cause us to incur expenses and may also limit our ability to generate revenues from such products.***

We cannot assure you that our products will prove to be safe or that there will not be serious injuries or product malfunctions, which could trigger recalls, class action lawsuits and other events that could cause us to incur significant expenses, limit our ability to market our products and generate revenues from such products or cause us reputational harm.

Under the FDC Act, we are required to submit medical device reports, or MDRs, to the FDA to report device-related deaths, serious injuries and malfunctions of medically approved products that could result in death or serious injury if they were to recur. Depending on their significance, MDRs could trigger events that could cause us to incur expenses and may also limit our ability to generate revenues from such products, such as the following: information contained in the MDRs could trigger FDA regulatory actions such as inspections, recalls and



patient/physician notifications; because the reports are publicly available, MDRs could become the basis for private lawsuits, including class actions; and if we fail to submit a required MDR to the FDA, the FDA could take enforcement action against us.

If any of these events occur, then we could incur significant expenses and it could become more difficult for us to market and sell our products and to generate revenues from sales. Other countries may impose analogous reporting requirements that could cause us to incur expenses and may also limit our ability to generate revenues from sales of our products.

***We face significant uncertainty in the industry due to government healthcare reform.***

The Patient Protection and Affordable Care Act, as amended, (the “Affordable Care Act”) as well as other healthcare reform may have a significant impact on our business. The Affordable Care Act is extremely complex, and, as a result, additional legislation is likely to be considered and enacted over time. The impact of the Affordable Care Act on the health care industry is extensive and includes, among other things, the federal government assuming a larger role in the health care system, expanding healthcare coverage of United States citizens and mandating basic healthcare benefits. The uncertainties regarding the implementation of the Affordable Care Act, including possible repeal of the Affordable Care Act, ongoing legal challenges, and further judicial interpretations, create unpredictability for the health care industry, which itself constitutes a risk.

The Affordable Care Act contains many provisions designed to generate the revenues necessary to fund the coverage expansions and to reduce costs of Medicare and Medicaid, including imposing a 2.3% excise tax on domestic sales of many medical devices by manufacturers that began in 2013. The medical device excise tax has been suspended in 2018 and 2019. If the excise tax is not repealed, we will be subject to this or any future excise tax on our sales of certain medical devices in the U.S. beginning January 1, 2020.

The Affordable Care Act includes a Hospital Readmission Reduction program and is designed to reduce payments to hospitals with excess heart failure readmissions, among other conditions. The penalty to hospitals can be significant, as much as 3% of total Medicare reimbursement. We believe the Aquadex FlexFlow system may offer hospitals an economic benefit for using the device on a regular basis for in-patient or out-patient usage to avoid readmissions for heart failure; however, if the Hospital Readmission Reduction program is repealed, hospitals may not be as inclined to take measures to reduce readmissions.

In addition, any healthcare reforms enacted in the future may, like the Affordable Care Act, be phased in over a number of years, but if enacted, could reduce our revenue, increase our costs, or require us to revise the ways in which we conduct business or put us at risk for loss of business. In addition, our results of operations, financial position and cash flows could be materially adversely affected by changes under the Affordable Care Act and changes under any federal or state legislation adopted in the future.

Moreover, the Physician Payment Sunshine Act (the Sunshine Act), which was enacted as part of the Affordable Care Act, requires applicable medical device companies to track and publicly report, with limited exceptions, all payments and other transfers of value to physicians and teaching hospitals in the U.S. Implementing regulations for these tracking and reporting obligations were finalized in 2013, and companies have been required to track payments made since August 1, 2013. Effective in 2019, payments to certain nurses, who prescribe treatments, has been added to the list of recipients that companies need to track. If we fail to comply with the data collection and reporting obligations imposed by the Sunshine Act, we may be subject to substantial civil monetary penalties.

***We are subject, directly or indirectly, to United States federal and state healthcare fraud and abuse and false claims laws and regulations. Prosecutions under such laws have increased in recent years and we may become subject to such litigation. If we are unable to, or have not fully complied with such laws, we could face substantial penalties.***

Our operations are directly, or indirectly through customers, subject to various state and federal fraud and abuse laws, including, without limitation, the federal Anti-Kickback Statute, the Stark law and federal False Claims Act. These laws may impact, among other things, our sales, marketing and education programs.

The federal Anti-Kickback Statute prohibits persons from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in exchange for or to induce either the referral of an individual, or the furnishing or arranging for a good or service, for which payment may be made under a federal healthcare program such as the Medicare and Medicaid programs. Several courts have interpreted the statute’s intent requirement to mean that if any one purpose of an arrangement involving remuneration is to induce referrals of federal healthcare covered

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business, the statute has been violated. The Anti-Kickback Statute is broad and, despite a series of narrow safe harbors, prohibits many arrangements and practices that are lawful in businesses outside of the healthcare industry. Penalties for violations of the federal Anti-Kickback Statute include criminal penalties and civil sanctions such as fines, imprisonment and possible exclusion from Medicare, Medicaid and other federal healthcare programs. Many states have also adopted laws similar to the federal Anti-Kickback Statute, some of which apply to the referral of patients for healthcare items or services reimbursed by any source, not only the Medicare and Medicaid programs. The physician self-referral laws, commonly referred to as the Stark law, is a strict liability statute that generally prohibits physicians from making referrals for the furnishing of any “designated health services,” for which payment may be made under the Medicare or Medicaid programs, to any entity with which the physician (or an immediate family member) has an ownership interest or compensation arrangement, unless an applicable exception applies. Moreover, many states have adopted or are considering adopting similar laws, some of which extend beyond the scope of the Stark law to prohibit the payment or receipt of remuneration for the prohibited referral of patients for designated healthcare services and physician self-referrals, regardless of the source of the payment for the patient’s care. If it is determined that any of the relationships we may have with physicians violate the Stark law or similar statutes, we could become subject to civil and criminal penalties. The imposition of any such penalties could harm our business.

The federal False Claims Act prohibits persons from knowingly filing, or causing to be filed, a false claim to, or the knowing use of false statements to obtain payment from the federal government. Suits filed under the False Claims Act, known as “qui tam” actions, can be brought by any individual on behalf of the government and such individuals, commonly known as “whistleblowers,” may share in any amounts paid by the entity to the government in fines or settlement. The frequency of filing qui tam actions has increased significantly in recent years, causing greater numbers of medical device, pharmaceutical and healthcare companies to have to defend a False Claim Act action. When an entity is determined to have violated the federal False Claims Act, it may be required to pay up to three times the actual damages sustained by the government, plus civil penalties for each separate false claim. Various states have also enacted laws modeled after the federal False Claims Act.

We are unable to predict whether we could be subject to actions under any of these laws, or the impact of such actions. If we are found to be in violation of any of the laws described above or other applicable state and federal fraud and abuse laws, we may be subject to penalties, including civil and criminal penalties, damages, fines, exclusion from government healthcare reimbursement programs and the curtailment or restructuring of our operations.

### ***Our operating results may fluctuate from quarter to quarter and year to year.***

Our sales and operating results may vary significantly from quarter to quarter and from year to year in the future. Our operating results are affected by a number of factors, many of which are beyond our control. Factors contributing to these fluctuations include the following:

- changes in the prices at which we sell our consoles and disposable blood sets and catheters;
- our bulk ordering practices by our customers;
- general economic uncertainties and political concerns;
- introduction of new products, product enhancements and new applications by our competitors;
- the timing of the introduction and market acceptance of new products, product enhancements and new applications;
- changes in demand for our Aquadex FlexFlow system;
- our ability to maintain sales volumes at a level sufficient to cover fixed manufacturing and operating costs;
- the effect of regulatory approvals and changes in domestic and foreign regulatory requirements;
- our highly variable sales cycle;
- changes in customers’ or potential customers’ budgets as a result of, among other things, reimbursement policies of government programs and private insurers for treatments that use the Aquadex FlexFlow system;
- variances in shipment volumes as a result of product, supply chain and training issues; and
- increased product costs.

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Our sales volumes from quarter to quarter may fluctuate significantly as a result of such ordering practices. Furthermore, from time to time, we offer our disposable blood sets and disposable catheters at a discount to the list price, and our agreements with certain customers may contain volume or other discounts from our normal selling prices and other special pricing considerations.

Discounted pricing can impact our operating results through increasing sales volumes, causing our average selling prices and operating margins to decline and, if we are unable to offset discounts by increasing our sales volume, our net sales could decline. As a result of discounted prices and/or bulk sales orders by our customers, our sales volume may significantly fluctuate quarter to quarter and our sales volume for one quarter may not be indicative of our sales volume for future periods.

Our expense levels are based, in part, on expected future sales. If sales levels in a particular quarter do not meet expectations, we may be unable to adjust operating expenses quickly enough to compensate for the shortfall of sales, and our results of operations may be adversely affected. In addition, we have historically made a significant portion of each quarter's product shipments near the end of the quarter. If that pattern continues, any delays in shipment could have a material adverse effect on results of operations for such quarter.

Due to these and other factors, we believe that quarter to quarter and year to year comparisons of our past operating results may not be meaningful. You should not rely on our results for any quarter or year as an indication of our future performance. Our operating results in future quarters and years may be below expectations, which would likely cause the price of our common stock to fall.

***If we acquire other businesses, products or technologies, we could incur additional impairment charges and will be subject to risks that could hurt our business.***

We may pursue acquisitions to obtain complementary businesses, products or technologies. Any such acquisition may not produce the revenues, earnings or business synergies that we anticipate and an acquired business, product or technology might not perform as we expect. Our management could spend a significant amount of time, effort and money in identifying, pursuing and completing the acquisition. If we complete an acquisition, we may encounter significant difficulties and incur substantial expenses in integrating the operations and personnel of the acquired businesses, products or technologies into our operations. In particular, we may lose the services of key employees and we may make changes in management that impair the acquired business's relationships with employees, vendors and customers. Additionally, we may acquire development-stage companies that are not yet profitable and which require continued investment, which could decrease our future earnings or increase our future losses.

Any of these outcomes could prevent us from realizing the anticipated benefits of an acquisition. To pay for an acquisition, we might use stock or cash. Alternatively, we might borrow money from a bank or other lender. If we use stock, our stockholders would experience dilution of their ownership interests. If we use cash or debt financing, our financial liquidity would be reduced.

As a result of a potential acquisition, we may be required to capitalize a significant amount of intangibles, including goodwill. We would be required to review our definite-lived intangible assets for impairment whenever events or changes in circumstances indicate that the carrying amount of the assets may not be recoverable through the estimated undiscounted future cash flows derived from such assets. In addition, we would be required to evaluate goodwill for impairment annually, or to the extent events or conditions indicate a risk of possible impairment during the interim periods prior to its annual impairment test. In the year ended December 31, 2017, we recognized impairment charges of \$4.0 million related to goodwill and intangible assets from our acquisition of the Aquadex Business. If we were required to recognize impairment charges related to future acquisitions, those charges could decrease our future earnings or increase our future losses.

### **Risks Related to Our Intellectual Property**

***We may not be able to protect our intellectual property rights effectively, which could have an adverse effect on our business, financial condition or results of operations.***

Our success depends in part on our ability to obtain and maintain protection in the United States and other countries of the intellectual property relating to or incorporated into our Aquadex FlexFlow system and related components. On August 5, 2016, upon closing of our acquisition of the Aquadex Business, we entered into a patent license agreement with Baxter pursuant to which we obtained, for no additional consideration, a world-wide license to 49 exclusively licensed and 9 non-exclusively licensed patents used in connection with the Aquadex FlexFlow

system to make, have made, use, sell, offer for sale and import, the Aquadex FlexFlow system in the “field of use” as defined in the license. The license is exclusive, with respect to some patents, and non-exclusive, with respect to other patents. Under the patent license agreement, Baxter has agreed to use commercially reasonable efforts to continue maintenance of seven “required maintenance patents,” and we have agreed to reimburse Baxter for all fees, costs, and expenses (internal or external) incurred by Baxter in connection with such continued maintenance. The rights granted to us under the patent license agreement will automatically revert to Baxter in the event we cease operation of the Aquadex Business or we file for, or have filed against us, or otherwise undertake any bankruptcy, reorganization, insolvency, moratorium, or other similar proceeding. We estimate that the patents licensed from Baxter will expire between approximately 2020 and 2025.

We have four patent applications pending with the United States Patent and Trademark Office. The first application is based on our design for a wearable device designed to assist in maintaining peripheral venous blood flow access in the arm during aquapheresis treatment. The second application includes multiple potential new features and improvements to the diagnostic and ultrafiltration capabilities of the Aquadex FlexFlow system, which, to the extent incorporated into the product, would be designed to help patient fluid balance and to improve usability for healthcare providers. The third application involves a vacuum pump-controlled garment to increase vein diameter and venous flow for peripheral ultrafiltration. The fourth application involves plasma and blood volume measurement during ultrafiltration therapy.

In addition, as of December 31, 2019, we owned 36 issued patents and two pending patent applications in the United States and in foreign jurisdictions related to our C-Pulse System and had one pending application for neuromodulation. We estimate that most of our currently issued U.S. patents will expire between approximately 2021 and 2027. Given the strategic refocus away from C-Pulse and towards the Aquadex FlexFlow system, we have chosen to limit the maintenance of issued C-Pulse related patents to those innovations that are of the highest value. Further, we have elected to emphasize a few of the most critical jurisdictions rather than maintain the earlier approach that involved multiple countries.

Our pending and future patent applications may not issue as patents or, if issued, may not issue in a form that will provide us any financial return. Even if issued, existing or future patents may be challenged, narrowed, invalidated or circumvented, which could limit our ability to obtain commercial benefits from them. Changes in patent laws or their interpretation in the United States and other countries could also diminish the value of our intellectual property or narrow the scope of our patent protection. In addition, the legal systems of certain countries do not favor the aggressive enforcement of patents, and the laws of foreign countries may not protect our rights to the same extent as the laws of the United States. In order to preserve and enforce our patent and other intellectual property rights, we may need to make claims or file lawsuits against third parties. This can entail significant costs to us and divert our management’s attention from our business.

***Intellectual property litigation could be costly and disruptive to us.***

In recent years, there has been significant litigation involving intellectual property rights. From time to time, third parties may assert patent, copyright, trademark and other intellectual property rights to technologies used in our business. Any claims, with or without merit, could be time-consuming, result in costly litigation, divert the efforts of our technical and management personnel or require us to pay substantial damages. If we are unsuccessful in defending ourselves against these types of claims, we may be required to do one or more of the following:

- halt use of our Aquadex FlexFlow products;
- attempt to obtain a license to sell or use the relevant technology or substitute technology, which license may not be available on reasonable terms or at all; or
- redesign our system.

In the event a claim against us were successful and we could not obtain a license to the relevant technology on acceptable terms or license a substitute technology or redesign our system to avoid infringement, our business, results of operations and financial condition would be significantly harmed.

***If we were unable to protect the confidentiality of our proprietary information and know-how, the value of our technology and system could be adversely affected.***

In addition to patented technology, we rely on our unpatented proprietary technology, trade secrets, processes and know-how. We generally seek to protect this information by confidentiality agreements with our employees,

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consultants, scientific advisors and third parties. These agreements may be breached, and we may not have adequate remedies for any such breach. In addition, our trade secrets may otherwise become known or be independently developed by competitors. To the extent that our employees, consultants or contractors use intellectual property owned by others in their work for us, disputes may arise as to the rights in related or resulting know-how and inventions.

***Our products could infringe patent rights of others, which may require costly litigation and, if we are not successful, could cause us to pay substantial damages or limit our ability to commercialize our products.***

Our commercial success depends on our ability to increase adoption of the Aquadex FlexFlow system without infringing the patents and other proprietary rights of third parties. As our industry expands and more patents are issued, the risk increases that there may be patents issued to third parties that relate to our system and technologies of which we are not aware or that we must challenge to continue our operations as currently contemplated. Our system may infringe or may be alleged to infringe these patents.

In addition, some patent applications in the United States may be maintained in secrecy until the patents are issued because patent applications in the United States and many foreign jurisdictions are typically not published until 18 months after filing, and because publications in the scientific literature often lag behind actual discoveries, we cannot be certain that others have not filed patent applications for technology covered by our issued patents or our pending applications or that we were the first to invent the technology. Another party may have filed, and may in the future file, patent applications covering our system or technology similar to ours. Any such patent application may have priority over our patent applications or patents, which could further require us to obtain rights to issued patents covering such technologies. If another party has filed a U.S. patent application on inventions similar to ours, we may have to participate in an interference or derivation proceeding declared by the U.S. Patent and Trademark Office to determine priority of invention in the United States. The costs of these proceedings could be substantial, and it is possible that such efforts would be unsuccessful if the other party had independently arrived at the same or similar invention prior to our own invention, resulting in a loss of our U.S. patent position with respect to such inventions.

***We may be subject to claims that our employees have wrongfully used or disclosed alleged trade secrets of their former employers.***

As is common in our industry, we employ individuals who were previously employed at other medical device companies, including our competitors or potential competitors. Although no claims against us are currently pending, we may be subject to claims that these employees, or we, have used or disclosed trade secrets or other proprietary information of their former employers. Litigation may be necessary to defend against these claims. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management.

***Security breaches, loss of data and other disruptions could compromise sensitive information related to our business or prevent us from accessing critical information and expose us to liability, which could adversely affect our business and our reputation.***

In the ordinary course of our business, we collect and store sensitive data, including legally protected health information, personally identifiable information, intellectual property and proprietary business information owned or controlled by ourselves or others. At times we may have access to limited amounts of protected health information as part of other healthcare providers' provision of treatment to patients with our medical devices. We manage and maintain our applications and data utilizing on-site systems. These applications and data encompass a wide variety of business-critical information including research and development information, commercial information, and business and financial information. We face four primary risks relative to protecting this critical information, including: loss of access risk; inappropriate disclosure risk; inappropriate modification risk; and the risk of our being unable to adequately monitor our controls over the first three risks.

The secure processing, storage, maintenance, and transmission of this critical information is vital to our operations and business strategy. Although we take measures to protect sensitive information from unauthorized access or disclosure, our information technology and infrastructure may be vulnerable to attacks by hackers or viruses or breached due to employee error, malfeasance, or other disruptions. Any such breach or interruption could compromise our networks and the information stored there could be accessed by unauthorized parties, publicly disclosed, lost, or stolen. Any such access, disclosure or other loss of information could result in legal claims or proceedings, liability under laws and regulations that protect the privacy of personal information and regulatory

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penalties. To the extent that we may engage in activities regulated by the Health Insurance Portability and Accountability Act (HIPAA) and the Health Information Technology for Clinical and Economic Health Act (HITECH) we may have additional regulatory and reporting obligations. Although we believe we have implemented security measures, there is no guarantee we can protect our systems and data from unauthorized access, loss or dissemination that could also disrupt our operations, including our ability to conduct our analyses, conduct research and development activities, collect, process, and prepare company financial information, provide information about our products and other patient and physician education and outreach efforts through our website, manage the administrative aspects of our business, and damage our reputation, any of which could adversely affect our business.

In addition, the interpretation and application of consumer, health-related, and data protection laws in the United States, Europe and elsewhere are often uncertain, contradictory, and in flux. It is possible that these laws may be interpreted and applied in a manner that is inconsistent with our practices. If so, this could result in government- imposed fines or orders requiring that we change our practices, which could adversely affect our business. In addition, these privacy regulations may differ from country to country, and may vary based on whether testing is performed in the United States or in the local country. Complying with these various laws could cause us to incur substantial costs or require us to change our business practices and compliance procedures in a manner adverse to our business.

### **Risks Related to Our Common Stock**

***Our business could be negatively affected as a result of actions of activist stockholders, and such activism could impact the trading value of our securities.***

Stockholders may, from time to time, engage in proxy solicitations or advance stockholder proposals, or otherwise attempt to effect changes and assert influence on our board of directors and management. Activist campaigns that contest or conflict with our strategic direction or seek changes in the composition of our board of directors could have an adverse effect on our operating results and financial condition. A proxy contest would require us to incur significant legal and advisory fees, proxy solicitation expenses and administrative and associated costs and require significant time and attention by our board of directors and management, diverting their attention from the pursuit of our business strategy. Any perceived uncertainties as to our future direction and control, our ability to execute on our strategy, or changes to the composition of our board of directors or senior management team arising from a proxy contest could lead to the perception of a change in the direction of our business or instability which may result in the loss of potential business opportunities, make it more difficult to pursue our strategic initiatives, or limit our ability to attract and retain qualified personnel and business partners, any of which could adversely affect our business and operating results. If individuals are ultimately elected to our board of directors with a specific agenda, it may adversely affect our ability to effectively implement our business strategy and create additional value for our stockholders. We may choose to initiate, or may become subject to, litigation as a result of the proxy contest or matters arising from the proxy contest, which would serve as a further distraction to our board of directors and management and would require us to incur significant additional costs. In addition, actions such as those described above could cause significant fluctuations in our stock price based upon temporary or speculative market perceptions or other factors that do not necessarily reflect the underlying fundamentals and prospects of our business.

***Nasdaq may delist our common stock from its exchange which could limit your ability to make transactions in our securities and subject us to additional trading restrictions.***

On December 17, 2019, we received a letter (the “Notice”) from Nasdaq advising that for 30 consecutive trading days preceding the date of the Notice, the bid price of our common stock had closed below the \$1.00 per share minimum required for continued listing on the Nasdaq Capital Market pursuant to Nasdaq Listing Rule 5550(a)(2) (the “Minimum Bid Price Requirement”). The Notice has no effect on the listing of our common stock at this time, and our common stock continues to trade on the Nasdaq Capital Market under the symbol “CHFS.” Under Nasdaq Listing Rule 5810(c)(3)(A), if during the 180 calendar day period following the date of the Notice (the “Compliance Period”), the closing bid price of our common stock is at or above \$1.00 for a minimum of 10 consecutive business days, we will regain compliance with the Minimum Bid Price Requirement and our common stock will continue to be eligible for listing on the Nasdaq Capital Market, absent noncompliance with any other requirement for continued listing. If we do not regain compliance with the Minimum Bid Price Requirement by the end of the Compliance Period (or the Compliance Period as may be extended) the Company’s common stock will be subject to delisting. We intend to monitor the closing bid price of our common stock and may, if appropriate, consider implementing available options to regain compliance with the Minimum Bid Price Requirement under the Nasdaq Listing Rules.

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On June 1, 2017, we received a notification from Nasdaq informing us that we were no longer in compliance with the minimum bid price requirement, as the bid price of our shares of common stock closed below the minimum \$1.00 per share for the 30 consecutive business days prior to the date of the notice. After implementing a 1-for-20 reverse stock split on October 12, 2017, we received confirmation from Nasdaq on October 27, 2017 that we had regained compliance with the minimum bid price rule.

On January 2, 2019, we effected a 1-for-14 reverse split of our outstanding common stock. This reverse stock split did not change the par value of our common stock or the number of common or preferred shares authorized by the Company's Fourth Amended and Restated Certificate of Incorporation.

Additionally, Nasdaq has the authority, pursuant to Nasdaq Listing Rule 5550(b)(1), to delist our common stock if our stockholders' equity falls below \$2.5 million. As of September 30, 2019, our stockholders' equity was \$4.3 million. If our stockholders' equity is hereafter reduced below \$2.5 million as a result of operating losses or for other reasons, we will fail to meet Nasdaq's stockholders' equity requirement. If that occurs, or if we are unable to demonstrate to Nasdaq's satisfaction that we will be able to sustain compliance with this requirement, Nasdaq may delist our common stock. In addition, even if we regain technical compliance with the stockholders' equity requirement, we will have to continue to meet other objective and subjective listing requirements to continue to be listed on the Nasdaq Capital Market. We are actively monitoring our stockholders' equity and will consider any and all options available to us to maintain compliance. There can be no assurance, however, that we will be able to maintain compliance and meet Nasdaq's minimum stockholders' equity requirements.

If our common stock is delisted, our common stock would likely then trade only in the over-the-counter market. If our common stock were to trade on the over-the-counter market, selling our common stock could be more difficult because smaller quantities of shares would likely be bought and sold, transactions could be delayed, and we could face significant material adverse consequences, including: a limited availability of market quotations for our securities; reduced liquidity with respect to our securities; a determination that our shares are a "penny stock," which will require brokers trading in our securities to adhere to more stringent rules, possibly resulting in a reduced level of trading activity in the secondary trading market for our securities; a reduced amount of news and analyst coverage for our Company; and a decreased ability to issue additional securities or obtain additional financing in the future. These factors could result in lower prices and larger spreads in the bid and ask prices for our common stock and would substantially impair our ability to raise additional funds and could result in a loss of institutional investor interest and fewer development opportunities for us.

In addition to the foregoing, if our common stock is delisted from Nasdaq and it trades on the over-the-counter market, the application of the "penny stock" rules could adversely affect the market price of our common stock and increase the transaction costs to sell those shares. The SEC has adopted regulations which generally define a "penny stock" as an equity security that has a market price of less than \$5.00 per share, subject to specific exemptions. If our common stock is delisted from Nasdaq and it trades on the over-the-counter market at a price of less than \$5.00 per share, our common stock would be considered a penny stock. The SEC's penny stock rules require a broker-dealer, before a transaction in a penny stock not otherwise exempt from the rules, to deliver a standardized risk disclosure document that provides information about penny stocks and the risks in the penny stock market. The broker-dealer must also provide the customer with current bid and offer quotations for the penny stock, the compensation of the broker-dealer and the salesperson in the transaction, and monthly account statements showing the market value of each penny stock held in the customer's account. In addition, the penny stock rules generally require that before a transaction in a penny stock occurs, the broker-dealer must make a special written determination that the penny stock is a suitable investment for the purchaser and receive the purchaser's agreement to the transaction. If applicable in the future, these rules may restrict the ability of brokers-dealers to sell our common stock and may affect the ability of investors to sell their shares, until our common stock no longer is considered a penny stock.

***The number of shares of common stock underlying our outstanding warrants and outstanding preferred stock is significant in relation to our currently outstanding common stock. Further, if the effective price per share of common stock in this offering is less than the current conversion price of our Series F Preferred Stock, we will be required to issue additional shares of common stock to the holders of such preferred stock upon conversion thereof. Conversion or exercise of such outstanding convertible securities will cause dilution to holders of our common stock, including investors in this offering, and could cause downward pressure on the market price for our common stock.***

The number of shares of common stock issuable upon conversion of our outstanding preferred stock and exercise of outstanding warrants is significant in relation to the number of shares of our common stock currently outstanding.

As of December 31, 2019, we have warrants to purchase 6,948,466 shares of common stock outstanding, with exercise prices ranging from \$0.9942 to \$43,848.00 with a weighted-average exercise price of \$7.06.

Through December 31, 2019, shares of our Series F Preferred Stock have been converted into 53,019 shares of our common stock. As of December 31, 2019, there were 535 shares of Series F Preferred Stock outstanding, convertible into an aggregate of 538,210 shares of common stock. The certificate of designation for our Series F Preferred Stock contains an anti-dilution provision, which provision requires the lowering of the applicable conversion price, as then in effect, to the purchase price per share of common stock or common stock equivalents issued in the future. As a result of this obligation, if the public offering price of our common stock in this offering is less than \$0.9942, the current conversion price of our Series F Preferred Stock, the conversion price shall be reduced to the effective price per share of common stock in this offering. This reduction in the conversion price will result in a greater number of shares of common stock being issuable upon conversion of the Series F Preferred Stock for no additional consideration, causing greater dilution to our stockholders and investors in this offering. In addition, should we issue any securities following this offering at an effective common stock purchase price that is less than the then effective conversion price of our Series F Preferred Stock, we will be required to further reduce the conversion price of our Series F Preferred Stock, which will result in a greater dilutive effect on our stockholders.

If any security holder determines to sell a substantial number of shares into the market at any given time, there may not be sufficient demand in the market to purchase the shares without a decline in the market price for our common stock. Moreover, continuous sales into the market of a number of shares in excess of the typical trading volume for our common stock could depress the trading market for our common stock over an extended period of time.

In addition, the fact that our stockholders, option holders and warrant holders can sell substantial amounts of our common stock in the public market, whether or not sales have occurred or are occurring, could make it more difficult for us to raise additional financing through the sale of equity or equity-related securities in the future at a time and price that we deem reasonable or appropriate, or at all.

***The rights of holders of our capital stock will be subject to, and could be adversely affected by, the rights of holders of our outstanding preferred stock and stock that may be issued in the future.***

Our board of directors has authority, without further stockholder approval, to issue additional shares of preferred stock with such rights, preferences and privileges as our board may determine. These rights, preferences and privileges may include dividend rights, conversion rights, voting rights and liquidation rights that may be greater than the rights of our common stock.

Our board of directors has previously approved, pursuant to this authority, the issuance of preferred stock, and we have 535 shares of Series F Preferred Stock outstanding as of December 31, 2019. The rights, preferences and privileges of our Series F Preferred Stock are described under “Description of Securities—Description of Capital Stock—Preferred Stock—Outstanding Series F Convertible Preferred Stock”. As described therein, upon liquidation, dissolution or winding-up of the Company, holders of our Series F Preferred Stock have the right to receive, out of the assets, whether capital or surplus, of the Company an amount equal to the par value, plus any accrued and unpaid dividends thereon, for each share of such preferred stock held by such holder before any distribution or payment shall be made to the holders of our common stock, and, following such payment, such holders are entitled to receive the same amount that a holder of common stock would receive if such preferred stock was fully converted, *pari passu* with all the holders of common stock. Our board of directors may issue additional series of preferred stock. As a result, the rights of holders of our capital stock will be subject to, and could be adversely affected by, the rights of holders of any stock that may be issued in the future.



***We have a large number of authorized but unissued shares of stock, which could negatively impact a potential investor if they purchased our common stock.***

On January 2, 2019, we effected a 1-for-14 reverse split of our outstanding common stock. This reverse stock split did not change the par value of our common stock or the number of common or preferred shares authorized by the Company's Fourth Amended and Restated Certificate of Incorporation. Because the number of authorized shares of our common stock was not reduced proportionately, the reverse stock split increased our board of directors' ability to issue authorized and unissued shares without further stockholder action. As of December 31, 2019, our certificate of incorporation provides for 100,000,000 shares of authorized common stock and 40,000,000 shares of authorized preferred stock, 30,000 of which are designated Series A Junior Participating Preferred Stock and 535 of which are designated Series F Preferred Stock and we have 4,674,068 shares of common stock outstanding, 7,892,406 shares reserved for issuance upon the conversion, exercise or vesting of outstanding preferred stock, warrants and options, and 163,563 shares of common stock reserved for future grant under the Company's equity incentive plans.

With respect to authorized but unissued and unreserved shares, we could also use such shares to oppose a hostile takeover attempt or delay or prevent changes in control or changes in or removal of management. The issuance of additional shares of common stock or securities convertible into common stock may have a dilutive effect on earnings per share and relative voting power and may cause a decline in the trading price of our common stock. We could use the shares that are available for future issuance in dilutive equity financing transactions, or to oppose a hostile takeover attempt or delay or prevent changes in control or changes in or removal of management, including transactions that are favored by a majority of the stockholders or in which the stockholders might otherwise receive a premium for their shares over then-current market prices or benefit in some other manner.

***The price of our common stock may fluctuate significantly, and this may make it difficult for you to resell the common stock you want or at prices you find attractive.***

The price of our common stock constantly changes. The price of our common stock could fluctuate significantly for many reasons, including the following:

- future announcements concerning us, including our clinical and product development strategy, or our competitors;
- regulatory developments, disclosure regarding completed, ongoing or future clinical studies and enforcement actions bearing on advertising, marketing or sales;
- reports and recommendations of analysts and whether or not we meet the milestones and metrics set forth in such reports;
- introduction of new products;
- acquisition or loss of significant manufacturers, distributors or suppliers or an inability to obtain sufficient quantities of materials needed to manufacture our system;
- quarterly variations in operating results, which we have experienced in the past and expect to experience in the future;
- business acquisitions or divestitures;
- changes in governmental or third-party reimbursement practices;
- fluctuations of investor interest in the medical device sector; and
- fluctuations in the economy, world political events or general market conditions.

In addition, stock markets in general, and the market for shares of health care stocks in particular, have experienced extreme price and volume fluctuations in recent years, fluctuations that frequently have been unrelated to the operating performance of the affected companies. These broad market fluctuations may adversely affect the market price of our common stock. The market price of our common stock could decline below its current price and the market price of our shares may fluctuate significantly in the future. These fluctuations may be unrelated to our performance. We expect that the market price of our common stock will continue to fluctuate.

***Our loan agreement subjects us to operating restrictions and financial covenants and may restrict our business and financing activities.***

On August 5, 2016, we entered into a loan agreement with Silicon Valley Bank for proceeds of up to \$5.0 million, including a \$1.0 million revolving line of credit and a \$4.0 million term loan. The term loan expired unused on November 30, 2016 and the term loan is no longer available to be drawn. Under the revolving line, we may borrow the lesser of \$1 million or 80% of our eligible accounts (subject to customary exclusions), minus the outstanding principal balance of any advances under the revolving line. Advances under the revolving line, if any, will accrue interest at a floating per annum rate equal to 1.75% or 1.0% above the prime rate, depending on liquidity factors. The revolving line of credit expires on March 31, 2020. Advances under the revolving line are subject to various conditions precedent, including our compliance with financial covenants relating to net liquidity relative to monthly cash burn. We have not made borrowings under the Silicon Valley Bank facility since its inception.

Our obligations under the loan agreement are secured by a security interest in our assets, excluding intellectual property and certain other exceptions. We are subject to a negative pledge covenant with respect to our intellectual property. The loan agreement contains customary representations, as well as customary affirmative and negative covenants. Among other restrictions, the negative covenants, subject to exceptions, prohibit or limit our ability to: declare dividends or redeem or purchase equity interests; incur additional liens; make loans and investments; incur additional indebtedness; engage in mergers, acquisitions, and asset sales; transact with affiliates; undergo a change in control; add or change business locations; and engage in businesses that are not related to its existing business. These covenants may restrict our ability to finance our operations and to pursue our business activities and strategies. Our ability to comply with these covenants may be affected by events beyond our control.

***Our ability to use U.S. net operating loss carryforwards or Australian tax losses might be limited.***

As of December 31, 2018, we had U.S. net operating loss (“NOL”) carryforwards of approximately \$120.1 million for U.S. income tax purposes, which expire from 2024 through 2037. To the extent these NOL carryforwards are available, we intend to use them to reduce any corporate income tax liability associated with our operations that we might have in the future. Section 382 of the U.S. Internal Revenue Code of 1986, as amended (the “Internal Revenue Code”), generally imposes an annual limitation on the amount of NOL carryforwards that might be used to offset taxable income when a corporation has undergone significant changes in stock ownership. During 2017, we experienced an ownership change as defined in Section 382 of the Internal Revenue Code which will limit our ability to utilize the our NOLs.

We may have experienced additional ownership changes further limiting the NOL carryforwards that may be utilized. We have not yet completed a formal Section 382 analysis. As a result, prior or future changes in ownership, including due to this offering, could put limitations on the availability of our NOL carryforwards. In addition, our ability to utilize the current NOL carryforwards might be further limited by future issuances of our common stock.

As of December 31, 2018, we had tax losses in the Commonwealth of Australia of approximately AU\$49.0 million. Continuing utilization of carryforward tax losses in Australia may also be affected by the issuance of our common stock. This is because one test for carrying forward tax losses in Australia from year to year requires continuity of ultimate ownership (subject to the relevant tests in Australian tax law) of more than 50% between the loss year and the income year in which the loss is claimed.

To the extent use of our NOL carryforwards or tax losses is limited, our income could be subject to corporate income tax earlier than it would if we were able to use NOL carryforwards and tax losses, which could result in lower profits.

***We do not intend to pay cash dividends on our common stock in the foreseeable future.***

We have never declared or paid any cash dividends on our common stock, and we currently do not anticipate paying any cash dividends in the foreseeable future. We intend to retain any earnings to finance the development and expansion of our products and business. Accordingly, our stockholders will not realize a return on their investments unless the trading price of our common stock appreciates.

***We will continue to incur increased costs as a result of being a U.S. reporting company.***

In connection with the effectiveness of our registration statement on Form 10, as of February 14, 2012, we became subject to the periodic reporting requirements of the Exchange Act. Although we were previously listed on the Australian Securities Exchange and had been required to file financial information and make certain other filings

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with the Australian Securities Exchange, our status as a U.S. reporting company under the Exchange Act has caused us, and will continue to cause us, to incur additional legal, accounting and other expenses that we did not previously incur, including costs related to compliance with the requirements of SOX and the listing requirements of The Nasdaq Capital Market. We expect these rules and regulations will continue to increase our legal and financial compliance costs and make some activities more time-consuming and costly, and these activities may increase general and administrative expenses and divert management's time and attention away from revenue-generating activities. Furthermore, now that we are a revenue-generating company following the acquisition of the Aquadex Business in August 2016, our costs to comply with regulations applicable to U.S. reporting companies may further increase. We also expect these rules and regulations may make it more difficult and more expensive for us to obtain director and officer liability insurance and we may be required to accept reduced policy limits and coverage or incur substantially higher costs to obtain the same or similar coverage. As a result, it may be more difficult for us to attract and retain qualified individuals to serve on our board of directors or as executive officers.

***Investors could lose confidence in our financial reports, and the value of our common stock may be adversely affected, if our internal controls over financial reporting are found not to be effective by management or by an independent registered public accounting firm or if we make disclosure of existing or potential material weaknesses in those controls.***

As long as our public float remains below \$75 million as of the last business day of our most recently completed second fiscal quarter, we are exempt from the attestation requirement in the assessment of our internal control over financial reporting by our independent auditors pursuant to section 404 (b) of the Sarbanes-Oxley Act of 2002 but are required to make our own internal assessment of the effectiveness of our internal controls over financial reporting.

We continue to evaluate our existing internal controls over financial reporting. During the course of our ongoing evaluation of the internal controls, we may identify areas requiring improvement and may have to design enhanced processes and controls to address issues identified through this review. Remediating any deficiencies, significant deficiencies or material weaknesses that we or our independent registered public accounting firm may identify may require us to incur significant costs and expend significant time and management resources. We cannot assure you that any of the measures we implement to remedy any such deficiencies will effectively mitigate or remedy such deficiencies. The existence of one or more material weaknesses could affect the accuracy and timing of our financial reporting. It may be more difficult for us to manage our internal control over financial reporting following our acquisition of the Aquadex Business now that we are a revenue generating company. Investors could lose confidence in our financial reports, and the value of our common stock may be harmed, if our internal controls over financial reporting are found not to be effective by management or by our independent registered public accounting firm or if we make disclosure of existing or potential material weaknesses in those controls.

***Our Fourth Amended and Restated Certificate of Incorporation, as amended, provides that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware will be the sole and exclusive forum for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers, or employees.***

Our Fourth Amended and Restated Certificate of Incorporation, as amended, provides that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware will be the exclusive forum for any derivative action or proceeding brought on our behalf; any action asserting a breach of fiduciary duty; any action asserting a claim against us arising pursuant to the Delaware General Corporation Law; or any action asserting a claim against us that is governed by the internal affairs doctrine. This choice of forum provision does not preclude or contract the scope of exclusive federal or concurrent jurisdiction for any actions brought under the Securities Act or the Exchange Act. Accordingly, our exclusive forum provision will not relieve us of our duties to comply with the federal securities laws and the rules and regulations thereunder, and our stockholders will not be deemed to have waived our compliance with these laws, rules and regulations.

Any person or entity purchasing or otherwise acquiring any interest in any of our securities shall be deemed to have notice of and consented to these provisions. These exclusive-forum provisions may limit a stockholder's ability to bring a claim in a judicial forum of its choosing for disputes with us or our directors, officers or other employees, which may discourage lawsuits against us and our directors, officers and other employees.

If a court were to find the choice of forum provision contained in our Fourth Amended and Restated Certificate of Incorporation, as amended, to be inapplicable or unenforceable in an action, we may incur additional costs

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associated with resolving such action in other jurisdictions, which could harm our business, results of operations, and financial condition. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management and other employees.

### ***Our certificate of incorporation and bylaws, as well as certain provisions of the DGCL, may delay or deter a change in control transaction.***

Certain provisions of our certificate of incorporation and bylaws may have the effect of deterring takeovers, such as those provisions authorizing our board of directors to issue, from time to time, any series of preferred stock and fix the designation, powers, preferences and rights of the shares of such series of preferred stock; prohibiting stockholders from acting by written consent in lieu of a meeting; requiring advance notice of stockholder intention to put forth director nominees or bring up other business at a stockholders' meeting; prohibiting stockholders from calling a special meeting of stockholders; requiring a 66 2/3% majority stockholder approval in order for stockholders to amend certain provisions of our certificate of incorporation or bylaws or adopt new bylaws; providing that, subject to the rights of preferred shares, the directors will be divided into three classes and the number of directors is to be fixed exclusively by our board of directors; and providing that none of our directors may be removed without cause. Section 203 of the DGCL, from which we did not elect to opt out, provides that if a holder acquires 15% or more of our stock without prior approval of our board of directors, that holder will be subject to certain restrictions on its ability to acquire us within three years. These provisions may delay or deter a change in control of us, and could limit the price that investors might be willing to pay in the future for shares of our common stock.

### ***We are a "smaller reporting company" under federal securities laws and we cannot be certain whether the reduced reporting requirements applicable to such companies will make our common stock less attractive to investors.***

We are a "smaller reporting company" under federal securities laws. For as long as we continue to be a smaller reporting company, we may take advantage of exemptions from various reporting requirements that are applicable to other public companies, including reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements. We will remain a smaller reporting company so long as our public float remains less than \$250 million as of the last business day of our most recently-completed second fiscal quarter. We cannot predict if investors will find our common stock less attractive because we may rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may decline or be more volatile.

### ***Stockholder litigation could divert the attention of management from the day-to-day operation of our business or result in us incurring substantial costs and liabilities.***

We cannot be sure that our stockholders will not initiate securities litigation against us in the future. If securities or stockholder derivative litigation were to be commenced against us, our defense of such litigation could divert the attention of management from the day-to-day operation of our business or result in us incurring substantial costs and liabilities, irrespective of the merits of the litigation.

## **Risks Relating to this Offering**

### ***Because our management will have broad discretion and flexibility in how the net proceeds from this offering are used, our management may use the net proceeds in ways with which you disagree or which may not prove effective.***

We currently intend to use the net proceeds from this offering as discussed under "Use of Proceeds" in this prospectus. We have not allocated specific amounts of the net proceeds from this offering for any of the foregoing purposes. Accordingly, our management will have significant discretion and flexibility in applying the net proceeds of this offering. You will be relying on the judgment of our management with regard to the use of these net proceeds, and you will not have the opportunity, as part of your investment decision, to assess whether the net proceeds are being used appropriately. It is possible that the net proceeds will be invested in a way that does not yield a favorable, or any, return for us. The failure of our management to use such funds effectively could have a material adverse effect on our business, financial condition, operating results and cash flow.

### ***The Series H Preferred Stock and the warrants are unlisted securities and there is no public market for them.***

There is no established public trading market for the Series H Preferred Stock or the warrants, and we do not expect a market to develop. In addition, neither the Series H Preferred Stock nor the warrants are listed, and we do not intend to apply for listing of the Series H Preferred Stock or the warrants on any securities exchange or trading system. Without an active market, the liquidity of the Series H Preferred Stock and the warrants is limited, and investors may be unable to liquidate their investments in the Series H Preferred Stock or the warrants.

***The value of our Series H Preferred Stock is directly tied to the value of our common stock, and any change in the value of our common stock will be reflected in the value of our Series H Preferred Stock.***

There is no established public trading market for the Series H Preferred Stock, and we do not expect a market to develop. In addition, we do not intend to apply for listing of the Series H Preferred Stock on any national securities exchange or other nationally recognized trading system. As a result, because each share of Series H Preferred Stock is initially convertible into one share of common stock, subject to certain beneficial ownership limitations, we expect the value of the Series H Preferred Stock to have a value directly tied to the value of our common stock. Accordingly, any change in the trading price of our common stock will be reflected in the value of our Series H Preferred Stock, and the price of our common stock may be volatile as described above.

***The warrants may not have any value.***

The warrants will be exercisable for five years from the closing date at an initial exercise price of \$[ ] per share. In the event that the price of a share of our common stock does not exceed the exercise price of the warrants during the period when the warrants are exercisable, the warrants may not have any value.

***The warrants purchased in this offering do not entitle the holder to any rights as common stockholders until the holder exercises the warrant for shares of our common stock.***

Until you acquire shares of our common stock upon exercise of your warrants purchased in this offering, such warrants will not provide you any rights as a common stockholder, except as set forth in the warrants. Upon exercise of your warrants purchased in this offering, you will be entitled to exercise the rights of a common stockholder only as to matters for which the record date occurs on or after the exercise date.

***Purchasers in this offering may experience additional dilution of their investment in the future.***

Subject to lock-up provisions described under “Underwriting,” we are generally not restricted from issuing additional securities, including shares of common stock, securities that are convertible into or exchangeable for, or that represent the right to receive, common stock or substantially similar securities. The issuance of securities may cause further dilution to our stockholders, including investors in this offering. In order to raise additional capital, such securities may be at prices that are not the same as the price per share in this offering. We cannot assure you that we will be able to sell shares or other securities in any other offering at a price per share that is equal to or greater than the price per share paid by investors in this offering, and investors purchasing shares or other securities in the future could have rights superior to existing stockholders, including investors who purchase securities in this offering. The price per share at which we sell additional shares of our common stock or securities convertible into common stock in future transactions may be higher or lower than the price per share in this offering. The exercise of outstanding stock options or warrants and the vesting of outstanding restricted stock units may also result in further dilution of your investment.

**CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS**

This prospectus contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, or the Securities Act, and Section 21E of the Exchange Act. Any statements about our expectations, beliefs, plans, objectives, assumptions or future events or performance are not historical facts and may be forward-looking. These statements are often, but are not always, made through the use of words or phrases such as “anticipates,” “estimates,” “plans,” “projects,” “continuing,” “ongoing,” “expects,” “management believes,” “we believe,” “we intend” and similar words or phrases. Accordingly, these statements involve estimates, assumptions and uncertainties which could cause actual results to differ materially from those expressed in them. Any forward-looking statements are qualified in their entirety by reference to the factors discussed throughout this prospectus, and in particular those factors included in the section entitled “Risk Factors.”

Because the factors referred to in the preceding paragraph could cause actual results or outcomes to differ materially from those expressed in any forward-looking statements we make, you should not place undue reliance on any such forward-looking statements. Further, any forward-looking statement speaks only as of the date on which it is made, and we undertake no obligation to update any forward-looking statement or statements to reflect events or circumstances after the date on which such statement is made or to reflect the occurrence of unanticipated events. New factors emerge from time to time, and it is not possible for us to predict which factors will arise. In addition, we cannot assess the impact of each factor on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements.

You should carefully read this prospectus and any related free writing prospectus and with the understanding that our actual future results may materially differ from what we expect.

Except as required by law, forward-looking statements speak only as of the date they are made, and we assume no obligation to update any forward-looking statements publicly, or to update the reasons why actual results could differ materially from those anticipated in any forward-looking statements, even if new information becomes available.

## USE OF PROCEEDS

We estimate that the net proceeds to us from the sale of the securities offered by this prospectus in this offering will be approximately \$6.2 million (or \$7.2 million if the underwriters fully exercise their overallotment option) after deducting commissions and estimated offering expenses payable by us.

We currently intend to use the net proceeds from this offering for general corporate purposes, including for continued investments in our commercialization efforts. We may use a portion of the net proceeds for the acquisitions of businesses, products, technologies or licenses that are complementary to our business, although we have no present commitments or agreements to do so.

The allocation of the net proceeds of the offering set forth above represents our estimates based upon our current plans and assumptions regarding industry and general economic conditions, our future revenues and expenditures.

The amounts and timing of our actual expenditures may vary significantly and will depend on numerous factors, including market conditions, cash generated or used by our operations, business developments and opportunities that may arise and related rate of growth. We may find it necessary or advisable to use portions of the proceeds from this offering for other purposes.

Circumstances that may give rise to a change in the use of proceeds and the alternate purposes for which the proceeds may be used include:

- the existence of other opportunities or the need to take advantage of changes in timing of our existing activities;
- the need or desire on our part to accelerate, increase or eliminate existing initiatives due to, among other things, changing market conditions and competitive developments; and/or
- if strategic opportunities present themselves (including acquisitions, joint ventures, licensing and other similar transactions).

From time to time, we evaluate these factors and other factors and we anticipate continuing to make such evaluations to determine if the existing allocation of resources, including the proceeds of this offering, is being optimized. Pending the application of the net proceeds as described above, we will hold the net proceeds from this offering in short-term, interest-bearing, securities.

We believe that the net proceeds of this offering, together with cash on hand, will be sufficient to fund our operations through 2020, and we believe that we will need to raise additional capital to fund our operations thereafter if warrant exercises for cash do not materialize. Additional capital may not be available on terms favorable to us, or at all. If we raise additional funds by issuing equity securities, our stockholders may experience dilution. Debt financing, if available, may involve restrictive covenants or additional security interests in our assets. Any additional debt or equity financing that we complete may contain terms that are not favorable to us or our stockholders. If we raise additional funds through collaboration and licensing arrangements with third parties, it may be necessary to relinquish some rights to our technologies or products or grant licenses on terms that are not favorable to us. If we are unable to raise adequate funds, we may have to delay, reduce the scope of, or eliminate some or all of, our development programs or liquidate some or all of our assets.

**MARKET INFORMATION AND DIVIDEND POLICY**

Our common stock is currently listed on The Nasdaq Capital Market under the symbol “CHFS.” See “Prospectus Summary—Recent Developments” in this prospectus for important information about the listing of our common stock on The Nasdaq Capital Market. Neither the Series H Preferred Stock nor the warrants will be traded on a national securities exchange.

As of December 31, 2019, the last reported sale price of our common stock on The Nasdaq Capital Market was \$0.86.

As of December 31, 2019, there were approximately 21 stockholders of record for our common stock. A substantially greater number of stockholders may be “street name” or beneficial holders, whose shares are held of record by banks, brokers and other financial institutions.

We have not historically paid cash dividends on our capital stock. We intend to retain our future earnings, if any, to finance the expansion and growth of our business, and we do not expect to pay cash dividends on our capital stock in the foreseeable future. In addition, pursuant to our loan agreement with Silicon Valley Bank, we are prohibited from paying cash dividends without the prior consent of Silicon Valley Bank. Payment of future cash dividends, if any, will be at the sole discretion of our board of directors after taking into account various factors, including our financial condition, earnings, capital requirements of our operating subsidiaries, covenants associated with any debt obligations, legal requirements, regulatory constraints and other factors deemed relevant by our board of directors. Moreover, if we determine to pay any dividends in the future, there can be no assurance that we will continue to pay such dividends.

Our transfer agent is American Stock Transfer & Trust Company LLC, 6201 15<sup>th</sup> Avenue, Brooklyn, New York 11219; Telephone: 800-937-5449.

The following table sets forth certain information as of December 31, 2019 concerning our equity compensation plans:

Plan category	Number of securities to be issued upon exercise of outstanding options and rights (a)	Weighted-average exercise price of outstanding options and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
Equity compensation plans approved by security holders	112,829 <sup>(1)</sup>	\$ 58.63 <sup>(2)</sup>	98,001 <sup>(3)</sup>
Equity compensation plans not approved by security holders	292,901 <sup>(4)</sup>	\$ 7.28	65,562 <sup>(5)</sup>
<b>Total</b>	<b>405,730</b>	<b>\$ 21.56</b>	<b>163,563</b>

- (1) Consists of shares of our common stock that may be issued pursuant to outstanding stock options under the 2011 Equity Incentive Plan, the 2017 Equity Incentive Plan and the 2013 Directors’ Plan.
- (2) Excludes RSUs because they convert into shares of our common stock on a one-for-one basis upon vesting at no additional cost.
- (3) Consists of 78,172 shares of our common stock remaining available for future issuance under the 2017 Equity Incentive Plan (the “2017 Plan”) and 19,829 shares of our common stock remaining available for future issuance under the 2013 Directors’ Plan. No additional awards may be issued under the 2002 Stock Plan or the 2011 Equity Incentive Plan.

Each of the 2017 Equity Incentive Plan and the 2013 Directors’ Plan contains an “evergreen” provision, pursuant to which the number of shares available for issuance under the plan automatically adjusts by a percentage of the number of fully diluted shares outstanding. Specifically, pursuant to the 2017 Equity Incentive Plan, the share reserve under the plan will automatically increase on January 1<sup>st</sup> of each year, for a period of not more than ten years, commencing on January 1, 2018 and ending on (and including) January 1, 2027, to an amount equal to 13% of the fully diluted shares outstanding on December 31<sup>st</sup> of the preceding calendar year; provided that the board of directors may act prior to January 1<sup>st</sup> of a given year to provide that there will be no January 1<sup>st</sup> increase in the share reserve for such year or that the increase in the share reserve for such year will be a lesser number of shares than would otherwise occur. Pursuant to the 2013 Directors’ Plan, the share reserve under the plan will automatically increase on January 1<sup>st</sup> of each year, for a period of not more than ten years, commencing on January 1, 2014 and ending on (and including) January 1, 2023, by an amount equal to 2% of the fully diluted shares outstanding on December 31<sup>st</sup> of the preceding calendar year; provided that the board of directors may act prior to January 1<sup>st</sup> of a given year to provide that there will be no January 1<sup>st</sup> increase in the share reserve for such year or that the increase in the share reserve for such year will be a lesser number of shares than would otherwise occur.



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- (4) Consists of shares of our common stock that may be issued pursuant to outstanding stock options under the New-Hire Plan. The board of directors approved the New-Hire Plan in July 2013. The New-Hire Plan provides for the grant of the following awards: options not intended to qualify as incentive stock options under Section 422 of the Internal Revenue Code, restricted stock awards, RSU awards, stock appreciation rights and other stock awards. Eligible award recipients are individuals entering into employment with the Company who were not previously employees or directors of the Company or following a *bona fide* period of non-employment. All awards must constitute inducements material to such individuals' entering into employment with the Company within the meaning of the Nasdaq listing rules, and all awards must be granted either by the Compensation Committee or a majority of the Company's independent directors. Promptly following the grant of an award under the New-Hire Plan, the Company must (i) issue a press release disclosing the material terms of the award and (ii) notify Nasdaq that it granted such award in reliance on the "inducement grant exemption" from Nasdaq's stockholder approval requirements for equity compensation plans.
- (5) Consists of 65,562 shares remaining available for future issuance under the New-Hire Plan.

**CAPITALIZATION**

The following table sets forth our actual cash and cash equivalents and our capitalization as of September 30, 2019 and on an adjusted basis to give effect to the sale of the securities offered hereby and the use of proceeds, as described in the section entitled “Use of Proceeds.”

You should read this information in conjunction with “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and our consolidated financial statements and related notes appearing in this prospectus. The information provided below has been adjusted to reflect our 1-for-14 reverse stock split that was effected after trading on January 2, 2019. The information below has also been adjusted to reflect (i) the effect of our registered direct offerings and private placements on October 25, 2019 and November 6, 2019 and (ii) the effect of this current offering.

The pro forma information set forth in the table below is illustrative only and will be adjusted based on the actual public offering price and other terms of this offering determined at pricing.

	As of September 30, 2019 (in thousands, except share and per share data)		
	Actual	As Adjusted	Pro Forma As Adjusted
Cash and cash equivalents	\$ 3,634	\$ 5,394	\$ 11,590
<b>Stockholders’ equity:</b>			
Series A junior participating preferred stock, par value \$0.0001 per share; authorized 30,000 shares, none outstanding	—	—	
Series F convertible preferred stock, par value \$0.0001 per share; authorized 535 shares, issued and outstanding 535 shares	—	—	
Series H convertible preferred stock, par value \$0.0001 per share; authorized none and 6,511,628 shares, respectively, issued and outstanding none and 6,511,628 shares, respectively	—	—	
Preferred stock, par value \$0.0001 per share; authorized 39,969,465 shares, respectively, none outstanding			
Common stock, par value \$0.0001 per share; authorized 100,000,000 shares, issued and outstanding 2,879,162 shares	—	—	
Additional paid-in capital	216,173	217,933	224,129
<b>Accumulated other comprehensive income:</b>			
Foreign currency translation adjustment	1,219	1,219	1,219
Accumulated deficit	(213,054)	(213,054)	(213,054)
Total stockholders’ equity	4,338	6,098	12,294

The as adjusted column reflects our registered direct offerings and private placements in October and November of 2019 and the pro forma as adjusted column above reflects our sale of Series H Preferred Stock, common stock and warrants in this offering at an assumed public offering price of \$0.86, the closing price of our common stock on December 31, 2019, per Class A Unit and an assumed public offering price of \$0.86 per Class B Unit. The above discussion and table are based on 2,879,162 shares of common stock outstanding as of September 30, 2019 and excludes:

- 332,722 shares of common stock issuable upon the exercise of outstanding stock options, having a weighted average exercise price of \$26.82 per share;
- 5,430,721 shares of our common stock issuable upon the exercise of outstanding warrants (other than the warrants offered hereby) with a weighted-average exercise price of \$10.18 per share;
- 102,185 shares of common stock issuable upon the conversion of the 535 outstanding shares of our Series F Preferred Stock (excluding additional shares of common stock that we may be required to issue upon such conversion due to the full ratchet anti-dilution price protection in the certificate of designation for the Series F Preferred Stock as described in the following bullet);
- 520,020 additional shares of common stock that we will be required to issue to the holders of our Series F Preferred Stock upon conversion thereof if the effective price per share of common stock in this offering

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is lower than \$5.25, the conversion price of the Series F Preferred Stock on September 30, 2019, as a result of the reduction of such conversion price to the per share price in this offering due to the full ratchet anti-dilution price protection in the certificate of designation for the Series F Preferred Stock (assuming a per share price of \$0.86, the closing price of our common stock on December 31, 2019); and

- 166,571 shares of our common stock reserved for future issuance under our equity incentive plans.

## MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

*The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our interim condensed consolidated financial statements and related notes and our audited consolidated financial statements and related notes included elsewhere in this prospectus.*

### OVERVIEW

#### About CHF Solutions

We are a medical device company dedicated to changing the lives of patients suffering from fluid overload through science, collaboration, and innovative technology. The company is focused on developing, manufacturing, and commercializing the Aquadex FlexFlow® system for ultrafiltration therapy. Aquadex FlexFlow system is indicated for temporary (up to eight hours) ultrafiltration treatment of patients with fluid overload who have failed diuretic therapy and extended (longer than 8 hours) ultrafiltration treatment of patients with fluid overload who have failed diuretic therapy and require hospitalization. In the United States, we hold 510(k) clearance from the FDA to market and sell the Aquadex FlexFlow system to adults. We have submitted an application to the FDA requesting for 510(k) clearance of the Aquadex FlexFlow system to include pediatric patients who weigh 20kg or more, which we expect to receive in early 2020. In the European Union ("EU"), we are required to hold a CE Mark to import our product into the EU. The CE Mark for the Aquadex FlexFlow system had previously expired. We received renewal for the Aquadex FlexFlow circuit in the second quarter of 2019 and expect to receive renewal for the Aquadex FlexFlow console in the first quarter of 2020, which would allow us to import additional console inventory into the EU. We believe that we currently have sufficient inventory of consoles already available for sale in the EU market and the timing of the receipt of the CE Mark for the console will not have a material impact on our revenue.

Previously, the Company was focused on developing the C-Pulse® Heart Assist System for treatment of Class III and ambulatory Class IV heart failure. In August 2016, the Company acquired the Aquadex Business from a subsidiary of Baxter

#### Recent Developments

##### *Preliminary Q4 and Year 2019 Revenue Results and Cash Position (unaudited)*

For the three months ended December 31, 2019, we generated estimated revenue of \$1.367 million, a 9.4% increase over the quarter ended September 30, 2019. For the year ended December 31, 2019, we generated estimated revenue of \$5.508 million, a 10.2% increase over the year ended December 31, 2018. In the fourth quarter, our cash utilization was \$4.1 million and as of December 31, 2019, our cash balance was \$1.3 million.

##### *Nasdaq Notice*

On December 17, 2019, we received a letter (the "Notice") from The Nasdaq Stock Market ("Nasdaq") advising that for 30 consecutive trading days preceding the date of the Notice, the bid price of our common stock had closed below the \$1.00 per share minimum required for continued listing on the Nasdaq Capital Market pursuant to Nasdaq Listing Rule 5550(a)(2) (the "Minimum Bid Price Requirement"). The Notice has no effect on the listing of our common stock at this time, and our common stock continues to trade on the Nasdaq Capital Market under the symbol "CHFS." Under Nasdaq Listing Rule 5810(c)(3)(A), if during the 180 calendar day period following the date of the Notice (the "Compliance Period"), the closing bid price of our common stock is at or above \$1.00 for a minimum of 10 consecutive business days, we will regain compliance with the Minimum Bid Price Requirement and our common stock will continue to be eligible for listing on the Nasdaq Capital Market, absent noncompliance with any other requirement for continued listing. If we do not regain compliance with the Minimum Bid Price Requirement by the end of the Compliance Period (or the Compliance Period as may be extended) the Company's common stock will be subject to delisting. We intend to monitor the closing bid price of our common stock and may, if appropriate, consider implementing available options to regain compliance with the Minimum Bid Price Requirement under the Nasdaq Listing Rules.

##### *Pediatrics*

On September 30, 2019, the Company submitted an application to the FDA requesting for 510(k) clearance of the Aquadex FlexFlow system to include pediatric patients who weigh 20kg or more. Currently, our Aquadex FlexFlow system is not recommended for use in pediatric patients. Therefore, we do not devote commercialization

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resources toward, nor promote, the use of the Aquadex FlexFlow system in pediatric patients. However, based on their clinical expertise and medical judgement, physicians are permitted to prescribe the Aquadex FlexFlow system for use in pediatric patients. We believe that Aquadex FlexFlow system is currently being prescribed by physicians to treat various conditions in pediatric patients, including heart failure, cardiac surgery<sup>9</sup>, extracorporeal membrane oxygenation (ECMO) therapy<sup>10</sup>, solid organ transplantation<sup>11</sup>, and kidney replacement therapy for neonatal patients. If we receive FDA clearance for an update to the product label, we intend to expand our commercialization efforts to include promotion to physicians and hospitals who treat this pediatric population. Subject to FDA review, the Company expects clearance for this pediatric population in early 2020.

### *Public Offerings*

On October 25, 2019, we closed on a registered direct offering of 575,830 shares of common stock at a price of \$1.15 per share, for gross proceeds of approximately \$660,000, prior to deducting commissions and expenses related to the transaction. In a concurrent private placement, we agreed to issue to the investors in the registered direct offering unregistered warrants to purchase up to 575,830 shares of our common stock at an exercise price of \$1.41 per share, which will be exercisable six months from the date of issuance, and will expire five years from the initial exercise date.

Additionally, our outstanding Series F preferred stock is subject to full-ratchet anti-dilution protection in the event we sell any common stock at a price lower than the then-conversion price of the Series F preferred stock. As a result of this offering, effective October 25, 2019, the conversion price of the Series F preferred stock was reduced from \$5.25 to \$1.15 per share, the per share price to the public in this transaction.

On November 6, 2019, we closed on a registered direct offering of 1,219,076 shares of common stock, or common equivalents, at a price of \$1.12 per share, for gross proceeds of approximately \$1.36 million prior to deduction of commissions and offering expenses related to the transaction. In a concurrent private placement, we agreed to issue to the investors in the registered direct offering unregistered warrants to purchase up to 1,219,076 shares of our common stock at an exercise price of \$0.9942 per share, which will be exercisable upon the date of issuance, and will expire five years from the initial exercise date. Effective November 6, 2019, the conversion price of the Series F preferred stock was reduced from \$1.15 to \$0.9942, the exercise price of the warrants issued in connection with this financing.

On March 12, 2019, we closed on an underwritten public offering of 455,178 shares of common stock, approximately 1.9 million shares of Series G Convertible Preferred Stock, and warrants to purchase approximately 4.7 million shares of common stock, which includes the full exercise of the underwriter's over-allotment option, for gross proceeds of \$12.4 million. Net proceeds totaled approximately \$11.0 million after deducting the underwriting discounts and commissions and other costs associated with the offering.

The unregistered warrants issued in each offering were subsequently registered pursuant to a registration statement on Form S-1 that was declared effective by the SEC on December 30, 2019.

### *Reverse Stock Split*

On January 2, 2019, we effected a 1-for-14 reverse split of our outstanding common stock. This reverse stock split did not change the par value of our common stock or the number of common or preferred shares authorized by the Company's Fourth Amended and Restated Certificate of Incorporation. All share and per-share amounts have been retroactively adjusted to reflect the reverse stock split for all periods presented.

### **Critical Accounting Policies and Estimates**

We have adopted various accounting policies to prepare the condensed consolidated financial statements in accordance with accounting principles generally accepted in the United States. (U.S. GAAP). Our most significant accounting policies are disclosed in Note 1 to the consolidated financial statements included in this prospectus.

The preparation of the condensed consolidated financial statements, in conformity with U.S. GAAP, requires us to make estimates and assumptions that affect the amounts reported in the condensed consolidated financial

<sup>9</sup> Hazle M, et al. *Pediatr Crit Care Med*. 2013 January ; 14(1): 44-49. doi:10.1097/PCC.0b013e3182712799.

<sup>10</sup> Selewski Dt, el al. *Crit Care Med*. 2012 September ; 40(9): 2694-2699. doi:10.1097/CCM.0b013e318258ff01.

<sup>11</sup> Florescu DF, et al. *Pediatr Infect Dis J*. 2015 Jan;34(1):47-51. doi:10.1097/INF.0000000000000487

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statements and accompanying notes. Our estimates and assumptions, including those related to stock-based compensation, valuation of equity and debt securities, and income tax reserves are updated as appropriate, which in most cases is quarterly. We base our estimates on historical experience, valuations, or various assumptions that are believed to be reasonable under the circumstances.

*Revenue Recognition:* We recognize revenue in accordance with Accounting Standards Codification (“ASC”), Topic 606, *Revenue from Contracts with Customers*, which we adopted effective January 1, 2018. Accordingly, we recognize revenue when our customers obtain control of its products or services, in an amount that reflects the consideration that we expect to receive in exchange for those goods and services. See Notes 1 and 2 to the consolidated financial statements included in this prospectus. For the three months ended September 30, 2019, three customers represented 11%, 12% and 12% of net sales. For the nine months ended September 30, 2019, one customer represented 10% of net sales. For the three months ended September 30, 2018, two customers represented 15% and 10% of net sales. For the nine months ended September 30, 2018, one customer represented 10% of net sales.

*Accounts Receivable:* Accounts receivable are unsecured, recorded at net realizable value, and do not bear interest. The Company makes judgments as to its ability to collect outstanding receivables based upon significant patterns of collectability, historical experience, and managements’ evaluation of specific accounts and will provide an allowance for credit losses when collection becomes doubtful. The Company performs credit evaluations of its customers’ financial condition on an as-needed basis. Payment is generally due 30 days from the invoice date and accounts past 30 days are individually analyzed for collectability. When all collection efforts have been exhausted, the account is written off against the related allowance. To date the Company has not experienced any write-offs or significant deterioration of the aging of its accounts receivable, and therefore, no allowance for doubtful accounts was considered necessary as of September 30, 2019 or December 31, 2018. As of September 30, 2019, two customers represented 14% and 12% of the accounts receivable balance. As of December 31, 2018, three customers represented 18%, 13% and 13% of the accounts receivable balance.

*Inventories:* Inventories consist of finished goods, raw materials and subassemblies and are recorded as the lower of cost or net realizable value using the first-in, first out method. Overhead is allocated to manufactured finished goods inventory based on the normal capacity of the Company’s production facilities. Abnormal amounts of overhead, if any, are expensed as incurred. Inventories consisted of the following:

<i>(in thousands)</i>	September 30, 2019	December 31, 2018
Finished Goods	\$ 468	\$ 517
Work in Process	185	34
Raw Materials	959	1,107
Total	<u>\$ 1,612</u>	<u>\$ 1,658</u>

*Contingent consideration:* In connection with the purchase of the Aquadex Business, we had an obligation to pay additional consideration that was contingent upon the occurrence of certain future events. See Note 9 to the condensed consolidated financial statements (unaudited) included in this prospectus. Contingent consideration was recognized at the acquisition date at \$126,000, the estimated fair value of the contingent milestone payments. The fair value of the contingent consideration was remeasured to its estimated fair value at the end of each reporting period, with changes recorded to earnings. As of September 30, 2019, this contingency had expired, therefore its fair value was \$0.

*Stock-Based Compensation:* We recognize all share-based payments to employees and directors, including grants of stock options, warrants and common stock awards in the consolidated statement of operations and comprehensive loss as an operating expense based on their fair values as established at the grant date. Equity instruments issued to non-employees include common stock awards or warrants to purchase shares of our common stock. These common stock awards or warrants are either fully-vested and exercisable at the date of grant or vest over a certain period during which services are provided. We expense the fair market value of fully vested awards at the time of grant, and of unvested awards over the period in which the related services are received. In accordance with Accounting Standards Update 2018-07, unvested awards are no longer remeasured to fair value until vesting and rather the fair value is established at the grant date consistent with the treatment of employee director awards.

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We compute the estimated fair values of stock options and warrants using the Black-Scholes option pricing model and market-based warrants using a Monte Carlo valuation model. Market price at the date of grant is used to calculate the fair value of restricted stock units and common stock awards.

Stock-based compensation expense is based on awards ultimately expected to vest and is reduced for estimated forfeitures except for market-based warrants which are expensed based on the grant date fair value regardless of whether the award vests. Forfeitures are estimated at the time of grant and revised, if necessary, in subsequent periods if actual forfeitures differ from those estimates.

*Loss per share:* We compute basic loss per share based on the net loss allocable to common stockholders for each period divided by the weighted average number of common shares outstanding. The net loss allocable to common stockholders for the nine months ended September 30, 2019, reflects a \$4.5 million increase for the net deemed dividend to preferred stockholders provided in connection with the close of the March 2019 public offering, representing the intrinsic value of the preferred shares at the time of issuance. Diluted earnings per share is computed based on the net loss allocable to common stockholders for each period divided by the weighted average number of common shares outstanding, increased by the number of additional shares that would have been outstanding had the potentially dilutive common shares been issued, and reduced by the number of shares the Company could have repurchased from the proceeds from issuance of the potentially dilutive shares. Potentially dilutive shares of common stock include warrants, stock options and other stock-based awards granted under stock-based compensation plans. These potentially dilutive shares were excluded from the computation of loss per share as their effect was antidilutive due to our net loss in each of those periods.

The following table sets forth the potential shares of common stock that are not included in the calculation of diluted net loss per share because to do so would be anti-dilutive as of the end of each period presented:

	September 30	
	2019	2018
Warrants to purchase common stock	5,430,721	608,787
Series F convertible preferred stock	102,185	19,210
Stock options	332,722	139,439
Restricted stock units	—	3
Total	5,865,628	767,439

The following table reconciles reported net loss with reported net loss per share for the periods ended September 30, 2019:

<i>(in thousands, except per share amounts)</i>	Three months	Nine months
Net loss	\$ (4,509)	\$ (13,666)
Deemed dividend to preferred shareholders (see Note 4)	—	(4,509)
Net loss after deemed dividend	(4,509)	(18,175)
Weighted average shares outstanding	2,646	1,915
Basic and diluted loss per share	\$ (1.70)	\$ (9.49)

*Going Concern:* Our consolidated financial statements have been prepared and presented on a basis assuming we continue as a going concern. During the years ended December 31, 2018 and 2017, and through September 30, 2019, we incurred losses from operations and net cash outflows from operating activities as disclosed in the condensed consolidated statements of operations and cash flows, respectively. As of September 30, 2019, we had an accumulated deficit of \$213.1 million and we expect to incur losses for the immediate future. To date, we have been funded primarily by various debt and equity financings, and although we believe that we will be able to successfully fund our operations, there can be no assurance that we will be able to do so or that we will ever operate profitably. These factors raise substantial doubt about our ability to continue as a going concern through the next twelve months.

We became a revenue generating company only after acquiring the Aquadex Business in August 2016. We expect to incur additional losses in the near-term as we grow the Aquadex Business, including investments in expanding our sales and marketing capabilities, purchasing inventory, manufacturing components, and complying with the requirements related to being a U.S. public company. To become and remain profitable, we must succeed

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in expanding the adoption and market acceptance of the Aquadex FlexFlow system. This will require us to succeed in training personnel at hospitals and in effectively and efficiently manufacturing, marketing and distributing the Aquadex FlexFlow system and related components. There can be no assurance that we will succeed in these activities, and we may never generate revenues sufficient to achieve profitability.

During 2017, 2018 and through November 6, 2019, we closed on registered direct and underwritten public equity offerings for net proceeds of approximately \$41.4 million after deducting the underwriting discounts and commissions and other costs associated with the offering. We will be required to seek additional funding to grow our Aquadex Business, which may not be available on terms favorable to us, or at all. We may receive those funds from the proceeds from future warrant exercises, issuances of equity securities, or other financing transactions. Should warrant exercises not materialize or future capital raising be unsuccessful, we may not be able to continue as a going concern. We have made no adjustments relating to the recoverability and classification of recorded asset amounts and classification of liabilities that might be necessary should we not continue as a going concern.

### **Internal Controls and Procedures**

Our independent registered public accounting firm is not required to formally attest to the effectiveness of our internal control over financial reporting and will not be required to do so for as long as our public float remains below \$75 million as of the last business day of our most recently completed second fiscal quarter. However, management is subject to Section 404(a) of the Sarbanes-Oxley Act of 2002 and is required to report annually on effectiveness of our internal control over financial reporting.

### **Recent Accounting Pronouncements**

In May 2014, August 2015, March 2016, April 2016 and May 2016, the Financial Accounting Standards Board (“FASB”) issued amended revenue recognition guidance to clarify the principles for recognizing revenue from contracts with customers. The guidance requires an entity to recognize revenue to depict the transfer of goods or services to customers in an amount that reflects the consideration to which an entity expects to be entitled in exchange for those goods or services. The guidance also requires expanded disclosures relating to the nature, amount, timing, and uncertainty of revenue and cash flows arising from contracts with customers. Additionally, qualitative and quantitative disclosures are required about customer contracts, significant judgments and changes in judgments, and assets recognized from the costs to obtain or fulfill a contract. We adopted this new standard on January 1, 2018, utilizing the modified retrospective approach. There were no impacts to the amount or timing of revenue that we had recognized in prior periods. For additional accounting policy and transition disclosures, see Note 2 – Revenue Recognition to the consolidated financial statements included in this prospectus.

In January 2017, the FASB issued amended guidance to simplify the accounting for goodwill impairment by removing Step 2 of the goodwill impairment test. A goodwill impairment will now be measured as the amount by which a reporting unit’s carrying value exceeds its fair value, limited to the amount of goodwill allocated to that reporting unit. This guidance is to be applied on a prospective basis effective for our interim and annual periods beginning after January 1, 2019, with early adoption permitted for any impairment tests performed after January 1, 2017. We adopted this guidance in 2017, and recognized \$0.2 million of impairment losses related to our goodwill.

In February 2016, FASB issued updated guidance to improve financial reporting about leasing transactions. This guidance required organizations that lease assets to recognize on the balance sheet the assets and liabilities for the rights and obligations created by those leases. The original guidance required application on a modified retrospective basis with the earliest period presented. In August 2018, the FASB issued new guidance which included an option to not restate comparative periods in transition. The Company adopted this new standard on January 1, 2019 with no retrospective adjustments to prior comparative periods. The adoption of this standard on January 1, 2019 resulted in an increase of approximately \$0.6 million in the Company’s other long-term assets and in short and long-term liabilities recorded on its consolidated balance sheet. In addition, the Company elected the package of practical expedients permitted under the transition guidance within the new standard which allowed it to carry forward the historical lease classification. For additional qualitative and quantitative disclosures, see Note 7 - Operating Leases to the consolidated financial statements included in this prospectus.

In August 2018, the FASB issued updated guidance to improve and simplify the disclosure requirements on fair value measurements for level 3 assets and liabilities valued at fair value. The Company early-adopted the guidance effective in its second quarter and the effect on the consolidated financial statements was not material.



**Financial Overview**

We are a medical device company focused on developing, manufacturing and commercializing the Aquadex system for ultrafiltration treatment of patients with fluid overload who have failed diuretic therapy. Activities since inception have consisted principally of raising capital, performing research and development and conducting preclinical and clinical studies. During 2016, we acquired the Aquadex Business and announced that we were halting all clinical evaluations of our prior technology, the C-Pulse System. Since then, our activities have consisted mainly of expanding our sales and marketing capabilities and transferring manufacturing capabilities from Baxter to our facilities in Eden Prairie, Minnesota. As of September 30, 2019, we had an accumulated deficit of \$213.1 million and we expect to incur losses for the immediate future. To date, we have been funded by public and private equity financings and debt. Although we believe that we will be able to successfully fund our operations, there can be no assurance that we will be able to do so or that we will ever operate profitably.

**Results of Operations****Comparison of Three Months Ended September 30, 2019 to Three Months Ended September 30, 2018****Net Sales***(in thousands)*

Three Months Ended September 30, 2019	Three Months Ended September 30, 2018	Increase (Decrease)	% Change
\$1,252	\$1,363	\$(111)	(8.1)%

Revenue is generated mainly from the sale of disposable blood filters and catheters used in conjunction with the Aquadex FlexFlow consoles. We sell primarily in the United States to hospitals and clinics through our direct salesforce. We sell outside of the United States to independent specialty distributors who in turn sell to hospitals and clinics in their geographic regions. The decrease in net sales compared to the same period of 2018 is driven by a reorganization of our salesforce to best align experiences and competencies with our go-to market strategy around cardiac surgery and eventually pediatrics.

**Costs and Expenses**

Our costs and expenses were as follows:

<i>(in thousands)</i>	Three Months Ended September 30, 2019	Three Months Ended September 30, 2018	Increase (Decrease)	% Change
Cost of goods sold	\$ 540	\$ 915	\$ (375)	(41.0)%
Selling, general and administrative	\$ 4,107	\$ 3,713	\$ 394	10.6%
Research and development	\$ 1,112	\$ 985	\$ 127	12.9%

**Cost of Goods Sold**

In connection with the acquisition of the Aquadex Business, we entered into a manufacturing and supply agreement with Baxter. In 2017, we provided notice to Baxter to cease the manufacturing of the Aquadex product line and we began transitioning activities in house. In August 2018, we announced that the transfer of all manufacturing activities was complete.

Cost of sales in 2018 reflects the agreed-upon price paid to Baxter for the manufacturing of the disposables and consoles, as well as startup costs associated with the transfer of manufacturing activities to our facilities in Eden Prairie, Minnesota. In the first quarter of 2019, we began selling our internally manufactured inventory, driving the improvement in our gross margins. In future quarters, we expect our gross margins will continue to improve as volumes increase and we achieve larger efficiencies of scale.

**Selling, General and Administrative**

The increase in selling, general and administrative expense reflect primarily on-going investment in our commercial organization as we continue to expand our outreach in the field with incremental clinical specialists and marketing support. Our general and administrative costs have remained consistent with the prior year.

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As we realign and grow our distribution footprint, we expect that our selling expenses will increase modestly in future quarters, and that general and administrative expenses will remain consistent to the current quarter.

### **Research and Development**

The increase in research and development expenses relate to investments we are making to support our 510(k) submission for pediatric label modification, and to improve the functionality of our Aquadex system, including console software updates and catheter improvements. We expect that our research and development expenditures will decrease modestly in future quarters.

### **Comparison of Nine Months Ended September 30, 2019 to Nine Months Ended September 30, 2018**

#### **Net Sales**

(dollars in thousands)

<u>Nine Months Ended September 30, 2019</u>	<u>Nine Months Ended September 30, 2018</u>	<u>Increase (Decrease)</u>	<u>% Change</u>
\$4,144	\$3,499	\$645	18.4%

Revenue is generated mainly from the sale of disposable blood filters and catheters used in conjunction with our Aquadex FlexFlow consoles. We sell primarily in the United States to hospitals and clinics through our direct salesforce. We sell outside of the United States to independent specialty distributors who in turn sell to hospitals and clinics in their geographic regions. The change in net sales compared to the same period of 2018 is driven by the execution of our commercialization strategy which includes continued expansion of our commercial footprint by the hiring of new sales representatives, clinical specialists, and marketing personnel. In the fourth quarter of 2019, we announced a reorganization of our sales force to best align experiences and competencies with our go-to market strategy around cardiac surgery and eventually pediatrics.

#### **Costs and Expenses**

Our costs and expenses were as follows:

<u>(dollars in thousands)</u>	<u>Nine Months Ended September 30, 2019</u>	<u>Nine Months Ended September 30, 2018</u>	<u>Increase (Decrease)</u>	<u>% Change</u>
Cost of goods sold	\$ 1,987	\$ 2,686	\$ (699)	(26.0)%
Selling, general and administrative	\$ 12,098	\$ 11,489	\$ 609	5.3%
Research and development	\$ 3,719	\$ 2,107	\$ 1,612	76.5%

#### **Cost of Goods Sold**

In connection with the acquisition of the Aquadex Business, we entered into a manufacturing and supply agreement with Baxter. We provided notice to Baxter to cease the manufacturing of the Aquadex product line in 2017, and we began transitioning activities in house. In August 2018, we announced that the transfer of all manufacturing activities was complete.

Cost of sales in 2018 reflects the agreed-upon price paid to Baxter for the manufacturing of the disposables and consoles, as well as startup costs associated with the transfer of manufacturing activities to our facilities in Eden Prairie, Minnesota. In the first quarter of 2019, we began selling our internally manufactured inventory, driving the improvement in our gross margins. In future quarters, we expect our gross margins will continue to improve as volumes increase and we achieve larger efficiencies of scale.

#### **Selling, General and Administrative**

The increase in selling, general and administrative expense reflect primarily on-going investment in our commercial organization as we continue to expand our outreach in the field with incremental sales specialists, clinical specialists and marketing support. Our general and administrative costs have remained consistent to the prior year.

As we continue to increase our distribution footprint, we expect that our selling expenses will continue to increase modestly in future quarters, and that general and administrative expenses will remain consistent to the current quarter.

**Research and Development**

The increase in research and development expenses relate to investments we are making to support our 510(k) submission for pediatric label modification, and to improve the functionality of our Aquadex system, including console software updates and catheter improvements. We expect that our research and development expenditures will decrease modestly in future quarters.

**Comparison of Year Ended December 31, 2018 to Year Ended December 31, 2017**

**Net Sales**

(dollars in thousands)

Year Ended December 31, 2018	Year Ended December 31, 2017	Increase (Decrease)	% Change
\$4,998	\$3,553	\$1,445	40.7%

Revenue is generated mainly from the sale of disposable blood filters and catheters used in conjunction with our Aquadex FlexFlow consoles. We had no commercial sales prior to the acquisition of the Aquadex Business, which we acquired from Baxter on August 5, 2016.

We sell primarily in the United States to hospitals and clinics through our direct salesforce. We sell outside the United States to independent specialty distributors who in turn sell to hospitals and clinics in their geographic regions. The increase in sales is driven by execution of our commercialization strategy which includes continued expansion of our commercial footprint by the hiring of new sales representatives, clinical education specialists, and marketing personnel.

**Costs and Expenses**

Our costs and expenses were as follows:

(dollars in thousands)

	Year Ended December 31, 2018	Year Ended December 31, 2017	Increase (Decrease)	% Change
Cost of goods sold	\$ 3,670	\$ 2,763	\$ 907	32.8%
Selling, general and administrative	\$ 15,311	\$ 10,170	\$ 5,141	50.6%
Research and development	\$ 3,053	\$ 1,481	\$ 1,572	106.1%
Goodwill and intangibles impairment	\$ —	\$ 3,951	\$ (3,951)	(100.0)%

**Cost of Goods Sold**

In connection with the acquisition of the Aquadex Business, we entered into a manufacturing and supply agreement with Baxter. Cost of sales reflects the agreed-upon price paid to Baxter for the manufacturing of the disposables and consoles, as well as startup costs associated with the transfer of manufacturing activities to our facilities in Eden Prairie, Minnesota.

We provided notice to Baxter to cease the manufacturing of the Aquadex FlexFlow system as of June 30, 2017, and we began transitioning activities in house. As part of the manufacturing transition, we agreed to continue to purchase inventory from Baxter through February 1, 2018. We began manufacturing our products in house in the fourth quarter of 2017, and in August 2018, we announced that the transfer of all manufacturing activities was complete.

Cost of sales for the years ended December 31, 2018 and 2017, include startup costs for the planning and preparation associated with the transfer of these manufacturing activities to our facilities in Eden Prairie, Minnesota. In 2019, we expect our gross margins to improve as we transition to selling internally manufactured inventory, and as volumes increase and we achieve larger efficiencies of scale.

**Selling, General and Administrative**

The increase in selling, general and administrative expense reflect primarily the investments made in our commercial organization to expand our outreach in the field with incremental sales specialists, clinical specialists and marketing support. Our general and administrative costs have remained consistent to the prior year. The increase also reflects incremental non-cash stock option expense totaling \$1.5 million.

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We expect investments in our commercial organization to increase modestly in 2019 as new investments level off and we seek productivity gains from the investments made in 2018. We expect 2019 general and administrative expenses to remain consistent with 2018 levels.

### **Research and Development**

The increase in research and development expenses relate to investments we are making to improve the functionality of our Aquadex FlexFlow system, including console software updates and catheter improvements. We expect that our research and development expenditures will increase modestly in future quarters as we continue to make improvements to our offerings.

### **Goodwill and Intangibles Impairment**

Impairment charges include \$3.8 million related to our identifiable intangible assets, including customer relationships, developed technology, and trademarks and tradenames, as well as \$0.2 million related to goodwill. As of December 31, 2017, all intangibles and goodwill were fully impaired.

### **Other Income (Expense)**

The following is a summary of other income (expense)

<i>(dollars in thousands)</i>	<b>Year Ended December 31, 2018</b>	<b>Year Ended December 31, 2017</b>	<b>Increase (Decrease)</b>	<b>% Change</b>
Change in fair value of warrant liability	\$ —	\$ 1,475	\$ (1,475)	(100.0)%
Warrant valuation expense	\$ —	\$ (67)	\$ (67)	(100.0)%

### **Change in fair value of warrant liability**

The gain recognized for the change in fair value of warrant liability relates to the decrease in value of the warrants issued in connection with financings completed on July 26, 2016, November 3, 2016, and January 10, 2017. These warrants were classified as liabilities on our consolidated balance sheet as of December 31, 2016 and were required to be marked to market at each reporting period, with the changes in fair value recorded on our consolidated statement of operations. All of the warrants issued as part of those financings were exercised during the year ended December 31, 2017 pursuant to the warrant exercise agreement described in Note 6 to the consolidated financial statements included in Part II, Item 8 of this Annual Report on Form 10-K. Accordingly, we remeasured each of these warrants as of the date of exercise and recorded \$1.5 million as an unrealized gain on our statement of operations. Although we issued replacement warrants under the warrant exercise agreement, those warrants are not accounted for as liabilities based on their terms.

### **Income tax expense**

<i>(dollars in thousands)</i>	<b>Year Ended December 31, 2018</b>	<b>Year Ended December 31, 2017</b>	<b>Increase (Decrease)</b>	<b>% Change</b>
Income tax expense	\$ (6)	\$ (6)	\$ —	—%

We have not recognized any income tax benefit in our statement of operations related to our U.S. operating losses, as all tax benefits are fully reserved. We generate minimal amounts of income tax expense in connection with activities incurred by our Irish subsidiary.

## **Liquidity and Capital Resources**

### **Sources of Liquidity**

We have funded our operations primarily through cash on hand and a series of equity and debt issuances.

On July 26, 2016, pursuant to a Securities Purchase Agreement dated July 20, 2016, we completed an equity financing with an institutional investor of shares of Series B Convertible Preferred Stock and warrants for gross cash proceeds of approximately \$3.5 million in a registered direct offering and simultaneous private placement. Also, on October 30, 2016, we entered into securities purchase agreement with an institutional investor pursuant to which we agreed to issue shares of Series C Convertible Preferred Stock, Series D Convertible Preferred Stock and warrants with an aggregate purchase price of \$3.8 million in a registered direct offering and simultaneous private placement. The first closing occurred on

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November 3, 2016, whereby we received \$3.6 million in gross proceeds and issued and sold shares of Series C Convertible Preferred Stock, shares of Series D Convertible Preferred Stock and warrants. At the second closing in January 2017, which was subject to receipt of shareholder approval of the transactions, we received \$0.2 million in gross proceeds and issued and sold shares of Series D Convertible Preferred Stock and warrants.

In February 2017, we entered into an agreement with the holder of the majority of our outstanding warrants to incent their exercise of warrants for cash on or before March 31, 2017. In exchange for any such exercise, we agreed to provide the investors a replacement warrant to purchase the same number of shares of common stock as were issued upon exercise of each exercised warrants with an exercise price equal to the consolidated closing bid price of our common stock on the date of issuance. In connection with this agreement, the investors exercised all of the original warrants for gross cash proceeds to us of \$2.0 million, and we issued 3,105 replacement warrants with exercise prices ranging from \$484.4 per share to \$1,397.2 per share.

On April 24, 2017, we closed on an underwritten public offering for net proceeds of approximately \$8.0 million after deducting the underwriting discounts and commissions and other costs associated with the offering, which included the full exercise of the underwriter's over-allotment option to purchase additional shares and warrants. In connection with this offering, we issued a total of 10,000 shares of common stock, 6,400 shares of Series E Convertible Preferred Stock (which were convertible into 22,858 shares of common stock) and warrants to purchase 32,165 shares of common stock.

On November 27, 2017, we closed on another underwritten public offering for net proceeds of approximately \$16.2 million after deducting the underwriting discounts and commissions and other costs associated with the offering. In connection with this offering we issued 18,000 shares of Series F Convertible Preferred stock (which were convertible into 286,715 shares of common stock) and warrants to purchase approximately 573,310 shares of common stock.

On July 3, 2018, we closed on an underwritten public offering of 181,941 shares of common stock, for gross proceeds of \$5.4 million. Net proceeds totaled approximately \$4.6 million after deducting the underwriting discounts and commissions and other costs associated with the offering. See Note 4 – Equity, to the condensed consolidated financial statements (unaudited) included in this prospectus.

On March 12, 2019, we closed on an underwritten public offering for net proceeds totaling approximately \$11.0 million after deducting the underwriting discounts and commissions and other costs associated with the offering, which included the full exercise of the underwriter's over-allotment option to purchase additional shares and warrants. In connection with this offering, we issued a total of 455,178 shares of common stock, approximately 1.9 million shares of Series G convertible preferred stock and warrants to purchase approximately 4.7 million shares of common stock. See Note 4 – Equity, to the condensed consolidated financial statements (unaudited) included in this prospectus.

On October 25, 2019, we closed on a registered direct offering of common stock, for gross proceeds of approximately \$660,000, prior to deducting commissions and expenses related to the transaction. In a concurrent private placement, we agreed to issue to the investors in the registered direct offering unregistered warrants to purchase up to 575,830 shares of our common stock. See Note 10 – Subsequent Events, to the condensed consolidated financial statements included in this prospectus.

On November 6, 2019, we closed on a registered direct offering of 1,219,076 shares of common stock, or common equivalents, at a price of \$1.12 per share, for gross proceeds of approximately \$1.36 million prior to deduction of commissions and offering expenses related to the transaction. In a concurrent private placement, we agreed to issue to the investors in the registered direct offering unregistered warrants to purchase up to 1,219,076 shares of our common stock at an exercise price of \$0.9942 per share, which will be exercisable upon the date of issuance, and will expire five years from the initial exercise date. Effective November 6, 2019, the conversion price of the Series F preferred stock was reduced from \$1.15 to \$0.9942, the exercise price of the warrants issued in connection with this financing.

On August 5, 2016, we entered into a loan agreement with Silicon Valley Bank for proceeds of up to \$5.0 million, including a \$1.0 million revolving line of credit and a \$4.0 million term loan. The term loan expired unused on November 30, 2016 and the term loan is no longer available to be drawn. Under the revolving line, we may borrow the lesser of \$1 million or 80% of our eligible accounts (subject to customary exclusions), minus the outstanding principal balance of any advances under the revolving line. Advances under the revolving line, if any,

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will accrue interest at a floating per annum rate equal to 1.75% or 1.0% above the prime rate, depending on liquidity factors. The loan agreement contains customary representations, as well as customary affirmative and negative covenants. Our obligations under the new loan agreement are secured by a security interest in our assets, excluding intellectual property and certain other exceptions. We are subject to a negative pledge covenant with respect to our intellectual property. Advances under the revolving line are subject to various conditions precedent, including our compliance with financial covenants relating to net liquidity relative to monthly cash burn. The revolving line of credit expires on March 31, 2020. We had no borrowings outstanding under the Silicon Valley Bank facility as of September 30, 2019 or December 31, 2018.

As of September 30, 2019, and December 31, 2018, cash and cash equivalents were \$3.6 million and \$5.5 million, respectively. Prior to our acquisition of the Aquadex Business in August 2016, we did not have a product approved for commercial sale and focused our resources on developing, manufacturing, and commercializing our C-Pulse System. Our business strategy and ability to fund our operations in the future depends in part on our ability to grow our Aquadex Business by establishing a sales force, selling our products to hospitals and other healthcare facilities and controlling costs. We believe we will need to seek financing in the future.

### ***Cash Flows from Operating Activities***

Net cash used in operating activities was \$12.3 million and \$11.8 million for the nine months ended September 30, 2019 and 2018, respectively. The net cash used in each of these periods primarily reflects the net loss for those periods, offset in part by stock-based compensation, depreciation and amortization, and the effects of changes in operating assets and liabilities.

### ***Cash Flows from Investing Activities***

Net cash used in investing activities was \$464,000 and \$177,000 for the nine months ended September 30, 2019 and September 30, 2018, respectively. The majority of cash used in investing activities was for internally manufactured equipment, and the purchase of manufacturing, laboratory and office equipment.

### ***Cash Flows from Financing Activities***

As described above, net cash provided by financing activities was \$11.0 million and \$4.6 million for the nine months ended September 30, 2019 and September 30, 2018, respectively.

### ***Capital Resource Requirements***

As of September 30, 2019, we did not have any material commitments for capital expenditures.

### ***Off-Balance Sheet Arrangements***

On August 5, 2016, we entered into an asset purchase agreement for the Aquadex Business with Baxter, whereby we agreed that, if we dispose of any of the acquired assets for a price that exceeds \$4.0 million within three years of the closing, we would pay Baxter 40% of the amount of such excess. This commitment expired on August 6, 2019. In addition, we also agreed that, if shares of our common stock cease to be publicly traded on the Nasdaq Capital Market, Baxter has the option to require us to repurchase, in cash, all or any part of the common shares held by Baxter at a price equal to their fair market value, as determined by a third-party appraiser.

Except as disclosed above, we have no off-balance sheet transactions, arrangements, obligations (including contingent obligations), or other relationships with unconsolidated entities or other persons that have, or may have, a material effect on our financial condition, changes in financial condition, revenues or expenses, results of operations, liquidity, capital expenditures or capital resources.

## BUSINESS

**Overview**

We are a medical device company dedicated to changing the lives of patients suffering from fluid overload through science, collaboration, and innovative technology. We are focused on developing, manufacturing, and commercializing the Aquadex FlexFlow® system for ultrafiltration therapy. Our commercial product, the Aquadex FlexFlow system, is indicated for temporary (up to eight hours) ultrafiltration treatment of patients with fluid overload who have failed diuretic therapy and extended (longer than 8 hours) ultrafiltration treatment of patients with fluid overload who have failed diuretic therapy and require hospitalization.

**Fluid Overload**

Fluid overload, also known as hypervolemia, is a condition in which there is too much fluid in the blood and generally refers to the expansion of the extracellular fluid volume. Although the body does need some amount of fluid to remain healthy, too much can cause an imbalance and damage to an individual's health.

The signs and symptoms of fluid overload are not always the same in each patient and may vary. However, possible signs and symptoms of fluid overload include: pitting edema, pulmonary edema/pleural effusion, jugular vein distention, dyspnea, or ascites. Medical conditions or diseases where excess fluid accumulates in the body are: heart failure, kidney failure, nephrotic syndrome, cirrhosis, or burn injuries/trauma. Individuals may also suffer from temporary fluid overload following certain surgical procedures, such as cardiac surgery. The diagnosis of fluid overload can be made through a variety of tests/exams such as a physical exam (weight and edema), blood chemistry, ECG or EKG, GFR, liver enzymes, and urinalysis, or serum/urine sodium test. Fluid overload has a significant association with the combined events of death, infection, bleeding, arrhythmia, and pulmonary edema<sup>12</sup> and is a leading cause of readmissions with patients suffering from heart failure and patients following cardiac surgery.

The condition of fluid overload is often observed in patients with heart failure and secondary oliguric states.<sup>13</sup> Most of the symptoms of congestive heart failure result from extracellular fluid volume. For this reason, diuretics have been the cornerstone of heart failure treatment for more than 50 years. Over the past 20 years, approaches to treatment have changed dramatically.<sup>14</sup> These dramatic improvements include new medications and new technologies, such as ultrafiltration, to help treat fluid overload.

**Treatments for Fluid Overload***Diuretics*

Treatment for fluid overload has traditionally been achieved through use of loop diuretics which may be accompanied by use of other categories of medications, such as ACE inhibitors, beta-blockers, and inotropic drugs. Although diuretics are the mainstay of treatment for congestion or fluid overload, no randomized trials have shown the effects of diuretics on mortality in chronic heart failure patients. Furthermore, appropriate titration of diuretics, specifically in the heart failure population, is unclear. Increasing concern exists that diuretics, particularly at high doses, may be deleterious in the inpatient setting. In addition, patients with heart failure and cardiorenal syndrome have diminished response to loop diuretics, making these agents less effective at relieving congestion.<sup>15</sup> Approximately 40% of heart failure patients have poor diuretic response.<sup>16</sup> This poor response is possibly due to noncompliance or high intake of salt, poor drug absorption, insufficient kidney response to drug, and reduced diuretic secretion.<sup>17</sup> Despite treatment with loop diuretics, patients are frequently hospitalized and treated for recurrent symptoms and signs of fluid overload. Among more than 50,000 patients enrolled in the ADHERE (Acute Decompensated Heart Failure National Registry) study, only 33% lost  $\geq 2.27$  kg (5 lbs), and 16% gained weight during hospitalization.<sup>18</sup>

<sup>12</sup> Stein, A *et. al.* Critical Care, 2012;16:R99

<sup>13</sup> Ronco C, Costanzo MR, Bellomo R, et al. (2010) Fluid Overload Diagnosis and Management. Basel, Switzerland: Karger.

<sup>14</sup> Ellison DH. Diuretic therapy and resistance in congestive heart failure. *Cardiology*.2001;96:132-143.

<sup>15</sup> Kamath SA. The role of ultrafiltration in patients with decompensated heart failure. *Int J of Nephrol*.2011.

<sup>16</sup> Testani JM, Hanberg JS, Cheng S, et al. Rapid and highly accurate prediction of poor loop diuretic natriuretic response in patients with heart failure. *Circ Heart Fail*. 2016 Jan;9(1):e002370.

<sup>17</sup> Hoorn EJ and Ellison DH. Diuretic Resistance. *Am J Kidney Dis*. 2017;69(1):136-142.

<sup>18</sup> Costanzo MR, Ronco C, Abraham WT, et al. Extracorporeal ultrafiltration for fluid overload in heart failure. *J Am Coll Cardiol*. 2017;69(19):2428-2445.

Nearly one-half of hospitalized patients with heart failure are discharged with residual fluid excess after receiving conventional diuretic therapies.<sup>19</sup> Regardless of diuretic strategy, 42% of acutely decompensated heart failure subjects in the DOSE (Diuretic Optimization Strategies Evaluation) trial reached the composite endpoint of death, rehospitalization, or emergency department visit at 60 days.<sup>20</sup> There is an association of chronic loop diuretic therapy and greater resource utilization at hospitals.<sup>21</sup> Therefore, an alternative therapy to help stabilize or improve patient care is needed.

#### *Ultrafiltration.*

Ultrafiltration, or aquapheresis, is an alternative therapy to diuretics for fluid removal in patients. Ultrafiltration has been a well-documented technique in the treatment of fluid overload in heart failure patients for 25-30 years.<sup>22</sup> Ultrafiltration is a safe and effective alternative therapy to remove extra fluid and salt by gently filtering blood through an ultrafiltration system. With ultrafiltration, medical practitioners can specify and control the amount of fluid to be extracted at a safe, predictable, and effective rate. The use of ultrafiltration therapy in subgroups of patients, such as heart failure and post-cardiac surgery, has demonstrated clinical benefits in treating fluid overload signs and symptoms. In addition to the clinical benefits of ultrafiltration, the therapy provides economic advantages. A recent hospital cost analysis demonstrated a total cost savings of \$3,975, or 14.4%, per patient when using ultrafiltration as compared to diuretic therapy over 90 days.<sup>23</sup>

#### **The Aquadex FlexFlow System**

The Aquadex FlexFlow system is designed and clinically proven to simply, safely, and precisely remove excess fluid (primarily excess salt and water) from patients suffering from fluid overload who have failed diuretic therapy. With the Aquadex FlexFlow system, medical practitioners can specify and control the amount of fluid to be extracted at a safe, predictable, and effective rate. The Aquadex FlexFlow system has been shown to have no clinically significant impact on electrolyte balance, blood pressure or heart rate.<sup>24</sup> Unlike other forms of ultrafiltration, which typically require administration specifically by a nephrologist, the Aquadex FlexFlow system may be prescribed by any physician and administered by a healthcare provider, both of whom have received training in extracorporeal therapies.

#### *Benefits of the Aquadex FlexFlow System*

The Aquadex FlexFlow system offers a safe approach to treating fluid overload and:

- Provides complete control over rate and total volume of fluid removed by allowing a medical practitioner to specify the amount of fluid to be removed from each individual patient;
- Can be performed via peripheral or central venous access;
- Removes isotonic fluid (extracts sodium while sparing potassium and magnesium);<sup>25</sup>
- Following ultrafiltration, neurohormonal activation is reset toward a more physiological condition and diuretic efficacy is restored;<sup>26</sup>
- Provides highly automated operation with only one setting required to begin;
- Utilizes a single-use, disposable auto-loading blood filter circuit that facilitates easy set-up;

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<sup>19</sup> Gheorghiadu M, Filippatos G. Reassessing treatment of acute heart failure syndromes: the ADHERE registry. *Eur Heart J Suppl.* 2005; 7:B13–19.

<sup>20</sup> Felker GM, Lee KL, Bull DA, et al. Diuretic strategies in patients with acute decompensated heart failure. *N Engl J Med.* 2011; 364:797–805.

<sup>21</sup> Costanzo MR, Guglin ME, Saltzberg MT, et al. Ultrafiltration versus intravenous diuretics for patients hospitalized for acute decompensated heart failure. *J Am Coll Cardiol.* 2007; 49(6):675-683.

<sup>22</sup> Agostoni PG, Marenzi GC, Pepi M, et al. Isolated ultrafiltration in moderate congestive heart failure. *J Am Coll Cardiol.* 1993; 21(2):424-431.

<sup>23</sup> Costanza MR, et al. Ultrafiltration vs. Diuretics for the Treatment of Fluid Overload in Patients with Heart Failure: A Hospital Cost Analysis. *Value Health.* 2018; 21 (Suppl 1):S167.

<sup>24</sup> SAFE Trial: Jaski BE, et al. *J Card Fail.* 2003 Jun; 9(3): 227-231; RAPID Trial: Bart BA, et al. *J Am Coll Cardiol.* 2005 Dec 6; 46(11): 2043-2046.

<sup>25</sup> Ali SS, et al. *Congest Heart Fail.* 2009; 15(1):1-4.

<sup>26</sup> Marenzi G, et al. *J Am Coll Cardiol.* 2001 Oct; 38(4): 963-968.



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- The console guides medical practitioner through the setup and operational process; and
- Decreased hospital readmissions and duration resulting in cost savings at 90 days.<sup>27 28</sup>

### *Components of the Aquadex FlexFlow System*

The Aquadex FlexFlow system consists of:

- A console, a piece of capital equipment containing electromechanical pumps and an LCD screen;
- A one-time disposable blood set, an integrated collection of tubing, filter, sensors, and connectors that contain and deliver the blood from and back to the patient; and
- A disposable catheter, a small, dual-lumen extended length catheter designed to access the peripheral venous system of the patient and to simultaneously withdraw blood and return filtered blood to the patient.

The Aquadex Flex Flow blood circuit set is proprietary and the Aquadex FlexFlow system can only be used with the Aquadex blood circuit set. The dual lumen extended length catheter (dELC) is designed for use with the Aquadex FlexFlow system, although it is one of many potential catheter options available to the healthcare provider.

### **Our Market Opportunity**

The Aquadex FlexFlow system is indicated for the treatment of patients suffering from fluid overload who have failed diuretics. We are currently focusing our commercial activities in two primary clinical areas where fluid overload is prevalent: cardiac surgery and other areas of critical care, and heart failure. We are also preparing for commercial activities with pediatric patients, once the anticipated clearance from the U.S. Food and Drug Administration, or FDA, is received.

### *Post-Cardiovascular Surgery and Critical Care*

Cardiac surgeries are commonly performed throughout the world. According to the National Center for Health Sciences, over 7.3 million cardiovascular operations are performed each year in the United States, including an estimated 340,000 coronary-artery bypass grafting (CABG) procedures,<sup>29</sup> 180,000 valve procedures<sup>30</sup>, and 3,000 ventricular assist device (VAD) implants<sup>31</sup>. Cardiac surgery is associated with a degree of fluid overload due to cardio pulmonary bypass. Cardio pulmonary bypass often requires a physician to administer a high volume of pre- and post-operative fluids (e.g. cardio pulmonary bypass pumps prime fluid, fluid used for cardioplegia, other fluids administered to address hypotension or post-operative crystalloid). Fluid overload in post-cardiac surgery can readily occur because surgery can affect the pumping actions of the heart, leading to postoperative hemodynamic instability. The condition often remains symptomless for several days until clinical symptoms become apparent, when treatment is almost always too late and ineffective.<sup>32</sup>

The potential complications (e.g. renal failure, stroke, infection, arrhythmias, or prolonged intubation) are reported to be associated with high mortality, particularly when renal replacement therapy is required. Major complications after cardiac operations are associated with an increased risk for operative death, longer hospital length of stay, and higher rates of discharge to a location other than home.<sup>33</sup> Readmissions are a common problem in cardiac surgery and remain high. Approximately 20% of patients who undergo cardiac operations require readmission, an outcome with significant health economic implications. Volume overload was among the top three most prevalent causes for first readmission within 30 days and beyond 30 days.<sup>34</sup> It is estimated that 13.5% of post cardiac surgery patients are readmitted due to fluid overload within 30 days of discharge, which equates to an

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<sup>27</sup> Costanzo MR, et al. J Am Coll Cardiol. 2005 Dec 6; 46(11): 2047-2051.

<sup>28</sup> Costanzo MR, et al. Ultrafiltration v. Diuretics for the Treatment of Fluid Overload in Patients with Heart Failure: A Hospital Cost Analysis. Poster presented at the ISPOR meeting, May 23, 2018, Baltimore, MD, USA.

<sup>29</sup> <https://idataresearch.com/new-study-shows-approximately-340000-cabg-procedures-per-year-in-the-united-states/>.

<sup>30</sup> <https://idataresearch.com/over-182000-heart-valve-replacements-per-year-in-the-united-states/>.

<sup>31</sup> Grand View Research. Market Research Report. 2015; 978-1-68038-603-5.

<sup>32</sup> Xu J, Shen B, Fang Y, et al. Postoperative fluid overload is a useful predictor of the short-term outcome of renal replacement therapy for acute kidney injury after cardiac surgery. Medicine. 2015;94(33):e1360.

<sup>33</sup> Crawford TC, Magnuder JT, Grimm JC, et al. Complications after cardiac surgery: All are not created equal. Ann Thorac Surg. 2017;103:32-40.

<sup>34</sup> Iribane A, Chang H, Alexander Jh, et al. Readmissions after cardiac surgery: Experience of the national institutes of health/Canadian institutes of health research cardiothoracic surgical trials network. Ann Thorac Surg. 2014;98:1274-80.

estimated 70,000 fluid overload-related readmissions for CABG, valve, and VAD procedures per year in the United States.<sup>35</sup> In addition to reducing readmissions, we believe that managing the patient's fluid shortly after cardiac surgery may lessen the time that a patient is in the intensive care unit, allowing the patient to transfer to a more comfortable and less expensive area of the hospital.

Similar to cardiac surgery, patients may suffer from fluid overload in connection with other critical care procedures, such as organ transplants, extra corporeal membrane oxygenation (ECMO) therapy, dialysis, and treatment for sepsis and severe burns. The potential complications (e.g. renal failure, infection, or prolonged intubation) are reported to be associated with high mortality, particularly when renal replacement therapy is required. Many patients are fluid overloaded following a transplant procedure and require treatment to achieve fluid balance. Hospitals are currently using ultrafiltration in connection with organ transplant procedures.

### *Heart Failure*

Heart failure is one of the leading causes of death in the United States and other developed countries. In fact, approximately 50% of patients who develop heart failure die within five years of diagnosis. Based on data from the National Health and Nutrition Examination Survey conducted by the Centers for Disease Control and Prevention/National Center for Health Statistics from 2011 to 2014, the American Heart Association estimates that 6.5 million people in the United States, age 20 and over, had heart failure.<sup>36</sup> Based on the Atherosclerosis Risk in Communities Study from 2005 to 2013, conducted by the National Heart, Lung and Blood Institute, there are an estimated 960,000 new heart failure cases annually.<sup>37</sup> Annual hospitalizations for heart failure exceed one million in both the United States and Europe, and more than 90% are due to symptoms and signs of fluid overload.<sup>38</sup> In addition, approximately 68% of patients are discharged with sub-optimal results.<sup>39</sup> As such, there are over 600,000 heart failure patients in the United States who might benefit from new technologies to treat fluid overload.

Heart failure is a progressive disease caused by impairment of the left side of heart's ability to pump blood to the various organs of the body. Patients with heart failure commonly experience shortness of breath, fatigue, difficulty exercising and swelling of the legs. The heart becomes weak or stiff and enlarges over time, making it harder for the heart to pump the blood needed for the body to function properly. The severity of heart failure depends on how well a person's heart pumps blood throughout the body.

According to a nationwide study of over 140,000 patients suffering from acute decompensated heart failure, over 38% of patients discharged were still symptomatic and about half of the patients were discharged with less than five pounds lost.<sup>40</sup> This clinical evidence from the ADHERE Registry clearly shows patients are discharged too early, while still showing evidence of fluid overload.

By not truly addressing the fluid overload problem, patients are being readmitted to the hospital too frequently, with 30-day readmissions of 25% and 6-month readmissions of 50%, while 78% of patients are admitted directly to the Emergency Department as the first point of care.<sup>41 42</sup>

Heart failure often requires inpatient treatment and it carries a huge economic burden in the United States, costing the nation an estimated \$60.2 billion each year with hospital costs accounting for 62% of the economic burden.<sup>43</sup> As the population ages, healthcare expenditures are expected to increase substantially.<sup>44</sup> Therefore, therapies aimed at treating congestion and fluid overload are essential from a patient care and health economic perspective.

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<sup>35</sup> Iribarne A, et al. *Ann Thorac Surg.* 2014 Oct; 98(4): 1274-80.

<sup>36</sup> Benjamin EJ, et al. on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2017 update: a report from the American Heart Association. *Circulation.* 2017;135:00-00. (e378).

<sup>37</sup> Benjamin EJ, et al. on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2017 update: a report from the American Heart Association. *Circulation.* 2017;135:00-00. (e378).

<sup>38</sup> Costanzo MR, et al. *J Am Coll Cardiol.* 2017; 69(19): 2428-45.

<sup>39</sup> Testani JM, et al. *Circ Heart Failure.* 2016;9(1).

<sup>40</sup> ADHERE Scientific Advisory Committee. ADHERE Final Cumulative National Benchmark Report. Mountain View, CA: Scios Inc.; 2006.

<sup>41</sup> Costanzo MR, et al. *J Am Coll Cardiol.* 2017; 69(19): 2428-2445.

<sup>42</sup> Krumholz HM et. al. *Arch Intern Med.* 1997 Jan 13;157(1): 99-104—Ross JS, et al. *Circ Heart Fail.* 2010 Jan; 3(1): 97-103.

<sup>43</sup> Voigt J, John S, Taylor A, Krucoff M, Reynolds M, Gibson CM. A Reevaluation of the costs of heart failure and its implications for allocation of health resources in the United States. *Clin Cardiol.* 2014;37(5): 312–321.

<sup>44</sup> Heidenreich PA, Albert NM, Allen LA, et al. Forecasting the impact of heart failure in the United States: a policy statement from the American Heart Association. *Circ Heart Fail.* 2013;6(3):606-619.

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To remove the excess fluid, patients suffering from heart failure may receive ultrafiltration therapy in two settings: (i) *inpatient care*: provided to a patient admitted to a hospital, extended care facility, nursing home or other longer-term care facility; and (ii) *outpatient care*: provided to a patient who is not admitted to a facility, but receives treatment at a doctor's office, clinic, or hospital outpatient department.

Hospitals in the United States also face potential penalties for heart failure readmissions. As part of the Affordable Care Act of 2012, Medicare instituted the Hospital Readmissions Reduction Program (HRRP), which penalizes hospitals with high 30-day readmission rates for heart failure and other common diseases and procedures. This penalty can be as high as 3% of reimbursement for all Medicare admissions. Technologies that help reduce readmissions, such as the Aquadex FlexFlow system, can help hospitals mitigate these penalties.

### *Pediatrics*

Many of the conditions and procedures faced by adult patients also occur in pediatric patients, such as cardiac surgery, organ transplants, heart failure and extracorporeal membrane oxygenation (ECMO) therapy. Similar to adult patients, these conditions and procedures may lead to fluid overload. While incidence data is not readily available, it is estimated that there are approximately 10,000 to 14,000 pediatric patients with heart failure<sup>45</sup> and approximately 18,000 receiving cardiac surgery, ECMO therapy, and solid organ transplantation.<sup>46, 47, 48</sup> In addition to these conditions, babies born prematurely may not have functioning kidneys and need kidney replacement therapy for survival. It is estimated that approximately 11,000 newborn babies require neonatal kidney replacement therapy each year in the U.S.<sup>49</sup>

### **Our Strategy**

Our vision is to change the lives of patients suffering from fluid overload through science, collaboration, innovation. We provide healthcare professionals with a reliable and sophisticated, yet easy to use, mechanical pump and filter system to remove excess fluid in fluid overloaded patients. We believe that our technology will provide a competitive advantage in the fluid management market by providing improved clinical benefits and reducing the cost of care relative to other treatment alternatives.

Our strategic focus is to demonstrate a strong business model by driving revenue growth. Growing revenue is the key metric employees, shareholders and potential investors will use to judge our performance. Our field-based employees include both sales representatives and clinical specialists in 13 sales territories in the U.S. We also have distribution agreements in several countries in Europe and Asia. We intend to focus on the acute needs of fluid overloaded patients in cardiac surgery and other areas of critical care, while continuing to support heart failure patients in the inpatient setting, and eventually the outpatient setting. Once we receive the anticipated clearance from the FDA, which is expected in the first quarter of 2020, we intend to expand our commercialization efforts to treatments for pediatric patients.

*Post Cardiac Surgery and Critical Care*: At the end of the third quarter of 2018, we launched a marketing campaign focused on the benefits of the Aquadex FlexFlow system in treating patients suffering from fluid overload following cardiac surgery procedures, such as CABG, valve repairs and replacements procedures, VAD implants and other cardiac surgical procedures. In September 2019, we realigned our sales force to further focus on the acute needs of fluid overloaded patients in cardiac surgery and other areas of critical care, such as organ transplantation. We believe that we will continue to grow revenue in this faster growing segment of our business by leveraging the synergies between heart failure cardiologists and cardiovascular surgeons, traditional technology adoption rates of cardiac surgeons, and product purchase cycle of the cardiac surgical and other critical care centers at large hospitals.

*Pediatrics*: In September 2019, the Company submitted an application to the FDA requesting for 510(k) clearance of the Aquadex FlexFlow system to include pediatric patients who weigh 20kg or more. Currently, our Aquadex FlexFlow system is not recommended for use in pediatric patients. Therefore, we do not devote commercialization resources toward, nor promote, the use of the Aquadex FlexFlow system in pediatric patients. However, based on their clinical expertise and medical judgement, physicians are permitted to prescribe the Aquadex FlexFlow system for use in pediatric patients. We believe that Aquadex FlexFlow system is currently being prescribed

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<sup>45</sup> Jayaprasad. Heart Views. 2016 Jul-Sep; 17(3): 92-99.

<sup>46</sup> <https://www.cdc.gov/ncbddd/heartdefects/data.html>.

<sup>47</sup> Karamlou T, et al. J Thorac Cardiovasc Surg. 2013 Feb;145(2):470-5. doi: 10.1016/j.jtcvs.2012.11.037. Epub 2012 Dec 14.

<sup>48</sup> <https://www.organdonor.gov/about/donors/child-infant.html>.

<sup>49</sup> <https://www.ncbi.nlm.nih.gov/pubmed/23833312>

by physicians to treat various conditions in pediatric patients, including heart failure, cardiac surgery<sup>50</sup>, extracorporeal membrane oxygenation (ECMO) therapy<sup>51</sup>, solid organ transplantation<sup>52</sup>, and kidney replacement therapy for neonatal patients. Based on submitting our application in September 2019, we anticipate receiving clearance from the FDA in early 2020. It is possible that the FDA requires additional testing prior to clearance of the modification to our indication for pediatric use or does not clear the modification at all. If we receive FDA clearance for an update to the product label, we intend to expand our commercialization efforts to include promotion to physicians and hospitals who treat this pediatric population. We expect to evaluate improvements to the Aquadex FlexFlow system to address the needs of the pediatric population.

*Heart Failure In-Patients:* Heart failure patients suffering from fluid overload may be treated in an inpatient setting, such as a hospital, extended care facility or nursing home. Historically, our commercial efforts have been primarily focused on use of the Aquadex FlexFlow system in the inpatient setting in large hospital accounts. We intend to continue to support our sales efforts on inpatient facilities, leveraging the clinical benefits and economic advantages of using the Aquadex FlexFlow system over diuretic therapy.

*Heart Failure Out-Patients:* Further, we intend to expand the use of the Aquadex FlexFlow system with heart failure patients in the outpatient setting, such as a clinic or hospital outpatient department (e.g. observation unit). While currently not reimbursed by Medicare and private payors, outpatient clinics are still using the Aquadex FlexFlow system to treat patients suffering from fluid overload because it can be a financial benefit to use the Aquadex FlexFlow system without reimbursement rather than to incur Medicare penalties for readmission into the inpatient setting. We are supporting the development of new evidence regarding the economic impact of ultrafiltration in the outpatient setting, including a clinical study on outpatient use that was initiated by the Department of Veterans Affairs Medical Center in Tampa, Florida in the fourth quarter of 2019. We plan to use such new evidence to seek reimbursement and gain broader adoption of the Aquadex FlexFlow system in the outpatient market.

Outside of the United States, we plan to continue to establish partnerships for the distribution of the Aquadex FlexFlow system. We currently have distribution relationships in Brazil, Germany, Greece, Hong Kong, India, Italy, Singapore, Spain, Thailand and the United Kingdom.

Besides driving near term revenue growth through sales of the Aquadex FlexFlow system, we intend to develop product enhancements to improve performance and customer satisfaction. We have projects designed to improve venous access for the Aquadex FlexFlow catheter and enhance the functionality of the hematocrit sensor that is part of the Aquadex FlexFlow console. We also are collaborating with partners to evaluate diagnostic tools for physicians to use during an aquapheresis therapy to more precisely determine the amount of excess fluid to be removed, the rate of ultrafiltration, and when to stop therapy as dry weight is approached. As we expand our commercialization efforts in the pediatric market, following FDA clearance, we expect to evaluate improvements to the Aquadex FlexFlow system to address the needs of the pediatric population.

## **Sales and Marketing**

As of December 31, 2019, we had 37 full-time employees in sales and marketing. Our U.S. sales force includes account managers in 13 territories, as well as field clinical specialists who provide training, technical and other support services to our customers. Following the acquisition of the Aquadex Business from Baxter in August 2016, our direct sales force was focused initially on re-engaging hospital accounts that ordered Aquadex FlexFlow blood sets in prior years, re-educating customers on the therapy, and assessing each hospital's use of the Aquadex FlexFlow system to gain additional opportunity for increased utilization, primarily in heart failure. In 2018, we expanded our commercialization efforts to include post-cardiac surgery. In September 2019, we realigned our sales force to further focus on the acute needs of fluid overloaded patients in cardiac surgery and other areas of critical care, such as organ transplantation, while still supporting heart failure.

In the United States, our target customers for the Aquadex FlexFlow system include health care systems and academic hospitals specializing in advanced treatment of chronic heart failure and/or cardiac surgery, other hospitals with heart failure related admissions and/or who perform cardiac surgery operations and clinical practices with heart failure or cardiac surgery programs. Our largest customer represented 10.1% of our 2018 annual revenue. The loss of this customer would have a material adverse effect on our revenue.

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<sup>50</sup> Hazle M, et al. *Pediatr Crit Care Med*. 2013 January; 14(1): 44–49. doi:10.1097/PCC.0b013e3182712799.

<sup>51</sup> Selewski DT, et al. *Crit Care Med*. 2012 September; 40(9): 2694–2699. doi:10.1097/CCM.0b013e318258ff01.

<sup>52</sup> Florescu DF, et al. *Pediatr Infect Dis J*. 2015 Jan; 34(1):47-51. doi: 10.1097/INF.0000000000000487.

Outside of the United States, our Aquadex FlexFlow system is sold by independent specialty distributors who in turn sell to hospitals and clinics in their geographic regions. We currently have distribution relationships in Brazil, Germany, Greece, Hong Kong, India, Italy, Singapore, Spain, Thailand and the United Kingdom. We intend to continue to establish distribution partners in additional countries outside of the United States.

### **Clinical Experience**

Several large-scale, multi-center, randomized, controlled trials have evaluated the use of ultrafiltration using the Aquadex FlexFlow system patients in patients with acute decompensated heart failure compared to standard-of-care treatment with intravenous diuretics. These trials followed early-stage studies which primarily focused on safety of ultrafiltration treatment with the Aquadex FlexFlow system.

The UNLOAD trial enrolled 200 patients and showed that average weight and fluid loss were greater in the ultrafiltration group 48 hours following randomization. No differences were noted in symptoms of dyspnea between the groups. In addition, through 90 days of follow-up, the ultrafiltration group experienced fewer re-hospitalizations for heart failure, while renal function assessed by serum creatinine level was not significantly different between the groups.

The CARRESS trial studied 188 randomized acute decompensated heart failure patients over the course of 96 hours and found no difference in weight loss and an increase in creatinine level relative to the control group treated with intravenous diuretics. The creatinine increase was interpreted as a sign of potential worsening renal function in the ultrafiltration group. Results of CARRESS have been criticized on several grounds, particularly that trial results were impacted by centers unfamiliar with the use of ultrafiltration therapy and that the diuretic regimen employed was not representative of standard-of-care. In addition, a recent analysis of the DOSE trial to explore the putative link between short-term changes in creatinine level and outcome in acute decompensated heart failure has found that the intragroup difference observed in CARRESS does not fall into a range associated with adverse long-term outcomes including death, re-hospitalization or visits to the emergency department. Such events were examined in CARRESS over 60 days and no differences were detected between the groups.

Disparate results between UNLOAD and CARRESS led to initiation of the AVOID-HF trial. AVOID-HF was designed to prospectively address the question of patient outcomes when treated with ultrafiltration versus intravenous diuretics for acute decompensated heart failure. Trial design assumptions indicated that 810 patients would need to be randomized to achieve adequate statistical power. However, the study was terminated at 224 patients for business reasons by Baxter. Despite being underpowered, the results of AVOID-HF indicated distinct trends toward reduced composite heart-failure events in the ultrafiltration group over 90 days. In addition, pre-specified secondary endpoints demonstrated significant reductions in heart failure re-hospitalization at 30 days. No significant differences were observed in creatinine level between the groups, although a trend toward increase may have been present at 48 hours. In totality, AVOID-HF recapitulated the results of both UNLOAD and CARRESS while providing evidence that had AVOID-HF been followed to completion it would likely have met its primary endpoint of improved outcome in acute decompensated heart failure patients.

We anticipate conducting additional clinical studies to provide further evidence of the safety and effectiveness of the Aquadex FlexFlow system and to support obtaining a specific reimbursement code for aquapheresis therapy.

Other uses of ultrafiltration with the Aquadex FlexFlow system have not been studied extensively. Case studies and case series demonstrating the use of ultrafiltration in the maintenance of outpatient heart failure have been published, but there has been no prospective, systematic evaluation of ultrafiltration versus standard-of-care for this population. Other potential uses also largely remain to be formally evaluated.

### **Research and Development**

Research and development costs include activities related to research, development, design, and testing improvements to the Aquadex FlexFlow system and potential related products. The Aquadex FlexFlow system software will require periodic modifications for feature additions and performance improvements. We will make such design changes as needed based on proactive and reactive mechanisms. Research and development costs also include expenses related to clinical research. Currently, we have projects designed to improve venous access for the Aquadex FlexFlow catheter and enhance the functionality of the hematocrit sensor that is part of the Aquadex FlexFlow console. We also evaluating diagnostic tools for physicians to use during an aquapheresis therapy to more precisely determine the amount of excess fluid to be removed, the rate of ultrafiltration, and when to stop therapy as dry weight

is approached. These diagnostic tools include the AcQtrac™ System, which we acquired in August 2018, and diagnostic tools marketed by Daxor Corporation (“Daxor”) and NI Medical, Inc. In of the fourth quarter of 2019, we initiated a clinical evaluation of Daxor’s BVA-100 and the Aquadex FlexFlow system, and if successful, we may initiate a co-marketing arrangement with Daxor in 2020. As we expand our commercialization efforts in the pediatric market, following FDA clearance, we expect to evaluate improvements to the Aquadex FlexFlow system to address the needs of the pediatric population. In the future, we also may sponsor or conduct additional clinical research related to the Aquadex FlexFlow system to enhance understanding of the product and its use.

### **Manufacturers and Suppliers**

We manufacture the Aquadex FlexFlow system at our 23,000 square foot facility in Eden Prairie, Minnesota. Following the acquisition of the Aquadex Business in 2016, Baxter manufactured and supplied the Aquadex FlexFlow blood circuit sets and Aquadex FlexFlow catheters. We transferred manufacturing equipment for the Aquadex Business to our manufacturing facility in July 2017. We began manufacturing Aquadex FlexFlow consoles and blood circuits in-house in the fourth quarter of 2017 and Aquadex FlexFlow catheters in-house in the third quarter of 2018. We purchase parts and components for the Aquadex FlexFlow system from third-party manufactures and suppliers. We believe that our current manufacturing facility is suitable and adequate to meet anticipated manufacturing demands, and that, if necessary, suitable additional or substitute space will be available to accommodate expansion of our operations.

### **Intellectual Property**

We have established an intellectual property portfolio through which we seek to protect our system and technology. In connection with our acquisition of the Aquadex Business, we entered into a patent license agreement with Baxter pursuant to which we obtained, for no additional consideration, a world-wide license to 49 exclusively licensed and 9 non-exclusively licensed patents used in connection with the Aquadex FlexFlow system to make, have made, use, sell, offer for sale and import, the Aquadex FlexFlow system in the “field of use.” The license is exclusive, with respect to some patents, and non-exclusive, with respect to other patents. Under the patent license agreement, Baxter has agreed to use commercially reasonable efforts to continue maintenance of seven “required maintenance patents,” and we have agreed to reimburse Baxter for all fees, costs, and expenses (internal or external) incurred by Baxter in connection with such continued maintenance. The rights granted to us under the patent license agreement will automatically revert to Baxter in the event we cease operation of the Aquadex Business or we file for, have filed against us, or otherwise undertake any bankruptcy, reorganization, insolvency, moratorium, or other similar proceeding. We estimate that the patents licensed from Baxter will expire between approximately 2020 and 2025.

We have four patent applications pending with the United States Patent and Trademark Office. The first application is based on our design for a wearable device designed to assist in maintaining peripheral venous blood flow access in the arm during aquapheresis treatment. The second application includes multiple potential new features and improvements to the diagnostic and ultrafiltration capabilities of the Aquadex FlexFlow system, which, to the extent incorporated into the product, would be designed to help patient fluid balance and to improve usability for healthcare providers. The third application involves a vacuum pump-controlled garment to increase vein diameter and venous flow for peripheral ultrafiltration. The fourth application involves plasma and blood volume measurement during ultrafiltration therapy.

In addition, as of December 31, 2019, we owned 36 issued patents and two pending patent applications in the United States and in foreign jurisdictions related to our C-Pulse System and had one pending application for neuromodulation. We estimate that most of our currently issued U.S. patents will expire between approximately 2021 and 2027. Given the strategic refocus away from C-Pulse and towards the Aquadex FlexFlow system, we have chosen to limit the maintenance of issued C-Pulse related patents to those innovations that are of the highest value. Further, we have elected to emphasize a few of the most critical jurisdictions rather than maintain the earlier approach that involved multiple countries. Our pending and future patent applications may not issue as patents or, if issued, may not issue in a form that will provide us any financial return. Even if issued, existing or future patents may be challenged, narrowed, invalidated or circumvented, which could limit our ability to obtain commercial benefits from them.

We have developed technical knowledge that, although non-patentable, we consider to be significant in enabling us to compete. It is our policy to enter into confidentiality agreements with each of our employees and consultants prohibiting the disclosure of any confidential information or trade secrets. In addition, these agreements provide that any inventions or discoveries by employees and consultants relating to our business will be assigned to us and become our sole property.

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Despite our patent rights and policies with regard to confidential information, trade secrets and inventions, we may be subject to challenges to the validity of our patents, claims that our system infringes the patent rights of others and the disclosure of our confidential information or trade secrets. These and other risks are described more fully under the heading “Risk Factors—Risks Relating to our Intellectual Property”.

At this time we are not a party to any material legal proceedings that relate to patents or proprietary rights.

### **Competition**

Competition from medical device companies and medical device divisions of health care companies, pharmaceutical companies and gene- and cell-based therapies is intense and expected to increase. The vast majority of patients with fluid overload receive pharmacological treatment (diuretics) as a standard of care. There are no direct competitors for the Aquadex FlexFlow system in the U.S., other than diuretics. Other systems, such as Baxter’s Prismaflex, a filter-based device that is approved for continuous renal replacement therapy for patients weighing 20kg or more with acute renal failure and/or fluid overload, represent indirect competitors, as they can also be used to conduct ultrafiltration.

Our ability to compete effectively depends upon our ability to demonstrate the advantages of ultrafiltration as compared to diuretics, a pharmacological treatment that is currently the standard of care. In addition, we need to distinguish Aquadex FlexFlow system from the indirect competition of other devices that can also be used to conduct ultrafiltration.

### **Third-Party Reimbursement**

In the United States, the Aquadex FlexFlow products are purchased primarily by customers, such as hospitals or other health care providers. Customers bill various third-party payers for covered Aquadex FlexFlow services provided to patients. These payers, which include federal health care programs (e.g., Medicare and Medicaid), state health care programs, private health insurance companies, and managed care organizations, then reimburse our customers based on established payment formulas that take into account part or all of the cost associated with these devices and the related procedures performed.

While the agency responsible for administering the Medicare program, the Centers for Medicare and Medicaid Services has not issued a favorable national coverage determination under its Investigational Device Exception Studies Program for ultrafiltration using the Aquadex FlexFlow system, a number of private insurers have approved reimbursement for Aquadex FlexFlow products use for specific indications and points of service. In addition, patients and providers may seek insurance coverage on a case-by-case basis. We are exploring the ability to increase the range of coverage for uses of Aquadex FlexFlow therapies, such as use in the outpatient setting and other indicated uses under its approved labeling.

Legislative proposals can substantially change the way health care is financed by both governmental and private insurers and may negatively impact payment rates for our system. Also, from time to time, there are a number of legislative, regulatory and other proposals both at the federal and state levels that may impact payment rates for our system. It remains uncertain whether there will be any future changes that will be proposed or finalized and what effect, if any, such legislation or regulations would have on our business. However, in the United States and international markets, we expect that both government and third-party payers will continue to attempt to contain or reduce the costs of health care by challenging the prices charged, or deny coverage, for health care products and services.

### **Government Regulations**

Regulation by governmental authorities in the United States and foreign countries is a significant factor in the manufacture and marketing of our current system and any future products and in our ongoing research and development activities. In particular, medical devices are subject to rigorous preclinical testing as a condition of approval by the FDA and by similar authorities in foreign countries. Any proposed products will require regulatory approval prior to commercialization.

#### ***United States***

The Federal Food, Drug, and Cosmetic Act (“FDC Act”) and the FDA’s implementing regulations govern medical device design and development, preclinical and clinical testing, premarket clearance or approval, registration and listing, manufacturing, labeling, storage, advertising and promotion, sales and distribution, export and import,

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and post market surveillance. Medical devices and their manufacturers are also subject to inspection by the FDA. The FDC Act, supplemented by other federal and state laws, also provides civil and criminal penalties for violations of its provisions. We manufacture and market medical devices that are regulated by the FDA, comparable state agencies and regulatory bodies in other countries.

Unless an exemption applies, each medical device we wish to commercially distribute in the U.S. will require marketing authorization from the FDA prior to distribution. The two primary types of FDA marketing authorization are premarket notification (also called 510(k) clearance) and premarket approval (PMA). The type of marketing authorization applicable to a device—510(k) clearance or PMA—is generally linked to classification of the device. The FDA classifies medical devices into one of three classes (Class I, II or III) based on the degree of risk the FDA determines to be associated with a device and the extent of control deemed necessary to ensure the device’s safety and effectiveness. Devices requiring fewer controls because they are deemed to pose lower risk are placed in Class I or II. Class I devices are deemed to pose the least risk and are subject only to general controls applicable to all devices, such as requirements for device labeling and adherence to the FDA’s current good manufacturing practice requirements, as reflected in its Quality System Regulation (QSR). Class II devices are intermediate risk devices that are subject to general controls and may also be subject to special controls such as performance standards, product-specific guidance documents, special labeling requirements, patient registries or post market surveillance. Class III devices are those for which insufficient information exists to assure safety and effectiveness solely through general or special controls, and include life-sustaining, life-supporting or implantable devices, and devices not “substantially equivalent” to a device that is already legally marketed.

Most Class I devices and some Class II devices are exempted by regulation from the 510(k) clearance requirement and can be marketed without prior authorization from FDA. Class I and Class II devices that have not been exempted are eligible for marketing through the 510(k) clearance pathway. By contrast, devices placed in Class III generally require PMA prior to commercial marketing. The PMA process is generally more stringent, time-consuming and expensive than the 510(k) clearance process.

*510(k) Clearance.* To obtain 510(k) clearance for a medical device, an applicant must submit a premarket notification to the FDA demonstrating that the device is “substantially equivalent” to a predicate device legally marketed in the United States. A device is substantially equivalent if, with respect to the predicate device, it has the same intended use and has either (i) the same technological characteristics or (ii) different technological characteristics and the information submitted demonstrates that the device is as safe and effective as a legally marketed device and does not raise different questions of safety or effectiveness. A showing of substantial equivalence sometimes, but not always, requires clinical data. Generally, the 510(k) clearance process can exceed 90 days and may extend to a year or more.

After a device has received 510(k) clearance for a specific intended use, any modification to that device that could “significantly affect its safety or effectiveness,” such as a significant change in the design, materials, method of manufacture or which results in “major change” to the intended use, will require a new 510(k) clearance or PMA (if the device as modified is not substantially equivalent to a legally marketed predicate device). The determination as to whether new authorization is needed is initially left to the manufacturer; however, the FDA may review this determination to evaluate the regulatory status of the modified product at any time and may require the manufacturer to cease marketing the modified device until 510(k) clearance or PMA is obtained. The manufacturer may also be subject to significant regulatory fines or penalties.

The Aquadex FlexFlow system was granted FDA 510(k) clearance for commercial use on June 3, 2002. Additional 510(k) clearances have been received for the Aquadex FlexFlow system in subsequent years. In September 2019, we submitted an application to the FDA requesting for 510(k) clearance of the Aquadex FlexFlow system to include pediatric patients who weigh 20kg or more. We anticipate receiving clearance from the FDA in early 2020. It is possible that the FDA requires additional testing prior to clearance of the modification to our indication for pediatric use or does not clear the modification at all.

*Clinical Trials.* To obtain FDA approval to market certain devices, clinical trials may be required to support a PMA application. We previously were conducting clinical trials for the C-Pulse System that were halted. We are currently not conducting any clinical trials; however, it is possible that we may need to conduct clinical trials in the future if we develop enhancements to, or expand the approved indication of, the Aquadex FlexFlow system or we acquire additional products that require a clinical trial. Clinical trials generally require submission of an application



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for an Investigational Device Exemption (IDE) to the FDA prior to commencing the trial. FDA approval of an IDE allows clinical testing to go forward, but does not bind the FDA to accept the results of the trial as sufficient to prove the product's safety and efficacy, even if the trial meets its intended success criteria.

All clinical trials must be conducted in accordance with regulations and requirements collectively known as Good Clinical Practice. Good Clinical Practices include the FDA's IDE regulations, which describe the conduct of clinical trials with medical devices. They also prohibit promotion, test marketing or commercialization of an investigational device and any representation that such a device is safe or effective for the purposes being investigated. Good Clinical Practices also include the FDA's regulations for institutional review board approval and for protection of human subjects (such as informed consent), as well as disclosure of financial interests by clinical investigators. Required records and reports are subject to inspection by the FDA.

The results of clinical testing may be unfavorable or, even if the intended safety and efficacy success criteria are achieved, may not be considered sufficient for the FDA to grant approval or clearance of a product. The commencement or completion of any clinical trials may be delayed or halted, or be inadequate to support approval of a PMA application or clearance of a premarket notification for numerous reasons.

*Continuing Regulation.* After a device is cleared or approved for use and placed in commercial distribution, numerous regulatory requirements continue to apply. These include:

- establishment registration and device listing upon the commencement of manufacturing;
- the QSR, which requires manufacturers, including third-party manufacturers, to follow design, testing, control, documentation and other quality assurance procedures during medical device design and manufacturing processes;
- labeling regulations, which prohibit the promotion of products for unapproved or "off-label" uses and impose other restrictions on labeling and promotional activities;
- medical device reporting regulations, which require that manufacturers report to the FDA if a device may have caused or contributed to a death or serious injury or malfunctioned in a way that would likely cause or contribute to a death or serious injury if malfunctions were to recur;
- corrections and removal reporting regulations, which require that manufacturers report to the FDA field corrections; and
- product recalls or removals if undertaken to reduce a risk to health posed by the device or to remedy a violation of the FDC Act caused by the device that may present a risk to health.

In addition, the FDA may require a company to conduct post market surveillance studies or order it to establish and maintain a system for tracking its products through the chain of distribution to the patient level.

Failure to comply with applicable regulatory requirements, including those applicable to the conduct of clinical trials, can result in enforcement action by the FDA, which may lead to any of the following sanctions:

- warning letters or untitled letters;
- fines, injunctions and civil penalties;
- product recall or seizure;
- unanticipated expenditures;
- delays in clearing or approving or refusal to clear or approve products;
- withdrawal or suspension of FDA approval;
- orders for physician notification or device repair, replacement or refund;
- operating restrictions, partial suspension or total shutdown of production or clinical trials; or
- criminal prosecution.

We and our contract manufacturers are also required to manufacture our products in compliance with Current Good Manufacturing Practice requirements set forth in the QSR. The QSR requires a quality system for the design, manufacture, packaging, labeling, storage, installation and servicing of marketed devices, and includes extensive

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requirements with respect to quality management and organization, device design, buildings, equipment, purchase and handling of components, production and process controls, packaging and labeling controls, device evaluation, distribution, installation, complaint handling, servicing and record keeping. The FDA enforces the QSR through periodic announced and unannounced inspections that may include the manufacturing facilities of subcontractors. If the FDA believes that we or any of our contract manufacturers is not in compliance with these requirements, it can shut down our manufacturing operations, require recall of our products, refuse to clear or approve new marketing applications, institute legal proceedings to detain or seize products, enjoin future violations or assess civil and criminal penalties against us or our officers or other employees. Any such action by the FDA would have a material adverse effect on our business.

### ***European Union***

In order to import and sell our products in member countries of the European Union, or EU, medical devices currently must comply with the essential requirements of the European Union Medical Devices Directive (Council Directive 93/42/EEC). Compliance with these requirements is a prerequisite to be able to affix the Conformité Européene, or CE, Mark to our products, without which they cannot be sold or marketed in the EU. To demonstrate compliance with the essential requirements we must undergo a conformity assessment procedure, which varies according to the type of medical device and its classification. Except for low-risk medical devices (Class I non-sterile, non-measuring devices), where the manufacturer can issue an EC Declaration of Conformity based on a self-assessment of the conformity of its products with the essential requirements of the European Union Medical Devices Directive, a conformity assessment procedure requires the intervention of a Notified Body, an organization accredited by a member state of the EU to conduct conformity assessments. Depending on the relevant conformity assessment procedure, the Notified Body would typically audit and examine the technical file and the quality system for the manufacture, design and final inspection of our devices. The Notified Body issues a certificate of conformity following successful completion of a conformity assessment procedure conducted in relation to the medical device and its manufacturer and their conformity with the essential requirements. This certificate entitles the manufacturer to affix the CE Mark to its medical devices after having prepared and signed a related EC Declaration of Conformity.

Recently, the European Union replaced the Medical Devices Directive (93/42/EEC) (MDD) with the new European Medical Devices Regulation, or MDR. The MDR will apply after a transitional period of three years ending on May 26, 2020. Manufacturers have the duration of the transition period to update their technical documentation and processes to meet the new requirements in order to obtain a CE Mark or to issue an EC Declaration of Conformity. After May 26, 2020, medical devices can still be placed on the market under the provision of the MDD or the Active Implantable Medical Devices Directive (“AIMDD”) 90/385/EEC (hereafter referred to together as “MDD/AIMDD”) until May 27, 2024; provided the CE Mark was issued prior to this date, the manufacturer continues to comply with either one of the directives, and that no significant changes are made in the design and intended purpose of the applicable medical device. By May 27, 2024, all medical devices entering the EU will need to have a new CE Mark under the MDR, even if they have been on the market previously under the MDD/AIMDD.

The CE Mark for Aquadex FlexFlow system had previously expired. We received renewal for the Aquadex FlexFlow circuit in the second quarter of 2019 and expect to receive renewal for the Aquadex FlexFlow console in the first quarter of 2020, which would allow us to import additional console inventory into the EU. We believe that we currently have sufficient product inventory already available for sale in the EU market and the timing of the receipt of the CE Mark will not have a material impact on our revenue.

### **Employees**

As of December 31, 2019, we had 71 full-time employees and no part-time employees. None of our employees are covered by a collective bargaining agreement. We consider relations with our employees to be good.

### **Company History**

Prior to July 2016, we were focused on developing the C-Pulse Heart Assist System for treatment of Class III and ambulatory Class IV heart failure. In August 2016, we acquired the Aquadex Business from a subsidiary of Baxter. In September 2016, we announced a strategic refocus of our strategy that included halting all clinical evaluations of the C-Pulse related technology to fully focus our resources on our recently acquired Aquadex Business. On May 23, 2017, we announced that we were changing our name from Sunshine Heart, Inc. to CHF Solutions, Inc. to more appropriately reflect the direction of our business.

## **Corporate Information**

CHF Solutions, Inc. was incorporated in Delaware on August 22, 2002. We began operating our business in November 1999 through Sunshine Heart Company Pty Limited, which currently is a wholly owned Australian subsidiary of CHF Solutions, Inc. Our common stock began trading on the Nasdaq Capital Market (“Nasdaq”) on February 16, 2012.

Our principal executive offices are located at 12988 Valley View Road, Eden Prairie, Minnesota 55344, and our telephone number is (952) 345-4200. Our website address is [www.chf-solutions.com](http://www.chf-solutions.com). Our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q and Current Reports on Form 8-K and amendments to reports filed or furnished pursuant to Sections 13(a) and 15(d) of the Exchange Act will be made available free of charge on our website as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. These reports are also available on the Securities and Exchange Commission’s website, [www.sec.gov](http://www.sec.gov). The information on, or that may be accessed through, any websites noted herein is not incorporated by reference into and should not be considered a part of this prospectus.

We are, and will remain, a “smaller reporting company” as long as our public float remains less than \$250 million as of the last business day of our most recently-completed second fiscal quarter. A smaller reporting company may take advantage of specified reduced reporting and other requirements that are otherwise applicable generally to U.S. public companies. As long as our public float remains below \$75 million as of the last business day of our most recently completed second fiscal quarter, we are exempt from the attestation requirement in the assessment of our internal control over financial reporting by our independent auditors pursuant to section 404 (b) of the Sarbanes-Oxley Act of 2002 but are required to make our own internal assessment of the effectiveness of our internal controls over financial reporting.

## **Properties**

We lease a 23,000 square foot facility located in Eden Prairie, Minnesota. The lease period commenced December 1, 2011 and extends through March 31, 2022. This facility serves as our corporate headquarters and houses substantially all of our functional areas, including manufacturing. Monthly rent and common area maintenance charges for our headquarters total approximately \$25,000. The lease contains provisions for annual inflationary adjustments.

We believe that our current facilities are suitable and adequate to meet our current needs, and that suitable additional or substitute space will be available as needed to accommodate expansion of our operations.

## **Legal Proceedings**

We are not currently subject to any material pending legal proceedings.

**MANAGEMENT**

**Directors and Executive Officers**

The following table sets forth certain information regarding our directors and executive officers as of December 31, 2019:

<b>Name</b>	<b>Age</b>	<b>Position(s)</b>	<b>Director Class – Term Ending</b>
John L. Erb	70	Chairman of the board of directors, Chief Executive Officer and President	Class III – 2022
Steve Brandt	64	Director	Class I – 2020
Maria Rosa Costanzo	65	Director	Class II – 2021
Jon W. Salvesson	54	Director	Class II – 2021
Gregory D. Waller	70	Director	Class III – 2022
Warren S. Watson	67	Lead Independent Director	Class I – 2020
Claudia Drayton	52	Chief Financial Officer	N/A
Nestor Jaramillo, Jr.	62	Chief Commercial Officer	N/A

Our board of directors is currently composed of six members. Our directors are elected for three-year staggered terms. The two Class I directors will hold office until the 2020 annual meeting of stockholders. The two Class II directors will hold office until the 2021 annual meeting of stockholders. The two Class III directors will hold office until the 2022 annual meeting of stockholders.

Our executive officers are elected by our board of directors and hold office until removed by the board of directors, and until their successors have been duly elected and qualified or until their earlier resignation, retirement, removal, or death.

**Background and Qualifications**

**John L. Erb** has served as chief executive officer and president of the Company since November 2015, as a director of the Company since September 2012 and as Chairman of our board of directors since October 2012. Previously, Mr. Erb served as chief executive officer (from 2007 to 2018) of NuAx, Inc. (formerly Cardia Access, Inc.), a medical device company involved in developing new devices for the treatment of heart disease; he was executive chairman of the board, during 2007, and chief executive officer, from 2001 to 2006, of the previous owner of the Aquadex FlexFlow system, which was also known as CHF Solutions, Inc., a medical device company involved in the development, manufacturing and distribution of devices to treat congestive heart failure; he was president and chief executive officer of IntraTherapeutics, Inc., a medical device company involved in the development, manufacturing and distribution of peripheral vascular stents, from 1997 to 2001; and he held various positions, including as vice president of worldwide operations at Schneider, a division of Pfizer, Inc., from 1991 to 1997. Mr. Erb’s prior board experience includes service as a director of SenoRx, Inc., (a NASDAQ listed company), from December 2001 until its acquisition by C.R. Bard, Inc. in July 2010; service as a director of CryoCath Technologies Inc., a publicly traded Canadian company, from October 2000 until its acquisition by Medtronic plc in November 2008; and service as chairman of the board of Vascular Solutions, Inc., (a NASDAQ listed company), where he also served as chairman of the compensation and nominating and corporate governance committees from October 2002 until its acquisition by Teleflex Incorporated in February 2017. Mr. Erb currently serves as chairman of the board of Osprey Medical, Inc., (listed on the Australian Securities Exchange), where he also serves as a member of the compensation committee and a member of the audit committee, and as a director of Miromatrix. Mr. Erb received a B.A. in business administration, with a concentration in finance, from California State University, Fullerton.

With over 40 years of experience in the medical device industry, including 20 years of experience serving as chief executive officer of medical device companies, Mr. Erb brings to our board of directors valuable business, management and leadership experience, as well as a deep understanding of the challenges presented in growing a medical device company. In addition, his role on the boards of Osprey Medical, Vascular Solutions, SenoRx and CryoCath Technologies has provided him with other public company board experience. Having managed significant operations of a multi-national medical device company, Mr. Erb also contributes valuable private company operational experience.

**Steve Brandt** has served as a director of the Company since February 2017. Mr. Brandt is a senior executive with over 35 years of experience in the healthcare industry. Mr. Brandt was employed by Thoratec Corporation, a medical

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device company, from November 2004 to October 2015, serving as vice president global sales and marketing, vice president of global sales and vice president international sales. Prior to Thoratec, Mr. Brandt was vice president sales & marketing for the previous owner of the Aquadex FlexFlow system, which was also known as CHF Solutions, Inc., from October 2002 to November 2004 and vice president global marketing, Cardiovascular Surgery Division for St. Jude Medical from November 2000 to October 2002. Mr. Brandt received a B.S. from Franklin Pierce College.

Mr. Brandt's qualifications to serve on our board of directors include his extensive experience in the management of medical device companies.

**Maria Rosa Costanzo, M.D.** has served as a director of the Company since September 2019. Dr. Costanzo has served as the medical director, Heart Failure Research, at Advocate Heart Institute, and the medical director for Advanced Heart Failure at Edward Hospital Center in Illinois since 2002. From 1994 until 2001, Dr. Costanzo served as the Medical Director of the Heart Failure/Cardiac Transplant Program at Rush University Medical Center and was the John H. and Margaret V. Krehbiel Professor of Cardiology at the Rush Medical College. From 1988 to 1994, she served as Medical Director of the Loyola University Chicago Heart Failure and Cardiac Transplant Program. From 1995 until 2000, Dr. Costanzo was also the Editor in Chief of the Journal of Heart and Lung Transplantation. In 2002, she was appointed by the Secretary of Health and Human Services to a four-year term on the National Heart, Lung and Blood Institute Advisory Council. Since 2012, Dr. Costanzo has been a member of the American Board of Internal Medicine exam writing committee for the specialty of Advanced Heart Failure and Transplant Cardiology. Dr. Costanzo currently serves on the board of directors for the Heart Failure Society of America. In addition, she is a member of several medical societies and a fellow with the American College of Cardiology, American College of Physicians, American Heart Association, and the European Society of Cardiology, and a Gold Member of the Heart Failure Association of the European Society of Cardiology. She is also a member of the Ordine Dei Medici (The Italian National Medical Professional Association). Dr. Costanzo received her medical degree with honors from Facolta' Di Medicina e Chirurgia dell' Universita' di Bologna in Bologna, Italy.

Dr. Costanzo's qualifications to serve on our board of directors include her years of clinical medical experience in cardiac care, in particular heart failure, including her experiences leading multi-center clinical trials and serving as a board member and fellow on international medical societies.

**Jon W. Salveson** has served as a director of the Company since March 2013. Mr. Salveson is vice chairman, investment banking and chairman of the healthcare investment banking group at Piper Jaffray Companies. He also serves on the board of CryoLife, Inc. a leading medical device company focused on cardiac and vascular surgery. Mr. Salveson joined Piper Jaffray Companies in 1993 as an associate, was elected managing director in 1999, and was named group head of Piper Jaffray's international healthcare investment banking group in 2001. Mr. Salveson was appointed global head of investment banking and a member of the executive committee of Piper Jaffray in 2004 and has served in his present position as vice chairman, investment banking since July 2010. Mr. Salveson started his career as a market manager at Bio-Metrics Systems (now part of Surmodics, Inc.), an innovator in medical device surface modification, where he gained experience working in cardiology and interventional medicine. Mr. Salveson received his undergraduate degree from St. Olaf College and an M.M.M. in finance from the Kellogg Graduate School of Management at Northwestern University.

Mr. Salveson's qualifications to serve on our board of directors include his 20-plus years of experience in healthcare investment banking, advising clients on hundreds of merger and acquisition and financing transactions.

**Gregory D. Waller** has served as a director of the Company since August 2011. Mr. Waller also serves on the boards of directors of Endologix Corporation (a NASDAQ listed company) and Arcadia Bioscience, Inc. (a NASDAQ listed Company), where he also serves as chairman of the audit committee and a member of the nominating and governance committee for both companies. Until April 2015, Mr. Waller was chief financial officer of Ulthera Corporation, a privately held company that sells an ultrasound device used for non-invasive brow lifts, which was sold to Merz North America in July 2014. From March 2006 to April 2011, Mr. Waller was chief financial officer of Universal Building Products, Inc., a manufacturer of concrete construction accessories. Mr. Waller served as vice president of finance, chief financial officer, and treasurer of Sybron Dental Specialties, Inc., a manufacturer and marketer of consumable dental products, from August 1993 until his retirement in May 2005, and was formerly vice president and treasurer of Kerr, Ormco Corporation, and Metrex. Mr. Waller joined Ormco in December 1980 as vice president and controller and served as vice president of Kerr European Operations from July 1989 to August 1993. Mr. Waller received an M.B.A. with a concentration in accounting from California State University, Fullerton. His prior board service includes service as a director for the following companies: Alsuis Corporation (a NASDAQ

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listed company), where he also served as chairman of the audit committee and a member of the compensation committee, from June 2007 until its acquisition by Zoll Medical Corporation in September 2009; Biolase Technology, Inc. (a NASDAQ listed company), where he also served as chairman of the audit committee from October 2009 to August 2010; Cardiogenesis Corporation (a NASDAQ listed company), where he also served as chairman of the audit committee from April, 2007 until its acquisition by Cryolife, in May 2011; Clariant, Inc. (a NASDAQ listed company), where he also served as chairman of the audit committee and a member of the compensation and corporate governance committees, from December 2006 until its acquisition by General Electric Company in December 2010; and SenoRx (a NASDAQ listed company), where he also served as chairman of the audit committee from May 2006 until its acquisition by C.R. Bard, Inc. in July 2010.

Mr. Waller's qualifications to serve on our board of directors include his 45 years of financial and management experience, including his experiences as chief financial officer of Universal Building Products, Sybron Dental Specialties, and Ulthera Inc. as well as his familiarity with public company board functions from his service on the boards of other public companies.

As described above, Mr. Waller served as chief financial officer of Universal Building Products from 2006 to 2011. Universal Building Products filed a voluntary petition for bankruptcy on August 4, 2010. Except as described in the preceding sentence, no other event has occurred during the past 10 years requiring disclosure pursuant to Item 401(f) of Regulation S-K.

**Warren S. Watson** has served as a director of the Company since January 2013. Mr. Watson is an executive with over 40 years of experience in the field of medical devices. Since 2010, Mr. Watson has served on the board of directors for Gillette Children's Specialty Healthcare including as chair of the board from 2015 to 2017. From 1982 to 2014, Mr. Watson served on the board of directors of Citizens Independent Bank of St. Louis Park, Minnesota, a community bank with four branches and \$300 million in assets. From 2010 to 2012, he served as executive chairman of Cameron Health Inc., a medical technology company focused on subcutaneous implantable cardioverter and defibrillator devices. Mr. Watson spent over 33 years, from 1976 to 2009, in various roles of increasing responsibility at Medtronic plc, including: from 1992 to 1995 and from 2000 to 2002, Mr. Watson served as vice president and general manager as Medtronic's ablation business; from 2000 to 2009, Mr. Watson served as vice president of Medtronic's Cardiac Rhythm Management (CRM) Research and Development organization, an organization leading over 1,800 professionals worldwide; and he also served as chair of the Medtronic Corporate Research and Development Council during his tenure as vice president of Research and Development for CRM. From 2002 to 2007, Mr. Watson served as vice president and general manager of the Vitatron pacing business of Medtronic in the Netherlands. Mr. Watson's board service also includes service as a director for the following companies: Bardy Diagnostics since 2017; CardioMems, Inc. from 2004 to 2009; Cardialen, Inc. since 2012; Closys from 2013 to 2016; Mardil, Inc. from 2013 to 2016; and NuAx, Inc. from 2011 to 2016.

Mr. Watson's qualifications to serve on our board of directors include his executive leadership in the field of medical devices, his over 40 years of experience in the medical technology field, his successful development of multiple emerging therapies and his general business experience due to his board service for other medical technology companies.

**Claudia Drayton** has served as our chief financial officer since January 2015. Prior to joining the Company, Ms. Drayton spent 15 years at Medtronic plc, a \$30 billion global leader in the medical device industry. During her tenure at Medtronic, Ms. Drayton held multiple senior managerial finance positions, culminating with an assignment in Europe serving as chief financial officer of the peripheral vascular business from 2012 to 2012 and, most recently, as chief financial person and senior finance director of the integrated health solutions business from 2012 to 2014. In these capacities, her responsibilities and experiences included profitability management, strategic planning, mergers and acquisitions, planning and forecasting, and implementation of financial best practices. Before joining Medtronic, Ms. Drayton was an audit and business advisory manager at Arthur Andersen for seven years. Ms. Drayton received an M.B.A. from the University of Minnesota's Carlson School of Management and a B.S. from the University of Mary Hardin-Baylor and is a Certified Public Accountant (inactive).

**Nestor Jaramillo, Jr.** has served as our chief commercial officer since May 2019. From October 2017 to May 2019, Mr. Jaramillo served as president and chief executive officer of Innerspace Neuro Solutions, Inc., a commercial-stage medical technology company that developed, manufactured and distributed an intracranial pressure monitoring system. From May 2014 to September 2017, Mr. Jaramillo was managing director of healthcare investment banking at Craig-Hallum Capital, based in Minneapolis, Minnesota, and from March 2010 to April 2014,

he was managing director of healthcare investment banking at Cherry Tree & Associates, an investment banking firm in Minneapolis, Minnesota. Mr. Jaramillo has also served in a variety of roles at Transoma Medical from 2007 to 2010, St. Jude Medical from 2006 to 2007, and at Medtronic plc from 1982 to 2006. In these roles, his responsibilities included leading sales and marketing teams both in the United States and internationally, where he spent five years in Europe. Mr. Jaramillo received an M.B.A. from the University of St. Thomas and a B.S. in Electrical Engineering from the University of North Dakota.

## **BOARD MATTERS**

### **General**

Our board of directors has general oversight responsibility for our affairs and, in exercising its fiduciary duties, our board of directors represents and acts on behalf of the stockholders. Although our board of directors does not have responsibility for our day-to-day management, it stays regularly informed about our business and provides oversight and guidance to our management through periodic meetings and other communications. Our board of directors provides critical oversight in our strategic planning process, as well as other functions carried out through our board of directors' committees as described below.

### **Board Leadership Structure**

Mr. Erb, our Chief Executive Officer and President, serves as Chairman of the board of directors, and Mr. Watson, a non-employee independent director, serves as Lead Independent Director. Our board of directors believes that having the Chief Executive Officer also serve as Chairman of the board of directors provides efficiencies and permits a unified strategic vision and clear leadership for the Company as it transitions from a research and development entity to a commercial organization. Our board of directors further believes that the Lead Independent Director role provides independence from management in the operation and governance of the board of directors.

### **Board Involvement in Risk Oversight**

It is the responsibility of management to identify, assess and manage our exposure to risks. Our board of directors plays an important role in overseeing management's performance of these duties as well as the processes and systems we use to identify, prioritize, source, manage and monitor our critical risks. To this end, our board of directors receives regular reports from members of management regarding risks associated with our operations and strategic plans. These reports typically take the form of discussions incorporated into presentations made to our board of directors at regular and special meetings where risks are identified in the context of the matter being discussed. Additionally, at least annually, our board of directors reviews a report presented by management regarding the material risks faced by us, our risk management processes and systems and the adequacy of our policies and procedures designed to respond to and mitigate these risks.

Our board of directors has generally retained the primary risk oversight function and has an active role in overseeing management of our material risks. The oversight of risk is also conducted at the committee level. The Audit Committee oversees the management of financial and internal control risks as well as risks associated with litigation and related party transactions. The Compensation Committee oversees the management of risks relating to our executive compensation plans and arrangements. The Nominating and Corporate Governance Committee oversees the management of risks associated with the composition and independence of the board of directors, compliance with various regulatory and listing standards requirements and succession planning. While each committee is responsible for evaluating and overseeing the management of risks relevant to that particular committee, the full board of directors is regularly informed of the committees' risk oversight activities through committee reports presented at board of directors' meetings.

### **Meetings**

Our board of directors and its committees meet throughout the year on a set schedule, and also hold special meetings and act by written consent from time to time as appropriate. The non-employee directors hold regularly scheduled executive sessions to meet without management present. These executive sessions generally occur around regularly scheduled meetings of the board of directors.

All directors are expected to attend all meetings of our board of directors and of the board of directors' committees on which they serve, as well as the annual meeting of stockholders. Our board of directors met eight times

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during 2019. In 2019, each director attended at least 75% of the aggregate of all meetings of the board of directors and the committees of which he or she was a member. All directors attended the 2019 annual meeting of stockholders, except Dr. Costanzo who was not appointed to our board of directors until after our annual meeting.

### **Board Committees**

Our board of directors has delegated various responsibilities and authority to our board of directors' committees. Each committee has regularly scheduled meetings and reports on its activities to the full board of directors. Each committee operates under a written charter approved by our board of directors, which is reviewed annually by the respective committee and the board of directors. Each committee's charter is posted on our website, [www.chf-solutions.com](http://www.chf-solutions.com), under the "Investors – Corporate Governance" tab. The table below sets forth the current membership for the three board of directors' committees and the number of meetings held for each in 2018.

<b>Director</b>	<b>Audit</b>	<b>Compensation</b>	<b>Nominating and Corporate Governance</b>
Steve Brandt	X	X	
Maria Rosa Costanzo, M.D.			X
John L. Erb			
Jon W. Salveson		Chair	
Gregory D. Waller	Chair	X	X
Warren S. Watson	X		Chair
<b>Meetings in 2019</b>	4	2	2

### **Director Independence**

Our board of directors believes that there should be at least a majority of independent directors on our board of directors. Our board of directors undertakes a review of director independence in accordance with Nasdaq listing rules at least once annually. The independence rules include a series of objective tests, including that the director is not employed by us and has not engaged in various types of business dealings with us. In addition, our board of directors is required to make a subjective determination as to each independent director that no relationships exist which, in the opinion of our board of directors, would interfere with the exercise of independent judgment in carrying out the responsibilities of a director. In making these determinations, our board of directors reviewed and discussed information provided by the directors and us with regard to each director's business and personal activities as they may relate to us and our management. In particular, our board of directors considered that (i) Mr. Watson, in his capacity as Chairman of the Nominating and Corporate Governance Committee, received \$25,000 from the Company in fiscal 2015 as compensation for duties as such committee chairman in connection with the amendment and restatement, implementation and administration of the Company's Code of Business Conduct and Ethics, (ii) Mr. Salveson is an executive officer of Piper Jaffray Companies, the parent company of Piper Jaffray & Co., which served as joint book-running manager for the Company's confidentially marketed public offering that closed on September 24, 2013, and (iii) Mr. Brandt provided consulting services to the Company on an interim basis from February 2019 to May 2019. Our board of directors determined that Mr. Watson continued to satisfy the objective independence tests and that his independence was not otherwise impaired under the subjective criteria, because, among other things, such payment was made to him in his capacity as Chairman of the Nominating and Corporate Governance Committee for services related to such role and the dollar amounts at issue were immaterial. In prior years, our board of directors determined that Mr. Salveson was not an independent director, but in the first quarter of fiscal 2016, our board of directors reassessed Mr. Salveson's independence and determined that he satisfies the objective independence tests and that his independence was not otherwise impaired under the subjective criteria because, among other reasons, the fees paid to Piper Jaffray in connection with the confidentially marketed public offering were well below the threshold dollar amount for payments made to affiliated entities set forth in the objective independence tests and due to the amount of time that has passed since such fees were paid. Our board of directors determined that Mr. Brandt continued to satisfy the objective independence tests and that his independence was not otherwise impaired under the subjective criteria because Mr. Brandt served as a consultant only on a short-term, interim basis for a period of four months and his total compensation was only \$76,000 plus reimbursement of expenses.

Our board of directors has affirmatively determined, after considering all of the relevant facts and circumstances, that all of our directors are independent directors under the applicable rules of Nasdaq, except for Mr. Erb, our current



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Chief Executive Officer and President. Mr. Watson serves as our lead independent director. Each member of the Audit Committee, Compensation Committee and Nominating and Corporate Governance Committee is independent under Nasdaq rules. In addition, our board of directors has affirmatively determined that the members of the Audit Committee and Compensation Committee qualify as independent in accordance with the additional independence rules established by the SEC and Nasdaq.

### **Audit Committee**

The primary purpose of the Audit Committee is to act on behalf of the board of directors in fulfilling the board of directors' oversight responsibilities with respect to the Company's corporate accounting and financial reporting processes; the Company's systems of internal control over financial reporting, including financial disclosure controls and procedures; audits of the Company's consolidated financial statements; the quality and integrity of the Company's consolidated financial statements and reports provided to the Company's stockholders, the SEC and other persons; and the qualifications, independence and performance of the Company's independent registered public accounting firm. To implement this purpose, the committee is charged with the following responsibilities, among others:

- to evaluate the qualifications, performance and independence of our independent registered public accounting firm and to assess the permissibility of and pre-approve all audit and permissible audit-related and non-audit services to be provided by the independent registered public accounting firm;
- to discuss with management and our independent registered public accounting firm any major issues as to the adequacy of our internal control over financial reporting, any actions to be taken in light of significant or material control deficiencies and the adequacy of our disclosures about changes in internal control over financial reporting;
- to establish procedures for the receipt, retention and treatment of complaints regarding accounting, internal control over financial reporting or auditing matters, including the confidential, anonymous submission by employees of concerns regarding questionable accounting or auditing matters;
- to review the consolidated financial statements proposed to be included in our annual report on Form 10-K and recommend to the board of directors whether or not such consolidated financial statements should be so included;
- to prepare the Audit Committee Report required by SEC rules to be included in our annual proxy statement; and
- to review the Company's disclosures in its periodic reports on Form 10-K and Form 10-Q to be filed with the SEC and approve the filing of each such report.

The responsibilities and activities of the committee are described in greater detail in its charter, a copy of which is available on the Company's website at <http://ir.chf-solutions.com/corporate-governance>.

Our board of directors has determined that each Audit Committee member has sufficient knowledge in reading and understanding financial statements to serve on the committee. Our board of directors has further determined that Mr. Waller qualifies as an "audit committee financial expert" in accordance with SEC rules. The designation of an "audit committee financial expert" does not impose upon such person any duties, obligations or liabilities that are greater than those which are generally imposed on him as a member of the committee and the board of directors, and such designation does not affect the duties, obligations or liabilities of any other member of the committee or the board of directors.

### **Compensation Committee**

The primary purpose of the Compensation Committee is to act on behalf of the board of directors in fulfilling the board of directors' responsibilities to oversee our compensation policies, plans and programs, and to review and determine the compensation to be paid to our executive officers. To implement this purpose, the Compensation Committee is charged with the following responsibilities, among others:

- to recommend the compensation and other terms of employment of our Chief Executive Officer to the board of directors for approval and to evaluate the Chief Executive Officer's performance in light of relevant individual and corporate performance goals and objectives;

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- to review and approve the individual and corporate performance goals and objectives of the Company's other executive officers, and to determine and approve the compensation and other terms of employment of such executive officers, considering, among other things, the recommendations of our Chief Executive Officer;
- to review the compensation paid to non-employee directors for their service on the Board and its committees and recommend any appropriate changes to the board of directors for approval;
- to recommend to the board of directors the adoption, amendment and termination of the Company's equity compensation plans and to administer such plans and approve grants and awards as permitted or required under such plans; and
- to evaluate risks associated with and potential consequences of our compensation policies and practices, as applicable to all of our employees.

The Compensation Committee may form and delegate authority to subcommittees as appropriate. The responsibilities and activities of the Compensation Committee are described in greater detail in its charter, a copy of which is available on the Company's website at <http://ir.chf-solutions.com/corporate-governance>.

### **Role of Compensation Consultant**

During fiscal 2019, the Compensation Committee engaged Frederic W. Cook & Co. ("FW Cook") to conduct an assessment of executive officer compensation for fiscal 2020 and advise on employee equity compensation. In connection with such engagement, FW Cook evaluated our executive officers' base salaries, incentive compensation, and total compensation relative to a peer group consisting of 15 companies similar to ours based on industry, market capitalization and revenue.

The Compensation Committee concluded that the advice the Company received from the compensation consultant in 2019 did not raise any conflict of interest, considering the following six factors: (i) the provision of other services to the Company by the consultant; (ii) the amount of fees received from us by the consultant, as a percentage of the total revenue of such consultant; (iii) the policies and procedures of the consultant that are designed to prevent conflicts of interest; (iv) any business or personal relationship of the consultant with a member of the Compensation Committee; (v) any stock of the Company owned by the consultant; and (vi) any business or personal relationship of the consultant with an executive officer of our company.

See "Director Compensation" and "Executive Compensation—Narrative Discussion of Summary Compensation Table for 2019" below for additional information regarding our processes and procedures for consideration and determination of director and executive officer compensation.

### **Nominating and Corporate Governance Committee**

The primary purpose of the Nominating and Corporate Governance Committee is to review the composition and performance of the board of directors and its committees and to oversee all aspects of our corporate governance functions. To implement this purpose, the committee is charged with the following responsibilities, among others:

- to identify, review and evaluate candidates to serve on the board of directors, to review and evaluate incumbent directors, and to recommend to the board of directors nominees for election to the board of directors;
- to monitor the size of the board of directors;
- to review, discuss and assess, on an annual basis, the performance of management and the board of directors, including its committees;
- to recommend to the board of directors, on an annual basis, the chairmanship and membership of each committee, considering the interests, independence and experience of individual directors and the independence and experience requirements of the SEC and Nasdaq; and
- to exercise our general oversight over corporate governance policy matters of the Company, including developing, reviewing and assessing the Corporate Governance Guidelines and recommending appropriate changes to the board of directors for consideration.

The responsibilities and activities of the committee are described in greater detail in its charter, a copy of which is available on the Company's website at <http://ir.chf-solutions.com/corporate-governance>.

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The Nominating and Corporate Governance Committee reviews and makes recommendations to the board of directors, from time to time, regarding the appropriate skills and characteristics required of our board of directors' members in the context of the current make-up of the board of directors, the operations of the Company and the long-term interests of stockholders. The committee does not have a specific diversity policy underlying its nomination process, although it seeks to ensure the board of directors includes directors with diverse backgrounds, qualifications, skills and experience relevant to our business.

In the case of an incumbent director whose term of office is set to expire, the Nominating and Corporate Governance Committee will generally re-nominate incumbent directors who continue to satisfy the committee's criteria for membership on the board of directors, continue to make important contributions to the board of directors and consent to continue their service on the board of directors.

If a vacancy on the board of directors occurs or the board of directors increases in size, the Nominating and Corporate Governance Committee will actively seek individuals that satisfy the committee's criteria for membership on the board of directors and the committee may rely on multiple sources for identifying and evaluating potential nominees, including referrals from our current directors and management. In 2019, the committee did not employ a search firm or pay fees to other third parties in connection with identifying or evaluating board of director nominee candidates.

The Nominating and Corporate Governance Committee will consider recommendations of director nominees by stockholders so long as such recommendations are sent on a timely basis and are otherwise in accordance with our Amended and Restated Bylaws and applicable law.

### Director Compensation

Our non-employee directors receive a mix of cash and share-based compensation. The compensation mix is intended to encourage non-employee directors to continue board of director service, further align the interests of the board of directors and stockholders and attract new non-employee directors with outstanding qualifications. Directors who are our employees or officers of do not receive any additional compensation for board of director service.

### 2019 Compensation Table

The table below sets forth the compensation of each non-employee director in 2019. As a named executive officer of the Company, compensation paid to Mr. Erb for the 2018 and 2019 fiscal years is fully reflected under "Named Executive Officer Compensation Tables—Summary Compensation Table for 2019".

Name	Fees Earned or Paid in Cash (\$)	Option Awards (\$) <sup>(1)</sup>	All Other Compensation (\$)	Total (\$)
Steve Brandt	52,019	5,576	76,000 <sup>(4)</sup>	133,595
Maria Rosa Costanzo, M.D. <sup>(2)</sup>	15,667	2,713	—	18,380
Jon W. Salvesson	53,435	5,576	—	59,012
Gregory D. Waller	58,685	5,576	—	64,262
Warren S. Watson	66,185	5,576	—	71,762
Matthew Likens <sup>(3)</sup>	41,935	5,576	—	47,512
<b>Total</b>	<b>287,926</b>	<b>30,593</b>	<b>—</b>	<b>394,523</b>

(1) This amount reflects stock options granted under the 2013 Directors' Plan on May 23, 2019. The amounts reported represent the grant date fair value of the stock options. Valuation assumptions used in determining the grant date fair value are included in Note 7 to the consolidated financial statements for the year ended December 31, 2018 included in our Annual Report on Form 10-K for the year ended December 31, 2018, which is incorporated by reference in this prospectus. The grant date fair value per share of the stock options granted on May 23, 2018 to all directors, other than Dr. Costanzo, was approximately \$2.92 per share. The grant date fair value per share of the stock option granted to Dr. Costanzo on September 3, 2019 was approximately \$2.07

(2) Dr. Costanzo was elected to the Board of Directors on September 3, 2019.

(3) Mr. Likens resigned from the Board of Directors on September 27, 2019.

(4) Mr. Brandt received \$76,000 for his services as a consultant from February to May 2019 as described under "Certain Relationships and Related Transactions."

Our Non-Employee Director Compensation Policy provides for (i) an annual cash retainer of \$55,000 payable in equal quarterly installments in arrears on the last day of each quarter in which the service occurs and (ii) an annual

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stock option award of the number of shares equal to 0.15% of the fully-diluted shares of the Company, granted on the date of the annual meeting of stockholders with 1/12th of the shares underlying the awards vesting monthly so that all of the underlying shares are vested on the one-year anniversary of the grant date. We do not provide any perquisites to directors.

During the fourth quarter of fiscal 2017, the Compensation Committee engaged Compensia to conduct an assessment of non-employee director compensation for fiscal 2018. In connection with such engagement, Compensia evaluated our non-employee director compensation program including cash compensation and equity compensation, reporting directly to the Compensation Committee. We did not make any changes to our Non-Employee Director Compensation Policy in 2018 as a result of such assessment. However, in May 2019, we changed the calculation of the number of shares included in the annual stock option grant to a percentage of the full-diluted shares of the Company rather than a cash value and equity compensation is in the form of only stock options.

On the date of the 2018 annual meeting of stockholders, there were insufficient shares available under the 2013 Directors' Plan to issue an equity award with an aggregate value on the date of grant of \$35,000 to each of our non-employee directors. Therefore, each non-employee director received an option to purchase 714 shares of our common stock with a grant date fair value of \$26,259 and a cash payment in the amount of \$2,186 per quarter for the twelve months prior from the second quarter of 2018 through the first quarter of 2019, in lieu of the remaining equity award contemplated by our Non-Employee Director Compensation Policy. Our board of directors determined that the full equity award would be issued in the form of a stock option to simplify the grant in light of the limited number of shares available.

As of December 31, 2019, each non-employee director had the following number of shares underlying outstanding options (both vested and unvested): Mr. Brandt 5,009; Dr. Costanzo 1,313, Mr. Salveson 5,954; Mr. Waller 6,423, and Mr. Watson, 5,954. As of December 31, 2018, no RSUs were held by the non-employee directors.

### **DELINQUENT SECTION 16(a) REPORTS**

Section 16(a) of the Exchange Act requires that our executive officers and directors, and persons who own more than 10% of a registered class of our equity securities, file reports of ownership and changes in ownership (Forms 3, 4, and 5) with the SEC. Executive officers, directors, and greater than 10% beneficial owners are required to furnish us with copies of all of the forms that they file.

Dr. Costanzo filed a late Form 4 on September 16, 2019 to report the acquisition of common shares of beneficial ownership on September 3, 2019. Other than this filing, based solely on our review of these reports or written representations from certain reporting persons, we believe that during the fiscal year ended December 31, 2019, our officers, directors, greater than 10% beneficial owners, and other persons subject to Section 16(a) of the Exchange Act filed on a timely basis all reports required of them under Section 16(a) so that there were no late filings of any Form 3 or Form 5 reports or late Form 4 filings with respect to transactions relating to our common stock.

EXECUTIVE COMPENSATION

Summary Compensation Table for 2019

The following table sets forth certain information, for the years ended December 31, 2019 and December 31, 2018, regarding compensation of our named executive officers.

Name Principal Position	Year	Salary (\$)	Bonus (\$)	Option Awards (\$) <sup>(1)</sup>	Nonequity Incentive Plan Compensation (\$)	All Other Compensation (\$) <sup>(2)</sup>	Total (\$)
John L. Erb	2019	436,965	—	—	131,127	11,666	579,758
Chief Executive Officer & President; Chairman of the Board	2018	424,754	—	2,043,696	159,283	11,670	2,639,169
Claudia Drayton	2019	291,747	—	—	81,689	18,986	392,422
Chief Financial Officer	2018	283,250	—	604,015	80,549	12,610	980,424
Nestor Jaramillo, Jr.	2019	208,651	—	254,177 <sup>(5)</sup>	58,412	6,558	527,762
Chief Commercial Officer <sup>(3)</sup>	2018	—	—	—	—	—	—
Jim Breidenstein	2019	—	—	—	—	137,000 <sup>(8)</sup>	137,000
Former Chief Commercial Officer <sup>(4)</sup>	2018	214,200	—	553,072 <sup>(5)(6)</sup>	33,702 <sup>(7)</sup>	171,594 <sup>(8)</sup>	972,568

- (1) Except as noted below, amounts in the Option Awards column relate to stock options granted under the 2017 Plan. The amounts reported reflect the grant date fair value of the stock options. Valuation assumptions used in determining the grant date fair value are included in Note 7 to the consolidated financial statements for the year ended December 31, 2018 included in our Annual Report on Form 10-K for the year ended December 31, 2018, which is incorporated by reference in this prospectus.
- (2) For each named executive officer, amounts include employer matching contributions made on the officer's behalf to the Company's 401(k) Plan, contributions to the officer's health savings account and Company payments for life insurance premiums. In addition, the amounts for Mr. Erb and Ms. Drayton include a one-time payment equal to 50% of such officer's accrued paid-time-off that exceeded the amount that is permitted to carry over from one fiscal year to the next fiscal year due to a change in the Company's paid-time-off policy effective January 1, 2019.
- (3) Mr. Jaramillo commenced employment with the Company effective May 7, 2019.
- (4) Mr. Breidenstein commenced employment with the Company effective April 24, 2017 and ended employment with the Company effective July 31, 2018.
- (5) Reflects a stock option granted under the Company's New-Hire Equity Incentive Plan (the "New-Hire Plan") in connection with such officer's hiring.
- (6) Such officer surrendered his options in connection with his departure from the Company.
- (7) Represents a cash payment of 1.6% of the Company's net sales from January to July 2018, as discussed below. Because he departed the Company in July 2018, such officer did not receive a bonus for 2018.
- (8) Includes salary continuation, reimbursement of monthly COBRA premiums, and payment for accrued paid time off, in each case paid pursuant to the Separation and Release Agreement between the Company and such officer.

Narrative Discussion of Summary Compensation Table for 2019

**Employment Agreements and Other Arrangements.** Mr. Erb has a written employment agreement. We signed offer letters with each of our other named executive officers upon the commencement of their employment with us. All of the named executive officers have change in control agreements, which entitle them to payments from the Company upon the happening of specified termination events. See "— Potential Payments Upon Termination or Change in Control".

**Base Salaries.** The initial annual base salaries of our executive officers are negotiated in connection with their hiring. The Compensation Committee reviews the base salaries of the executive officers on an annual basis and generally grants salary increases following such reviews. In 2019, the salaries for each of Mr. Erb and Ms. Drayton was increased by 3, representing a combination of a cost of living and inflation adjustment and a merit raise.

As discussed above under "Board Matters—Committees of the Board—Compensation Committee—Role of Compensation Consultant," the Compensation Committee engaged FW Cook 2019 to conduct a review of our executive compensation program. Based on the advice and information from FW Cook and taking into account information from publicly available industry surveys, the Compensation Committee approved base salary increases ranging from 2% to 4% for our officers and, specifically, a 3% increase for Mr. Erb, a 3.5% increase for Ms. Drayton and a 3% increase for Mr. Jaramillo (pro-rated because he commenced employment with the Company in May 2019).

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**Equity Compensation.** Pursuant to the terms of his offer letter, Mr. Jaramillo was granted on May 23, 2019, an option to purchase 84,489 shares of our common stock with a grant date fair value of \$254,176.71.

In January 2018, to restore a meaningful equity interest in the Company by our executive officers following the reverse stock splits and public offerings consummated in 2017 and following the increase in the number of shares reserved for issuance under the 2017 Plan on January 1, 2018 pursuant to the “evergreen” provision in such plan, and considering the advice of Compensia, who was engaged in the fourth quarter of 2017 to provide an assessment of executive officer and non-employee director compensation for 2018, the board of directors and Compensation Committee granted options to purchase shares of our common stock to our named executive officers as follows:

Name	Option Awards (#) <sup>(1)</sup>	Exercise Price (\$)	Option Awards (\$) <sup>(2)</sup>
John L. Erb	47,085	\$ 49.70	2,043,696
Claudia Drayton	14,124	\$ 49.00	604,015
Nestor Jaramillo, Jr. <sup>(3)</sup>	—	—	—
Jim Breidenstein <sup>(4)</sup>	12,933	\$ 49.00	553,072
<b>Total</b>	<b>74,142</b>	<b>—</b>	<b>3,200,783</b>

- (1) 25% will vest on the one-year anniversary of the date of grant, with the remaining shares vesting in 36 equal consecutive monthly installments.
- (2) The amounts reported represent the grant date fair value of the stock options. General valuation assumptions used in determining grant date fair values are included in Note 7 to the consolidated financial statements for the year ended December 31, 2018 included in our Annual Report on Form 10-K for the year ended December 31, 2018, which is incorporated by reference in this prospectus.
- (3) Such officer was not employed by the Company in January 2018 and, therefore, did not receive a stock option grant under this program.
- (4) Such officer surrendered his options in connection with his departure from the Company effective July 31, 2018.

**Nonequity Incentive Plan Compensation.** In 2019, the Compensation Committee made no change to the target bonuses, set forth as a percentage of annual base salary, for Mr. Erb which 50% of base salary. For Ms. Drayton, the target bonus was increased to 40% of base salary. The target bonus of 40% for Mr. Jaramillo was approved by the Compensation Committee in connection with commencement of his employment. The earned bonus was based on the achievement of corporate performance objectives defined and weighted by the Compensation Committee, in consultation with our Chief Executive Officer, and primarily related to our annual revenue, the management of cash to achieve our business objectives, the development and approval of a three-year strategic plan, and regulatory milestones for each of the Aquadex FlexFlow system and the modification of our label to include pediatric patients. The Compensation Committee assessed our achievement of the corporate objectives at 2019 year end and calculated a total weighted average performance to corporate objectives of 60%. While Mr. Erb’s bonus was based solely on the achievement of corporate objectives, Ms. Drayton and Mr. Jaramillo were also compensated based on the achievement of individual personal objectives, which accounted for 25% of their overall bonus. Because his employment with the Company commenced in May 2019, Mr. Jaramillo’s bonus was pro-rated for his time with the Company in 2019.

The following table sets forth target and earned non-equity incentive plan compensation for 2018 and 2019.

Name	2018			2019		
	Target	Earned		Target	Earned	
	% of Base Salary	\$	\$	% of Base Salary	\$	\$
John L. Erb	50	212,377	159,283	50	218,482	152,981
Claudia Drayton	35	99,137	80,549	40	116,699	90,442
Nestor Jaramillo, Jr. <sup>(1)</sup>	—	—	—	40	83,446	64,671
Jim Breidenstein <sup>(2)</sup>	35	145,068	—	—	—	—

- (1) Amounts reflect that such officer commenced employment with the Company effective May 7, 2019.
- (2) Because he departed the Company on July 31, 2018, such officer did not receive a bonus for 2018 or 2019 and had no target bonus for 2019.

Pursuant to his offer letter, during 2017, Mr. Breidenstein was also entitled to receive 1.6% of the Company’s total net sales during each month of his employment. The Compensation Committee, taking into account the

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assessment of Compensia, who was engaged in the fourth quarter of 2017 to provide an assessment of executive officer and non-employee director compensation for 2018, elected to continue this payment for fiscal 2018, reflected as non-equity incentive compensation in the “Summary Compensation Table for 2019” above. Mr. Breidenstein departed the Company on July 31, 2018.

**Outstanding Equity Awards at Fiscal Year-End**

The following table sets forth certain information concerning equity awards held by our named executive officers that were outstanding as of December 31, 2019.

Name	Option Awards				Stock Awards	
	Number of Securities Underlying Unexercised Options (#) Exercisable	Number of Securities Underlying Unexercised Options (#) Unexercisable	Option Exercise Price (\$)	Option Expiration Date	Number of Shares or Units of Stock That Have Not Vested (\$)	Market Value of Shares or Units of Stock That Have Not Vested (\$) <sup>(5)</sup>
John L. Erb	6 <sup>(1)</sup>	—	69,468.00	09/11/2022		
	— <sup>(7)</sup>	—	—	05/28/2024		
	— <sup>(7)</sup>	—	—	05/20/2025		
	59 <sup>(2)</sup>	4 <sup>(2)</sup>	7,812.00	03/16/2026		
	22,561 <sup>(3)</sup>	24,524 <sup>(3)</sup>	49.70	01/17/2028		
					—	3 <sup>(4)</sup>
Claudia Drayton	13 <sup>(6)</sup>	—	37,632.00	01/05/2025		
	6 <sup>(2)</sup>	—	8,736.00	01/15/2026		
	6,768	7,356 <sup>(3)</sup>	49.00	01/3/2028		
Nestor Jaramillo, Jr.	—	84,489 <sup>(5)</sup>	3.01	05/22/2029		
Jim Breidenstein <sup>(6)</sup>	—	—	—	—	—	—

- (1) Consists of stock options granted under the 2013 Directors’ Plan. 1/12th of the shares underlying the awards vests monthly, commencing on the one-month anniversary of the grant date, so that all of the shares are vested on the one-year anniversary of the grant date.
- (2) Consists of stock options granted under the Second Amended and Restated 2011 Equity Incentive Plan (the “2011 Plan”). The underlying shares generally vest as follows: 25% of the shares vest on the one-year anniversary of the grant date; the remaining shares vest in 36 equal consecutive monthly increments thereafter, so that all of the shares will be vested on the four-year anniversary of the grant date.
- (3) Consists of stock options granted under the 2017 Plan. The underlying shares generally vest as follows: 25% of the shares vest on the one-year anniversary of the grant date; the remaining shares vest in 36 equal consecutive monthly increments thereafter, so that all of the shares will be vested on the four-year anniversary of the grant date.
- (4) Consists of RSUs granted under the 2011 Plan. The RSUs vest in 36 consecutive monthly increments, commencing on the one-month anniversary of the grant date, so that all of the underlying shares will be vested on the three-year anniversary of the grant date.
- (5) Consists of stock options granted under the New-Hire Plan. The underlying shares generally vest as follows: 25% of the shares vest on the one-year anniversary of the grant date; the remaining shares vest in 36 equal consecutive monthly increments thereafter, so that all of the shares will be vested on the four-year anniversary of the grant date.
- (6) Such officer surrendered his options in connection with his departure from the Company effective July 31, 2018.
- (7) There are no shares underlying these options following application of the reverse stock split.

## Potential Payments Upon Termination or Change of Control

### Equity Compensation Plans

Equity awards have been issued to the named executive officers under the 2017 Plan, 2011 Plan and the New-Hire Plan. A termination or change in control may affect the vesting and/or exercisability of awards issued under the equity compensation plans, as further discussed below.

**Stock Options** Generally, if a participant's continuous service terminates:

- other than for cause or upon the participant's death or disability, the participant may exercise his or her option (to the extent the option was vested as of the date of termination) within such period of time ending on the earlier of (i) the date three months following the termination or (ii) the expiration of the term of the option. If the option is not exercised within such period, it will terminate.
- upon the participant's disability, the participant may exercise his or her option (to the extent the option was vested as of the date of termination) within such period of time ending on the earlier of (i) the date 12 months following the termination or (ii) the expiration of the term of the option. If the option is not exercised within such period, it will terminate.
- as a result of the participant's death, or if the participant dies within the period during which the option may be exercised after the termination of the participant's continuous service for a reason other than death, the option may be exercised (to the extent the option was vested as of the date of death) by the participant's estate within the period ending on the earlier of (i) the date 18 months following the date of death or (ii) the expiration of the term of the option. If the option is not exercised within such period, it will terminate.
- for cause, the option will terminate upon the date of termination, and the participant will be prohibited from exercising his or her option from and after such time.

**RSUs.** Upon termination of a participant's continuous service for any reason, any unvested RSUs will be immediately canceled and forfeited, provided that the Compensation Committee may accelerate the vesting of all or a portion of the award in connection with such termination.

**Acceleration of Vesting.** Under the 2017 Plan, the 2011 Plan and the New Hire Plan, the board of directors or the Compensation Committee may accelerate the exercisability or vesting of an award at any time, including immediately prior to a participant's termination or change of control.

### Change in Control Agreements

We have entered into change in control agreements with the named executive officers who are currently executive officers of the Company that require us to provide compensation to the officer in the event of a change in control. Each agreement has a term that runs from its effective date through the later of: (i) the five-year anniversary of the effective date, subject to automatic extension for successive two-year periods until notice of non-renewal is given by either party at least 60 days prior to the end of the then-effective term; or (ii) if a change in control occurs on or prior to the end of the then-effective term, then the one-year anniversary of the effective date of such change in control.

The change in control agreements provide that, if: (x) a change in control occurs during the term of the officer's agreement; and (y) the officer's employment terminates anytime during the one-year period after the effective date of the change in control; and (z) such termination is involuntary at the Company's initiative without cause or is due to the officer's voluntary resignation for good reason, then the Company will: (i) pay in a lump sum the officer's salary for 12 months and any other earned but unpaid compensation; (ii) pay in a lump sum an amount equal to the incentive bonus payment received by the officer for the fiscal year immediately preceding the fiscal year in which the termination occurs; and (iii) provide healthcare benefits to the officer and the officer's family until the earlier of (A) the date 12 months after the officer's termination and (B) the date the officer is, and/or the officer's covered dependents are, eligible to receive group medical and/or dental insurance coverage by a subsequent employer.

We are also obligated to make the foregoing payments and to provide the foregoing healthcare benefits in the event (i) the officer's employment terminates (A) due to a voluntary resignation for good reason or (B) due to an involuntary termination by the Company without cause, and (ii) a change in control occurs within 90 days after the termination date and during the term of the agreement.



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In addition to the payments described above, each change in control agreement provides that if a change in control occurs while the officer is actively employed by the Company and during the term of the agreement, such change in control will cause the immediate acceleration of the vesting of 100% of any unvested portion of any stock option awards held by the officer on the effective date of such change in control.

We are not obligated to make the payments described above unless: (i) the officer signs a full release of any and all claims in favor of the Company; (ii) all applicable consideration periods and rescission periods have expired; and (iii) as of the dates we provide any payments to the named executive officer, the officer is in strict compliance with the terms of the applicable change in control agreement and any proprietary information agreement the officer has entered into with the Company.

### **Employment Agreement – Mr. Erb**

On March 1, 2016, we entered into an executive employment agreement with Mr. Erb regarding his employment as our Chief Executive Officer and President.

The agreement has an initial term (the “Initial Term”) of twelve (12) months beginning on March 1, 2016 and automatically renews for an additional twelve (12) month period at the end of the Initial Term and each anniversary thereafter provided that at least ninety (90) days prior to the expiration of the Initial Term or any renewal term the board of directors does not notify Mr. Erb of its intention not to renew the employment period.

The agreement entitles Mr. Erb to, among other benefits, the following compensation:

- an annual base salary of at least \$400,000, reviewed at least annually;
- initial equity grants of an option to purchase 63 shares of common stock and 42 restricted stock units, in each case, granted in accordance with the terms and conditions of the Company’s Second Amended and Restated 2011 Equity Incentive Plan;
- an opportunity to receive additional annual equity awards as determined by the Compensation Committee based on Mr. Erb’s performance and commensurate with grants made to chief executive officers in the Company’s compensation peer group;
- an opportunity for Mr. Erb to receive an annual performance bonus in an amount of up to 50% of Mr. Erb’s annual base salary for such fiscal year based upon achievement of certain performance goals to be established by the board of directors;
- participation in welfare benefit plans, practices, policies and programs provided by the Company and its affiliated companies (including, without limitation, medical, prescription, dental, disability, employee life, group life, accidental death and travel accident insurance plans and programs) to the extent available generally or to other senior executive officers of the Company;
- prompt reimbursement for all reasonable expenses incurred by Mr. Erb in accordance with the plans, practices, policies and programs of the Company; and
- 22 days paid time off, to accrue and to be used in accordance with our policies and practices in effect from time to time, as well as all recognized Company holidays.

In connection with the equity grant contemplated by the agreement, Mr. Erb received an option to purchase 63 shares of our common stock at an exercise price of \$7,812.00 per share and an award of 42 restricted stock units, both of which were issued on March 16, 2016.

The agreement also includes a “claw-back” provision providing for the recoupment of unearned incentive compensation if the board of directors, or an appropriate committee thereof, determines that Mr. Erb engaged in any fraud, negligence, or intentional misconduct that caused or significantly contributed to the Company having to restate all or a portion of its financial statements, or if we are required to seek reimbursement by applicable laws or regulations, the board of directors or committee may require reimbursement of any bonus or incentive compensation paid to Mr. Erb.

Upon termination of Mr. Erb’s employment, Mr. Erb may be entitled to certain payments and benefits, depending on the reason for his termination. In the event Mr. Erb resigns his employment without good reason, the Company terminates Mr. Erb’s employment for cause, or Mr. Erb’s employment terminates as a result of his death or disability, Mr. Erb is entitled to receive the Unconditional Entitlements, but not the Conditional Benefits (each as

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defined below). In the event Mr. Erb resigns with good reason or the Company terminates Mr. Erb's employment for reason other than cause, Mr. Erb is entitled to receive the Unconditional Entitlements, as well as the Conditional Benefits, provided that Mr. Erb signs and delivers to the Company, and does not revoke, a general release of claims in favor of the Company and certain related parties.

The "**Unconditional Entitlements**" include the following: (i) any annual base salary earned, but unpaid, for services rendered to the Company on or prior to the date on which the employment period ends; (ii) in the event Mr. Erb's employment terminates after the end of a fiscal year but before payment of the annual bonus payable for his services rendered in that fiscal year, the annual bonus that would have been payable to Mr. Erb for such completed fiscal year, provided that such termination is not due to the Company's termination of Mr. Erb for cause or Mr. Erb's resignation without good reason; and (iii) certain other benefits contemplated by the agreement.

The "**Conditional Benefits**" include the following: (i) a lump sum amount equal to one times Mr. Erb's annual base salary as of the termination date; (ii) continued medical coverage for 12 months following the termination date; (iii) continued vesting of equity awards for 12 months following the termination date; and (iv) a pro-rata annual bonus for the year in which the termination date occurs, determined on the basis of an assumed full-year target bonus and the number of days in the applicable fiscal year occurring on or before the termination date.

### **Offer Letter – Ms. Drayton**

On December 9, 2014, we entered into an offer letter with Ms. Drayton regarding her employment as our Chief Financial Officer effective January 5, 2015. Ms. Drayton was offered an annualized salary of \$240,000, paid in monthly installments in accordance with the Company's payroll procedures. Ms. Drayton was also made eligible for a bonus of up to 25% of her base salary. The Company also agreed to discuss a performance bonus based upon mutually agreed objectives upon commencement of her employment. Ms. Drayton also received a grant of stock options as a result of her employment and was made eligible to participate in the employee stock option program, and benefit programs generally made available to employees.

### **Offer Letter – Mr. Breidenstein**

On April 12, 2017, we entered into an offer letter with Mr. Breidenstein regarding his employment as our Chief Commercial Officer effective April 24, 2017. In addition to the compensation described above under "—Narrative Discussion of Summary Compensation Table for 2019," Mr. Breidenstein was also entitled to salary continuation and reimbursement of monthly COBRA premiums paid by him, in each case, for the 9-month period following the termination date, if the Company terminates his employment without cause; provided that Mr. Breidenstein signs and delivers to the Company, and does not revoke, a general release of claims. On July 31, 2018, Mr. Breidenstein ended employment with the Company and received the salary continuation and other benefits under the offer letter.

### **Offer Letter – Mr. Jaramillo**

On April 12, 2019, we entered into an offer letter with Mr. Jaramillo regarding his employment as our Chief Commercial Officer effective May 7, 2019. Mr. Jaramillo was offered an annualized salary of \$320,000, paid in semi-monthly installments in accordance with the Company's payroll procedures. Mr. Jaramillo was also made eligible for a bonus of up to 40% his base salary, pro-rated for 2019, dependent upon Mr. Jaramillo's good standing with the Company as of such bonus payment date. Mr. Jaramillo also received a grant of stock options as a result of his employment and was made eligible to participate in the employee stock option program, and benefit programs generally made available to employees.

## CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS

We give careful attention to related person transactions because they may present the potential for conflicts of interest. Under SEC rules, a related person transaction is any transaction or series of transactions in which: the Company or a subsidiary is a participant; the amount involved exceeds the lesser of \$120,000 or 1% of the average of the Company's total assets at year-end for the last two completed fiscal years; and a related person has a direct or indirect material interest. A "related person" is a director, executive officer, nominee for director or a more than 5% stockholder, and any immediate family member of the foregoing.

To identify related person transactions in advance, we rely on information supplied by our executive officers, directors and certain significant stockholders. We maintain a written policy for the review, approval or ratification of related person transactions, and our Audit Committee reviews all related person transactions identified by us. The Committee approves or ratifies only those related person transactions that are determined by it to be, under all of the circumstances, in the best interests of the Company and its stockholders.

Scott Erb, who served as our Senior Manager of Operations and Director of Marketing during 2017, is the son of John Erb, our Chief Executive Officer, President and Chairman of the Board. Scott Erb was paid \$78,974 in 2017 as an employee of the Company. Following Scott Erb's departure from the Company, the Company paid \$15,010 in 2017 to Infinitum Analytics, LLC, of which Scott Erb is Owner/Principal, for consulting services.

In January 2019, we entered into a consulting agreement with Steven Brandt, one of our non-employee directors, pursuant to which Mr. Brandt provided services, on an interim basis, until May 31, 2019, to support our commercial strategy under the direction of our Chief Executive Officer. Mr. Brandt was paid a fee of \$19,000 per month, for a total of \$76,000 for his services. Mr. Brandt also received \$2,453 for reimbursement of expenses.

**SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT**

The following table sets forth information regarding the beneficial ownership (as defined in Rule 13d-3 of the Securities Exchange Act of 1934, as amended (the “Exchange Act”)) of our common stock as of December 31, 2019 by (i) each of the directors and named executive officers, (ii) all of the directors and executive officers as a group, and (iii) to our knowledge, beneficial owners of more than 5% of our common stock. As of December 31, 2019, there were 4,674,068 shares of our common stock outstanding. Unless otherwise indicated and subject to applicable community property laws, each owner has sole voting and investment powers with respect to the securities listed below.

<b>Name of Beneficial Owner</b>	<b>Number of Shares</b>	<b>Right to Acquire<sup>(1)</sup></b>	<b>Total</b>	<b>Aggregate Percent of Class<sup>(2)</sup></b>
John L. Erb	11,617	48,987 <sup>(3)</sup>	60,604	1.28%
Steve Brandt	5	4,533	4,538	*
Maria Rosa Costanzo, M.D.		548	548	*
Matthew E. Likens <sup>(4)</sup>	5	—	5	*
Jon W. Salvesson	3	5,478	5,481	*
Gregory D. Waller	2	5,947	5,949	*
Warren S. Watson	3	5,478	5,481	*
Claudia Drayton	2	7,376	7,378	*
Nestor Jaramillo, Jr.	—	—	—	—
All current directors and executive officers as a group (8 persons) <sup>(4)</sup>	11,632	78,347	89,979	1.91%
Bigger Capital Fund, L.P. <sup>(5)</sup> 175 W. Carver Street Huntington, New York 11743	83,154	661,041	774,195	9.99%
Anson Funds Management LP <sup>(6)</sup> 5950 Berkshire Lane, Suite 210 Dallas, Texas 75225	51,000	1,102,106	1,153,106	9.99%
Altium Capital Management, L.P. <sup>(7)</sup> 551 Fifth Avenue, Floor 19 New York, New York 10176	25,000	832,142	857,142	9.99%

\* Less than one percent.

- (1) Except as otherwise described below, amounts reflect the number of shares that such holder could acquire through (i) the exercise of outstanding stock options, (ii) the vesting/settlement of outstanding RSUs, (iii) the exercise of outstanding warrants to purchase common stock and (iv) the conversion of outstanding Series F convertible preferred stock, in each case within 60 days after December 31, 2019.
- (2) Based on 4,674,068 shares outstanding as of December 31, 2019.
- (3) Consists of (i) 23,609 shares issuable upon the exercise of outstanding stock options, (ii) 20,996 shares issuable upon the exercise of outstanding warrants to purchase common stock and (iv) 3,400 shares issuable upon conversion of outstanding shares of Series F Convertible Preferred Stock (assuming all 100 shares of Series F Convertible Preferred Stock held by Mr. Erb are converted at once and rounded up to the nearest whole share).
- (4) Mr. Likens resigned as a director on September 24, 2019 and is not included in the total for all current directors and officers.
- (5) Based on the Schedule 13G/A filed by Bigger Capital Fund, LP, Bigger Capital Fund GP, LLC, District 2 Capital Fund LP, District 2 Capital LP, District 2 GP LLC, District 2 Holdings LLC and Michael Bigger with the SEC on November 27, 2019. Consists of 83,154 shares of common stock beneficially owned by Bigger Capital Fund, LP. The number of shares under “Right to Acquire” consists of (i) 561,041 shares of common stock issuable upon the exercise of outstanding warrants to purchase common stock beneficially owned by Bigger Capital Fund, LP and (ii) 100,000 shares of common stock issuable upon the exercise of outstanding warrants to purchase common stock beneficially owned by District 2 Capital Fund LP. Bigger Capital Fund GP, LLC is the general partner of, and may be deemed to beneficially own the securities owned by, Bigger Capital Fund, LP. Each of (i) District 2 Capital LP, as the investment manager of District 2 Capital Fund LP, (ii) District 2 GP LLC, as the general partner of District 2 Capital Fund LP, and (iii) District 2 Holdings LLC, as the managing member of District 2 GP LLC, may be deemed to beneficially own securities owned by District 2 Capital Fund LP. Mr. Bigger is the managing member of Bigger Capital Fund GP, LLC and is the managing member of District 2 Holdings LLC and may be deemed to beneficially own the securities held by Bigger Capital Fund, LP and District 2 Capital Fund LP. The percentage in this table reflects that the reporting persons may not exercise the warrants to the extent such exercise would cause the reporting persons to beneficially own a number of shares of common stock that would exceed 4.99% of our then outstanding common stock following such exercise; provided, however, that upon prior notice to us, such holder may increase its ownership, provided that in no event will the ownership exceed 9.99%.
- (6) Based on the Schedule 13G filed by Anson Funds Management LP, Anson Management GP LLC, Bruce R. Winson, Anson Advisors Inc. Amin Nathoo, and Moez Kassam on March 15, 2019 relating to common stock purchased by a private fund to which Anson Funds Management LP and Anson Advisors Inc. serve as co-investment advisors. The number of shares under “Right to Acquire” consists of

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- (i) 772,154 shares such holder could acquire upon exercise of outstanding warrants to purchase common stock and (ii) 329,952 shares such holder could acquire upon conversion of outstanding Series G Preferred Stock. Each of the reporting persons shares voting and disposal power over the shares. The percentage in this table reflects that the reporting persons may not exercise the warrants to the extent such exercise would cause the reporting persons to beneficially own a number of shares of common stock that would exceed 4.99% of our then outstanding common stock following such exercise; provided, however, that upon prior notice to us, such holder may increase its ownership, provided that in no event will the ownership exceed 9.99%.
- (7) Based on the Schedule 13G filed by Altium Capital Management, LP, Altium Growth Fund, LP, and Altium Growth GP, LLC on March 15, 2019. Altium Growth Fund, LP is the record and direct beneficial owner of the securities. Altium Capital Management, LP is the investment advisor of, and may be deemed to beneficially own securities owned by Altium Growth Fund, LP. Altium Growth GP, LLC is the general partner of, and may be deemed to beneficially own securities owned by, Altium Growth Fund, LP. The number of shares under "Right to Acquire" consists of (i) 571,428 shares such holder could acquire upon exercise of outstanding warrants to purchase common stock and (ii) 260,714 shares such holder could acquire upon conversion of outstanding Series G Preferred Stock. Each of the reporting persons shares voting and disposal power over the shares. The percentage in this table reflects that the reporting persons may not exercise the warrants to the extent such exercise would cause the reporting persons to beneficially own a number of shares of common stock that would exceed 4.99% of our then outstanding common stock following such exercise; provided, however, that upon prior notice to us, such holder may increase its ownership, provided that in no event will the ownership exceed 9.99%.

## DESCRIPTION OF SECURITIES

### Description of Units

We are offering up to 1,627,907 Class A Units, with each Class A Unit consisting of one share of common stock and a warrant to purchase one share of our common stock (together with the shares of common stock underlying such warrants) at an assumed public offering price of \$0.86 per Class A Unit. Each warrant included in the Class A Units entitles its holder to purchase one share of Common Stock at an exercise price of \$[ ].

We are also offering 6,511,628 Class B Units to purchasers who prefer not to beneficially own more than 4.99% (or, at the election of the purchaser, 9.99%) of our outstanding common stock following the consummation of this offering with each Class B Unit consisting of one share of Series H Preferred Stock, par value \$0.0001 per share, convertible into one share of common stock and a warrant to purchase one share of common stock (together with the shares of common stock underlying such warrants) at an assumed public offering price of \$0.86 per Class B Unit. Each warrant included in the Class B Units entitles its holder to purchase a number of shares of Common Stock equal to 100% of the shares of Common Stock issuable upon conversion of the Series H Preferred Stock included in such units at an exercise price of \$[ ] per share.

The securities of which the units are composed (the “underlying securities”) are being sold in this offering only as part of the units. However, the Class A Units and Class B Units will not be certificated and the underlying securities comprising such units are immediately separable. Each underlying security purchased in this offering will be issued independent of each other underlying security and not as part of a unit. Upon issuance, each underlying security may be transferred independent of any other underlying security, subject to applicable law and transfer restrictions.

### Description of Warrants Included in the Units

The material terms and provisions of the warrants being offered pursuant to this prospectus are summarized below. This summary of some provisions of the warrants is not complete. For the complete terms of the warrants, you should refer to the form of warrant filed as an exhibit to the registration statement of which this prospectus is a part.

Pursuant to a warrant agency agreement between us and American Stock Transfer & Trust Company LLC, as warrant agent, the warrants will be issued in book-entry form and shall initially be represented only by one or more global warrants deposited with the warrant agent, as custodian on behalf of The Depository Trust Company, or DTC, and registered in the name of Cede & Co., a nominee of DTC, or as otherwise directed by DTC.

Each Class A Unit and each Class B Unit includes a warrant to purchase one share of our common stock at an exercise price of \$[ ] per share at any time for up to five years after the date of the closing of this offering. The warrants issued in this offering will be governed by the terms of a global warrant held in book-entry form. The holder of a warrant will not be deemed a holder of our underlying common stock until the warrant is exercised, except as set forth in the warrants.

Subject to limited exceptions, a holder of warrants will not have the right to exercise any portion of its warrants if the holder (together with such holder’s affiliates, and any persons acting as a group together with such holder or any of such holder’s affiliates) would beneficially own a number of shares of common stock in excess of 4.99% (or, upon election by a holder prior to the issuance of any warrants, 9.99%) of the shares of our common stock then outstanding after giving effect to such exercise (the “Beneficial Ownership Limitation”); provided, however, that upon notice to the Company, the holder may increase or decrease the Beneficial Ownership Limitation, provided that in no event shall the Beneficial Ownership Limitation exceed 9.99% and any increase in the Beneficial Ownership Limitation will not be effective until 61 days following notice of such increase from the holder to us.

The exercise price and the number of shares issuable upon exercise of the warrants is subject to appropriate adjustment in the event of recapitalization events, stock dividends, stock splits, stock combinations, reclassifications, reorganizations or similar events affecting our common stock. The warrant holders must pay the exercise price in cash upon exercise of the warrants, unless such warrant holders are utilizing the cashless exercise provision of the warrants, which is only available in certain circumstances such as if the underlying shares are not registered with the SEC pursuant to an effective registration statement. We intend to use commercially reasonable efforts to have the registration statement of which this prospectus forms a part, effective when the warrants are exercised.

In addition, in the event we consummate a merger or consolidation with or into another person or other reorganization event in which our common shares are converted or exchanged for securities, cash or other property, or we sell, lease, license, assign, transfer, convey or otherwise dispose of all or substantially all of our assets or we or another person acquire 50% or more of our outstanding shares of common stock, then following such event, the

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holders of the warrants will be entitled to receive upon exercise of the warrants the same kind and amount of securities, cash or property which the holders would have received had they exercised the warrants immediately prior to such fundamental transaction. Any successor to us or surviving entity shall assume the obligations under the warrants. Further, as more fully described in the warrants, in the event of certain fundamental transactions, the holders of the warrants will be entitled to receive consideration in an amount equal to the Black-Scholes value of the warrants as of the date of consummation of such transaction.

Upon the holder's exercise of a warrant, we will issue the shares of common stock issuable upon exercise of the warrant within the earlier of three trading days following our receipt of a notice of exercise or the standard settlement period for the market on which the common stock is then listed, provided that payment of the exercise price has been made (unless exercised via the "cashless" exercise provision).

Prior to the exercise of any warrants to purchase common stock, holders of the warrants will not have any of the rights of holders of the common stock purchasable upon exercise, including the right to vote, except as set forth therein.

Warrant holders may exercise warrants only if the issuance of the shares of common stock upon exercise of the warrants is covered by an effective registration statement, or an exemption from registration is available under the Securities Act and the securities laws of the state in which the holder resides. We intend to use commercially reasonable efforts to have the registration statement of which this prospectus forms a part effective when the warrants are exercised. The warrant holders must pay the exercise price in cash upon exercise of the warrants unless there is not an effective registration statement or, if required, there is not an effective state law registration or exemption covering the issuance of the shares underlying the warrants (in which case, the warrants may only be exercised via a "cashless" exercise provision).

The warrants are callable by us in certain circumstances. Subject to certain exceptions, in the event that the warrants are outstanding, following the date that is 180 days after the closing date, (i) the volume weighted average price of our common stock for each of 30 consecutive trading days (the "Measurement Period"), which Measurement Period commences after the date that is 180 days after the closing date, exceeds 300% of the initial exercise price (subject to adjustment for forward and reverse stock splits, recapitalizations, stock dividends and similar transactions), (ii) the average daily trading volume for such Measurement Period exceeds \$500,000 per trading day and (iii) the holder is not in possession of any information that constitutes or might constitute, material non-public information which was provided by the Company, and subject to the Beneficial Ownership Limitation, then we may, within one trading day of the end of such Measurement Period, upon notice (a "Call Notice"), call for cancellation of all or any portion of the warrants for which a notice of exercise has not yet been delivered (a "Call") for consideration equal to \$0.0001 per share. Any portion of a warrant subject to such Call Notice for which a notice of exercise shall not have been received by the Call Date (as hereinafter defined) will be canceled at 6:30 p.m. (New York City time) on the tenth trading day after the date the Call Notice is received by the Holder (such date and time, the "Call Date"). Our right to call the warrants shall be exercised ratably among the holders based on the outstanding warrants.

We do not intend to apply for listing of the warrants on any securities exchange or other trading system.

### **Description of Capital Stock**

Our authorized capital stock consists of 100,000,000 shares of common stock, par value \$0.0001 per share, and 40,000,000 shares of preferred stock, par value \$0.0001 per share, 30,000 of which are designated as Series A Junior Participating Preferred Stock and 535 of which are designated Series F Convertible Preferred Stock (the "Series F Preferred Stock") as of December 31, 2019. Once shares of Series F Preferred Stock are converted, redeemed or reacquired by us, such shares shall resume the status of authorized but unissued shares of undesignated preferred stock.

As of December 31, 2019, we had (i) 4,674,068 outstanding shares of common stock, (ii) 535 outstanding shares of Series F Preferred Stock, which, at the currently applicable conversion price, would convert into 538,210 shares of common stock, subject to future adjustment, (iii) outstanding options to acquire 405,730 shares of our common stock, and (iv) outstanding warrants to purchase 6,948,466 shares of our common stock. In December 2018, the Company's stockholders approved a reverse split of its outstanding common stock at a ratio in the range of 1-for-2 to 1-for 14 and, in January 2019, the board of directors approved a 1-for-14 reverse split of the Company's outstanding common stock that became effective after trading on January 2, 2019. All share and per share amounts presented herein have been retroactively adjusted to reflect the reverse stock split.

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The following description summarizes the most important terms of our capital stock. Because it is only a summary, it does not contain all the information that may be important to you. For a complete description you should refer to our certificate of incorporation, bylaws and certificate of designation of preferences, rights and limitations of Series F Preferred Stock, copies of which have been incorporated by reference as exhibits to the registration statement of which this prospectus forms a part, and to the applicable provisions of the Delaware General Corporation Law.

### **Common Stock**

#### ***Dividends***

Holders of our common stock are entitled to receive dividends when and as declared by our board of directors out of funds legally available.

#### ***Voting***

Holders of our common stock are entitled to one vote for each share on each matter properly submitted to our stockholders for their vote; provided however, that except as otherwise required by law, holders of our common stock will not be entitled to vote on any amendment to our certificate of incorporation (including any certificate of designation filed with respect to any series of preferred stock) that relates solely to the terms of a series of outstanding preferred stock if the holders of such affected series are entitled, either separately or together as a class with the holders of one or more other such series, to vote thereon by law or pursuant to our certificate of incorporation (including any certificate of designation filed with respect to any series of preferred stock).

Subject to the voting restrictions described above, holders of our common stock may adopt, amend or repeal our bylaws and/or alter certain provisions of our certificate of incorporation with the affirmative vote of the holders of at least 66 $\frac{2}{3}$ % of the voting power of all of the then-outstanding shares of our capital stock entitled to vote generally in the election of directors, voting together as a single class, in addition to any vote of the holders of a class or series of our stock required by law or our certificate of incorporation. Those provisions of our certificate of incorporation that may be altered only by the super-majority vote described above relate to:

- the number of directors on our board of directors, the classification of our board of directors and the terms of the members of our board of directors;
- the limitations on removal of any of our directors described below under “—Anti-Takeover Effects of Certain Provisions of Our Certificate of Incorporation and Bylaws and Delaware Law;”
- the ability of our directors to fill any vacancy on our board of directors by the affirmative vote of a majority of the directors then in office under certain circumstances;
- the ability of our board of directors to adopt, amend or repeal our bylaws and the super-majority vote of our stockholders required to adopt, amend or repeal our bylaws described above;
- the limitation on action of our stockholders by written action described below under “—Anti-Takeover Effects of Certain Provisions of Our Certificate of Incorporation and Bylaws and Delaware Law;”
- the choice of forum provision described below under “—Choice of Forum;”
- the limitations on director liability and indemnification described below under the heading “—Limitation on Liability of Directors and Indemnification;” and
- the super-majority voting requirement to amend our certificate of incorporation described above.

#### ***Conversion, Redemption and Preemptive Rights***

Holders of our common stock do not have any conversion, redemption or preemptive rights pursuant to our organizational documents.

#### ***Liquidation, Dissolution and Winding-up***

In the event of our liquidation, dissolution or winding up, holders of our common stock are entitled to share ratably in any assets remaining after the satisfaction in full of the prior rights of creditors and the aggregate of any liquidation preference pursuant to the terms of any certificate of designation filed with respect to any series of preferred stock, including our outstanding Series F Preferred Stock and the Series H Preferred Stock being offered hereby.



**Listing**

Our common stock is listed on The Nasdaq Capital Market under the symbol “CHFS.” See “Prospectus Summary—Recent Developments” in this prospectus for important information about the listing of our common stock on The Nasdaq Capital Market.

**Preferred Stock**

We may issue any class of preferred stock in any series. Our board of directors has the authority to establish and designate series, and to fix the number of shares included in each such series and to determine or alter for each such series, such voting powers, designation, preferences, and relative participating, optional, or other rights and such qualifications, limitations or restrictions thereof. Our board of directors is not restricted in repurchasing or redeeming such stock while there is any arrearage in the payment of dividends or sinking fund installments. Our board of directors is authorized to increase or decrease the number of shares of any series subsequent to the issuance of shares of that series, but not below the number of shares of such series then outstanding. The number of authorized shares of preferred stock may be increased or decreased, but not below the number of shares thereof then outstanding, by the affirmative vote of the holders of a majority of the common stock, without a vote of the holders of the preferred stock, or of any series thereof, unless a vote of any such holders is required pursuant to the terms of any certificate of designation filed with respect to any series of preferred stock.

Prior to issuance of shares of any series of preferred stock, our board of directors is required by Delaware law to adopt resolutions and file a certificate of designation with the Secretary of State of the State of Delaware. The certificate of designation fixes for each class or series the terms, preferences, conversion or other rights, voting powers, restrictions, limitations as to dividends or other distributions, qualifications and terms or conditions of redemption for each class or series. Any shares of preferred stock will, when issued, be fully paid and non-assessable.

**Outstanding Series F Convertible Preferred Stock.** Our Board designated 18,000 shares of preferred stock as Series F convertible preferred stock, \$0.0001 par value. As of December 31, 2019, there were 535 shares of Series F Preferred Stock outstanding with a conversion price of \$0.9942.

**Liquidation.** Upon any dissolution, liquidation or winding up, whether voluntary or involuntary, holders of Series F Preferred Stock will be entitled to receive distributions out of our assets, whether capital or surplus, of an amount equal to \$0.0001 per share of Series F Preferred Stock before any distributions shall be made on the common stock or any series of preferred stock ranked junior to the Series F Preferred Stock.

**Dividends.** Holders of the Series F Preferred Stock are entitled to receive dividends equal (on an “as converted to common stock” basis) to and in the same form as dividends actually paid on shares of our common stock when, as and if such dividends are paid on shares of our common stock. No other dividends will be paid on shares of Series F Preferred Stock.

**Conversion.** Each share of Series F Preferred Stock is convertible, at any time and from time to time at the option of the holder thereof, into that number of shares of common stock determined by dividing \$1,000 by the conversion price of \$0.9942 (subject to adjustment described below). This right to convert is limited by the beneficial ownership limitation described below.

**Forced Conversion.** Subject to certain ownership limitations as described below and certain equity conditions being met, until such time that during any 20 of 30 consecutive trading days, the volume weighted average price of our common stock exceeds 300% of the conversion price and the daily dollar trading volume during such period exceeds \$200,000 per trading day, we have the right to force the conversion of the Series F Preferred Stock into common stock.

**Beneficial Ownership Limitation.** A holder shall have no right to convert any portion of Series F Preferred Stock, to the extent that, after giving effect to such conversion, such holder, together with such holder’s affiliates, and any persons acting as a group together with such holder or any such affiliate, would beneficially own in excess of 4.99% of the number of shares of common stock outstanding immediately after giving effect to the issuance of shares of common stock upon such conversion (subject to the right of the holder to increase such beneficial ownership limitation upon not less than 61 days prior notice provided that such limitation can never exceed 9.99% and such 61 day period cannot be waived). Beneficial ownership of the holder and its affiliates will be determined in accordance with Section 13(d) of the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder. Holders of Series F Preferred Stock who are subject to such beneficial ownership limitation are and will remain responsible for ensuring their own compliance with Regulation 13D-G promulgated under the

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Securities Exchange Act of 1934, as amended, consistent with their individual facts and circumstances. In addition, pursuant to Rule 13d-3(d)(1) (i) promulgated under the Securities Exchange Act of 1934, as amended, any person who acquires Series F Preferred Stock with the purpose or effect of changing or influencing the control of our company, or in connection with or as a participant in any transaction having such purpose or effect, immediately upon such acquisition will be deemed to be the beneficial owner of the underlying common stock.

*Optional Redemption.* Subject to the terms of the certificate of designation, the Company holds an option to redeem some or all the Series F Preferred Stock six months after its issuance date at a 200% premium to the stated value of the Series F Preferred Stock subject to the redemption, upon 30 days prior written notice to the holder of the Series F Preferred Stock. The Series F Preferred Stock would be redeemed by the Company for cash.

### *Conversion Price Adjustment*

*Subsequent Equity Sales.* The Series F Preferred Stock has full ratchet price based anti-dilution protection, subject to customary carve outs, in the event of a down-round financing at a price per share below the conversion price of the Series F Preferred Stock, including in this offering. If during any 20 of 30 consecutive trading days the volume weighted average price of our common stock exceeds 300% of the then-effective conversion price of the Series F Preferred Stock and the daily dollar trading volume for each trading day during such period exceeds \$200,000, the anti-dilution protection in the Series F Preferred Stock will expire and cease to apply.

*Stock Dividends and Stock Splits.* If we pay a stock dividend or otherwise make a distribution payable in shares of common stock on shares of common stock or any other common stock equivalents, subdivide or combine outstanding common stock, or reclassify common stock, the conversion price will be adjusted by multiplying the then conversion price by a fraction, the numerator of which shall be the number of shares of common stock outstanding immediately before such event, and the denominator of which shall be the number of shares outstanding immediately after such event.

*Fundamental Transaction.* If we effect a fundamental transaction in which we are the surviving entity, then upon any subsequent conversion of Series F Preferred Stock, the holder thereof shall have the right to receive, for each share of common stock that would have been issuable upon such conversion immediately prior to the occurrence of such fundamental transaction, the number of shares of our common stock and any additional consideration receivable as a result of such fundamental transaction by a holder of the number of shares of common stock into which Series F Preferred Stock is convertible immediately prior to such fundamental transaction. If we effect a fundamental transaction in which we are not the surviving entity or a reverse merger in which we are the surviving entity, then the surviving entity shall purchase the outstanding Series F Preferred Stock by paying and issuing, in the event that such consideration given to common stockholders is non-cash consideration, as the case may be, to such holder (or canceling such holder's outstanding Series F Preferred Stock and converting it into the right to receive) an amount equal to the greater of (i) the cash consideration plus the non-cash consideration (in the form issuable to the holders of common stock) per share of the common stock in the fundamental transaction multiplied by the number of conversion shares underlying the shares of Series F Preferred Stock held by the holder on the date of the consummation of the fundamental transaction or (ii) 130% of the stated value of the Series F Preferred Stock then outstanding on the date immediately prior to the consummation of the fundamental transaction. Such amount shall be paid in the same form and mix (be it securities, cash or property, or any combination of the foregoing) as the consideration received by the common stock in such fundamental transaction. A fundamental transaction means: (i) our merger or consolidation with or into another entity, (ii) any sale or other disposition of all or substantially all of our assets in one transaction or a series of related transactions, (iii) any tender offer or exchange offer allowing holders of our common stock to tender or exchange their shares for cash, property or securities, and has been accepted by the holders of 50% or more of the outstanding common stock (iv) any reclassification of our common stock or any compulsory share exchange by which common stock is effectively converted into or exchanged for other securities, cash or property, or (v) consummation of a stock or share purchase agreement or other business combination with another person whereby such other person acquires more than 50% of the outstanding shares of common stock.

*Voting Rights, etc.* Except as otherwise provided in the Series F Preferred Stock certificate of designation or required by law, the Series F Preferred Stock has no voting rights. However, as long as any shares of Series F Preferred Stock are outstanding, we may not, without the affirmative vote of the holders of a majority of the then outstanding shares of the Series F Preferred Stock, alter or change adversely the powers, preferences or rights given to the Series F Preferred Stock, amend its certificate of designation, amend our certificate of incorporation or other charter documents in any manner that adversely affects any rights of the holders, increase the number of authorized

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shares of Series F Preferred Stock, or enter into any agreement with respect to any of the foregoing. The Series F Preferred Stock certificate of designation provides that if any party commences an action or proceeding to enforce any provisions of the certificate of designation, then the prevailing party in such action or proceeding shall be reimbursed by the other party for its attorneys' fees and other costs and expenses incurred in the investigation, preparation and prosecution of such action or proceeding. This provision may, under certain circumstances, be inconsistent with federal securities laws and Delaware general corporation law.

*Fractional Shares.* No fractional shares of common stock will be issued upon conversion of Series F Preferred Stock. Rather, we shall, at our election, either pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the conversion price or round up to the next whole share.

The Series F Preferred Stock was issued in book-entry form under a preferred stock agent agreement between American Stock Transfer & Trust as preferred stock agent, and us, and shall initially be represented by one or more book-entry certificates deposited with The Depository Trust Company, or DTC, and registered in the name of Cede & Co., a nominee of DTC, or as otherwise directed by DTC. There is no established public trading market for the Series F Preferred Stock, and the Series F Preferred Stock is not listed on The Nasdaq Capital Market, any other national securities exchange or any other nationally recognized trading system.

*Series H Convertible Preferred Stock Being Offered Pursuant to this Prospectus.* Our Board has designated [\_\_\_] shares of preferred stock as Series H convertible preferred stock, \$0.0001 par value ("Series H Preferred Stock"), none of which are issued and outstanding prior to this offering. Although there is no current intent to do so, our Board may, without stockholder approval, issue shares of an additional class or series of preferred stock with voting and conversion rights which could adversely affect the voting power of the holders of the common stock or the convertible preferred stock, except as prohibited by the certificate of designation of preferences, rights and limitations of Series H Preferred Stock.

The following is a summary of the material terms of our Series H Preferred Stock. For more information, please refer to the certificate of designation of preferences, rights and limitations of Series H Preferred Stock to be filed as an exhibit to the registration statement of which this prospectus is a part.

*Liquidation.* Upon any dissolution, liquidation or winding up, whether voluntary or involuntary, holders of Series H Preferred Stock will be entitled to receive distributions out of our assets, whether capital or surplus, of an amount equal to \$0.0001 per share of Series H Preferred Stock before any distributions shall be made on the common stock or any series of preferred stock ranked junior to the Series H Preferred Stock, but after distributions shall be made on any outstanding Series F Preferred Stock and any of our existing or future indebtedness.

*Dividends.* Holders of the Series H Preferred Stock will be entitled to receive dividends equal (on an "as converted to common stock" basis) to and in the same form as dividends actually paid on shares of our common stock when, as and if such dividends are paid on shares of our common stock. No other dividends will be paid on shares of Series H Preferred Stock.

*Conversion.* Each share of Series H Preferred Stock is convertible, at any time and from time to time at the option of the holder thereof, into one share of common stock (subject to adjustment described below). This right to convert is limited by the beneficial ownership limitation described below.

*Forced Conversion.* Subject to certain ownership limitations as described below and certain equity conditions being met, until such time that during any 20 of 30 consecutive trading days, the volume weighted average price of our common stock exceeds 300% of the conversion price and the daily dollar trading volume during such period exceeds \$200,000 per trading day, we shall have the right to force the conversion of the Series H Preferred Stock into common stock.

*Beneficial Ownership Limitation.* A holder shall have no right to convert any portion of Series H Preferred Stock, to the extent that, after giving effect to such conversion, such holder, together with such holder's affiliates, and any persons acting as a group together with such holder or any such affiliate, would beneficially own in excess of 4.99% (or, upon the election by a holder prior to the issuance of any shares of Series H Preferred Stock, 9.99%) of the number of shares of common stock outstanding immediately after giving effect to the issuance of shares of common stock upon such conversion (subject to the right of the holder to increase such beneficial ownership limitation upon not less than 61 days prior notice provided that such limitation can never exceed 9.99% and such 61 day period cannot be waived). Beneficial ownership of the holder and its affiliates will be determined in accordance with Section 13(d) of the Securities Exchange Act of 1934, as amended, and the rules and regulations

promulgated thereunder. Holders of Series H Preferred Stock who are subject to such beneficial ownership limitation are and will remain responsible for ensuring their own compliance with Regulation 13D-G promulgated under the Securities Exchange Act of 1934, as amended, consistent with their individual facts and circumstances. In addition, pursuant to Rule 13d-3(d)(1)(i) promulgated under the Securities Exchange Act of 1934, as amended, any person who acquires Series H Preferred Stock with the purpose or effect of changing or influencing the control of our company, or in connection with or as a participant in any transaction having such purpose or effect, immediately upon such acquisition will be deemed to be the beneficial owner of the underlying common stock.

#### *Conversion Price Adjustment*

*Stock Dividends and Stock Splits.* If we pay a stock dividend or otherwise make a distribution payable in shares of common stock on shares of common stock or any other common stock equivalents, subdivide or combine outstanding common stock, or reclassify common stock, the conversion price will be adjusted by multiplying the then conversion price by a fraction, the numerator of which shall be the number of shares of common stock outstanding immediately before such event, and the denominator of which shall be the number of shares outstanding immediately after such event.

*Fundamental Transaction.* If we effect a fundamental transaction in which we are the surviving entity, then upon any subsequent conversion of Series H Preferred Stock, the holder thereof shall have the right to receive, for each share of common stock that would have been issuable upon such conversion immediately prior to the occurrence of such fundamental transaction, the number of shares of our common stock and any additional consideration receivable as a result of such fundamental transaction by a holder of the number of shares of common stock into which Series H Preferred Stock is convertible immediately prior to such fundamental transaction. A fundamental transaction means: (i) our merger or consolidation with or into another entity, (ii) any sale or other disposition of all or substantially all of our assets in one transaction or a series of related transactions, (iii) any tender offer or exchange offer allowing holders of our common stock to tender or exchange their shares for cash, property or securities, and has been accepted by the holders of 50% or more of the outstanding common stock (iv) any reclassification of our common stock or any compulsory share exchange by which common stock is effectively converted into or exchanged for other securities, cash or property, or (v) consummation of a stock or share purchase agreement or other business combination with another person whereby such other person acquires more than 50% of the outstanding shares of common stock.

*Voting Rights, etc.* Except as otherwise provided in the Series H Preferred Stock certificate of designation or required by law, the Series H Preferred Stock has no voting rights. However, as long as any shares of Series H Preferred Stock are outstanding, we may not, without the affirmative vote of the holders of a majority of the then outstanding shares of the Series H Preferred Stock, alter or change adversely the powers, preferences or rights given to the Series H Preferred Stock, amend its certificate of designation, amend our certificate of incorporation or other charter documents in any manner that adversely affects any rights of the holders, increase the number of authorized shares of Series H Preferred Stock, or enter into any agreement with respect to any of the foregoing. The Series H Preferred Stock certificate of designation provides that if any party commences an action or proceeding to enforce any provisions of the certificate of designation, then the prevailing party in such action or proceeding shall be reimbursed by the other party for its attorneys' fees and other costs and expenses incurred in the investigation, preparation and prosecution of such action or proceeding. This provision may, under certain circumstances, be inconsistent with federal securities laws and Delaware general corporation law.

*Fractional Shares.* No fractional shares of common stock will be issued upon conversion of Series H Preferred Stock. Rather, we shall, at our election, either pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the conversion price or round up to the next whole share.

The Series H Preferred Stock will be issued in book-entry form under a preferred stock agent agreement between American Stock Transfer & Trust as preferred stock agent, and us, and shall initially be represented by one or more book-entry certificates deposited with The Depository Trust Company, or DTC, and registered in the name of Cede & Co., a nominee of DTC, or as otherwise directed by DTC. There is no established public trading market for the Series H Preferred Stock and we do not expect a market to develop. We do not plan on applying to list the Series H Preferred Stock on The Nasdaq Capital Market, any other national securities exchange or any other nationally recognized trading system.

### **Description of Outstanding Warrants**

As of December 31, 2019, there were warrants outstanding to purchase a total of 6,948,466 shares of our common stock, which expire between 2020 and 2025. Each of these warrants entitles the holder to purchase one share of common stock at prices ranging from \$0.9942 to \$43,848 per common share, with a weighted average exercise price of \$7.06 per share. Certain of these warrants have a net exercise provision under which its holder may, in lieu of payment of the exercise price in cash, surrender the warrant and receive a net amount of shares based on the fair market value of our common stock at the time of exercise of the warrant after deduction of the aggregate exercise price. Each of these warrants also contains provisions for the adjustment of the exercise price and the aggregate number of shares issuable upon the exercise of the warrant in the event of dividends, share splits, reorganizations and reclassifications and consolidations. Certain of these warrants provide that, subject to limited exceptions, a holder will not have the right to exercise any portion of its warrants if the holder, together with its affiliates, would beneficially own over 4.99% of our then outstanding common stock following such exercise; provided, however, that upon prior notice to us, the warrant holder may increase its ownership, provided that in no event will the ownership exceed 9.99%.

### ***Anti-Takeover Effects of Certain Provisions of Our Certificate of Incorporation and Bylaws and***

#### ***Delaware Law Certificate of Incorporation and Bylaws***

Certain provisions of our certificate of incorporation and bylaws may be considered to have an anti-takeover effect, such as those provisions:

- providing for our board of directors to be divided into three classes with staggered three-year terms, with only one class of directors being elected at each annual meeting of our stockholders and the other classes continuing for the remainder of their respective three-year terms;
- authorizing our board of directors to issue from time to time any series of preferred stock and fix the voting powers, designation, powers, preferences and rights of the shares of such series of preferred stock;
- prohibiting stockholders from acting by written consent in lieu of a meeting;
- requiring advance notice of stockholder intention to put forth director nominees or bring up other business at a stockholders' meeting;
- prohibiting stockholders from calling a special meeting of stockholders;
- requiring a 66 $\frac{2}{3}$ % super-majority stockholder approval in order for stockholders to alter, amend or repeal certain provisions of our certificate of incorporation;
- requiring a 66 $\frac{2}{3}$ % super-majority stockholder approval in order for stockholders to adopt, amend or repeal our bylaws;
- providing that, subject to the rights of the holders of any series of preferred stock to elect additional directors under specified circumstances, neither the board of directors nor any individual director may be removed without cause;
- creating the possibility that our board of directors could prevent a coercive takeover of our Company due to the significant amount of authorized, but unissued shares of our common stock and preferred stock;
- providing that, subject to the rights of the holders of any series of preferred stock, the number of directors shall be fixed from time to time exclusively by our board of directors pursuant to a resolution adopted by a majority of the total number of authorized directors; and
- providing that any vacancies on our board of directors under certain circumstances will be filled only by a majority of our board of directors then in office, even if less than a quorum, and not by the stockholders.

#### ***Delaware Law***

We are also subject to Section 203 of the DGCL, which generally prohibits a Delaware corporation from engaging in any business combination with any interested stockholder for a period of three years following the date that the stockholder became an interested stockholder, unless:

- prior to that date, our board of directors approved either the business combination or the transaction that resulted in the stockholder becoming an interested stockholder;

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- upon consummation of the transaction that resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of our voting stock outstanding at the time the transaction commenced, excluding for purposes of determining the number of shares outstanding (but not the outstanding voting stock owned by the interested stockholder) those shares owned by (i) persons who are directors and also officers and (ii) employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or
- on or subsequent to that date, the business combination is approved by our board of directors and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66<sup>2</sup>/<sub>3</sub>% of the outstanding voting stock that is not owned by the interested stockholder.

In general, Section 203 of the DGCL defines an interested stockholder as an entity or person beneficially owning 15% or more of the outstanding voting stock of the corporation and any entity or person affiliated with or controlling or controlled by any of these entities or persons.

The above-summarized provisions of our certificate of incorporation and bylaws and the above-summarized provisions of the DGCL could make it more difficult to acquire us by means of a tender offer, a proxy contest or otherwise, or to remove incumbent officers and directors. These provisions are expected to discourage certain types of coercive takeover practices and takeover bids that our board of directors may consider inadequate and to encourage persons seeking to acquire control of us to first negotiate with our board of directors. We believe that the benefits of increased protection of our ability to negotiate with the proponent of an unfriendly or unsolicited proposal to acquire or restructure us outweigh the disadvantages of discouraging takeover or acquisition proposals because, among other things, negotiation of these proposals could result in an improvement of their terms.

### **Choice of Forum**

Our Fourth Amended and Restated Certificate of Incorporation, as amended, provides that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware will be the exclusive forum for any derivative action or proceeding brought on our behalf; any action asserting a breach of fiduciary duty; any action asserting a claim against us arising pursuant to the Delaware General Corporation Law; or any action asserting a claim against us that is governed by the internal affairs doctrine. These provisions would not apply to suits brought to enforce a duty or liability created by the Exchange Act, or any other claim for which the federal courts have exclusive jurisdiction. Our Fourth Amended and Restated Certificate of Incorporation, as amended, will further provide that the federal district courts of the United States of America will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act, subject to applicable law. Any person or entity purchasing or otherwise acquiring any interest in our securities shall be deemed to have notice of and consented to these provisions. Our exclusive forum provision will not relieve us of our duties to comply with the federal securities laws and the rules and regulations thereunder, and our stockholders will not be deemed to have waived our compliance with these laws, rules and regulations.

The provisions of the Delaware General Corporation Law, our Fourth Amended and Restated Certificate of Incorporation, as amended, and our Second Amended and Restated Bylaws could have the effect of discouraging others from attempting hostile takeovers and, as a consequence, they may also inhibit temporary fluctuations in the price of our common stock that often result from actual or rumored hostile takeover attempts. These provisions may also have the effect of preventing changes in our management. It is possible that these provisions could make it more difficult to accomplish transactions that stockholders may otherwise deem to be in their best interests.

### **Limitation on Liability of Directors and Indemnification**

Our certificate of incorporation limits the liability of our directors to the fullest extent permitted by Delaware law. Delaware law provides that directors of a corporation will not be personally liable for monetary damages for breach of their fiduciary duties as directors, except for liability for any:

- breach of their duty of loyalty to us or our stockholders;
- act or omission not in good faith or that involves intentional misconduct or a knowing violation of law;
- unlawful payment of dividends or redemption of shares as provided in Section 174 of the DGCL; or
- transaction from which the directors derived an improper personal benefit.

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These limitations of liability do not apply to liabilities arising under federal securities laws and do not affect the availability of equitable remedies such as injunctive relief or rescission.

Our bylaws provide that we will indemnify and advance expenses to our directors and officers to the fullest extent permitted by law or, if applicable, pursuant to indemnification agreements. They further provide that we may choose to indemnify our other employees or agents from time to time. Subject to certain exceptions and procedures, our bylaws also require us to advance to any person who was or is a party, or is threatened to be made a party, to any proceeding by reason of the person's service as one of our directors or officers all expenses incurred by the person in connection with such proceeding.

Section 145(g) of the DGCL and our bylaws also permit us to secure insurance on behalf of any officer, director, employee or other agent for any liability arising out of his or her actions in connection with their services to us, regardless of whether our bylaws permit indemnification. We maintain a directors' and officers' liability insurance policy.

We entered into indemnification agreements with each of our directors and executive officers that provide, in general, that we will indemnify them to the fullest extent permitted by law in connection with their service to us or on our behalf and, subject to certain exceptions and procedures, that we will advance to them all expenses that they incur in connection with any proceeding to which they are, or are threatened to be made, a party.

At present, there is no pending litigation or proceeding involving any of our directors or officers as to which indemnification is required or permitted, and we are not aware of any threatened litigation or proceeding that may result in a claim for indemnification.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Company pursuant to the foregoing provisions, or otherwise, the Company has been advised that in the opinion of the SEC this indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

### **Registration Rights**

*Outstanding Warrants.* We intend to register for resale the shares of common stock underlying certain replacement warrants issued to investors under a letter agreement dated February 15, 2017 that was entered into between us and such affiliates to encourage such affiliates to exercise their then-outstanding warrants for cash on or before March 31, 2017. See our Current Reports on Form 8-K filed with the SEC on February 16, 2017 and March 29, 2017 for additional information about the letter agreement and replacement warrants.

In addition, we agreed to register for resale the shares of common stock underlying certain warrants issued in a private placement transactions to investors pursuant to a securities purchase agreement, each dated October 23, 2019 and November 4, 2019. See our Current Reports on Form 8-K filed with the SEC on October 23, 2019 and November 4, 2019 for additional information about the private placement transaction and these warrants.

*Aquadex Acquisition.* On August 5, 2016, upon closing of the acquisition of the Aquadex Business, we entered into a registration rights agreement with Baxter, pursuant to which Baxter or its affiliates has the right to request that we file a registration statement with the SEC to register all or part of the 1,666 shares of common stock that Baxter received in connection with the acquisition. Upon receipt of any such request, we have agreed to use reasonable best efforts to prepare and file a registration statement as expeditiously as possible but in any event within 30 days of such request, to cause the registration statement to become effective in accordance with Baxter's intended method of distribution, and to pay the expenses incurred in connection with any such registration.

### **Transfer Agent and Registrar**

The transfer agent and registrar for our common stock is American Stock Transfer & Trust Company LLC.

### **Listing**

Our common stock trades on The Nasdaq Capital Market under the symbol "CHFS." See "Prospectus Summary—Recent Developments" in this prospectus for important information about the listing of our common stock on The Nasdaq Capital Market.

**UNDERWRITING**

We are offering the units described in this prospectus through the underwriters named below. Ladenburg Thalmann & Co. Inc. is acting as book-running manager of the offering. Subject to the terms and conditions of the underwriting agreement, the underwriters have agreed to purchase the number of our securities set forth opposite its name below.

<u>Underwriters</u>	<u>Class A Units</u>	<u>Class B Units</u>
Ladenburg Thalmann & Co. Inc.	[ ]	[ ]
Total	[ ]	[ ]

A copy of the underwriting agreement will be filed as an exhibit to the registration statement of which this prospectus is part.

We have been advised by the underwriters that they propose to offer the Units directly to the public at the public offering price set forth on the cover page of this prospectus. The underwriters may sell Class A Units or Class B Units separately to purchasers or may sell a combination of Class A Units and Class B Units to purchasers in any proportion. Any securities sold by the underwriters to securities dealers will be sold at the public offering price less a selling concession not in excess of \$[ ] per share and \$[ ] per warrant.

The underwriting agreement provides that the underwriters' obligation to purchase the securities we are offering is subject to conditions contained in the underwriting agreement.

No action has been taken by us or the underwriters that would permit a public offering of the Units, or the shares of common stock, shares of preferred stock and warrants included in the Units in any jurisdiction outside the United States where action for that purpose is required. None of our securities included in this offering may be offered or sold, directly or indirectly, nor may this prospectus or any other offering material or advertisements in connection with the offer and sales of any of the securities offering hereby be distributed or published in any jurisdiction except under circumstances that will result in compliance with the applicable rules and regulations of that jurisdiction. Persons who receive this prospectus are advised to inform themselves about and to observe any restrictions relating to this offering of securities and the distribution of this prospectus. This prospectus is neither an offer to sell nor a solicitation of any offer to buy the securities in any jurisdiction where that would not be permitted or legal.

The underwriters have advised us that they do not intend to confirm sales to any account over which they exercise discretionary authority.

**Underwriting Discount and Expenses**

The following table summarizes the underwriting discount and commission to be paid to the underwriters by us.

	<u>Per Class A Unit<sup>(1)</sup></u>	<u>Per Class B Unit<sup>(1)</sup></u>	<u>Total</u>	<u>Total with Full Exercise of Overallotment</u>
Public offering price				
Underwriting discount to be paid to the underwriters by us (8.0%)(2)(3)				
Proceeds to us (before expenses)				

- (1) The public offering price and underwriting discount corresponds to (x) in respect of the Class A Units (i) a public offering price per share of common stock of \$[ ] and (ii) a public offering price per warrant of \$[ ] and (y) in respect of the Class B Units (i) a public offering price per share of Series H Preferred Stock of \$[ ] and (ii) a public offering price per warrant of \$[ ].
- (2) We have also agreed to reimburse the accountable expenses of the representative, including legal fees, in this offering, up to a maximum of \$85,000.
- (3) We have granted a 45 day option to the representative to purchase up to [ ] additional shares of common stock (up to 15% of the shares of common stock plus the number of shares of common stock issuable upon conversion of shares of Series H Preferred Stock) and/or additional warrants exercisable for up to an additional [ ] shares of common stock (up to 15% of the warrants sold in this offering) at the assumed public offering price per share of common stock and the assumed public offering price per warrant set forth above less the underwriting discounts and commissions solely to cover over-allotments, if any.



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We estimate the total expenses payable by us for this offering to be approximately \$805,165, which amount includes (i) the underwriting discount of \$560,000 and (ii) reimbursement of the accountable expenses of the underwriters, including the legal fees of the representative and (iii) other estimated company expenses of approximately \$245,165 which includes legal accounting printing costs and various fees associated with the registration and listing of our shares.

The securities we are offering are being offered by the underwriters subject to certain conditions specified in the underwriting agreement.

### **Over-allotment Option**

We have granted to the underwriters an option exercisable not later than 45 days after the date of this prospectus to purchase up to a number of additional shares of common stock and/or warrants equal to 15% of the number of shares of common stock sold in the primary offering (including the number of shares of common stock issuable upon conversion of shares of Series H Preferred Stock but excluding any shares of common stock underlying the warrants issued in this offering and any shares of common stock issued upon any exercise of the underwriters' over-allotment option) and/or 15% of the warrants sold in the primary offering at the public offering price per share of common stock and the public offering price per warrant set forth on the cover page hereto less the underwriting discounts and commissions. The underwriters may exercise the option solely to cover over-allotments, if any, made in connection with this offering. If any additional shares of common stock and/or warrants are purchased, the underwriters will offer these shares of common stock and/or warrants on the same terms as those on which the other securities are being offered.

### **Other Relationships**

Upon completion of this offering, we have granted the representative a right of first refusal to act as lead bookrunner or lead placement agent in connection with any subsequent public or private offering of equity securities or other capital markets financing by us. This right of first refusal extends for 12 months from the closing date of this offering. The terms of any such engagement of the representative will be determined by separate agreement. The representative and its respective affiliates have in the past and may in the future engage in investment banking and other commercial dealings in the ordinary course of business with us or our affiliates. The representative has received, or may in the future receive, customary fees and commissions for these transactions.

### **Determination of Offering Price**

Our common stock is currently traded on The Nasdaq Capital Market under the symbol "CHFS." See "Prospectus Summary—Recent Developments" for important information about the listing of our common stock on The Nasdaq Capital Market. On December 31, 2019, the closing price of our common stock was \$0.86 per share. We do not intend to apply for listing of the Series H Preferred Stock or the warrants on any securities exchange or other trading system.

The public offering price of the securities offered by this prospectus will be determined by negotiation between us and the underwriters among the factors considered in determining the public offering price of the shares were;

- our history and our prospects;
- the industry in which we operate;
- our past and present operating results;
- the previous experience of our executive officers; and
- the general condition of the securities markets at the time of this offering, including discussions between the underwriters and prospective investors.

The offering price stated on the cover page of this prospectus should not be considered an indication of the actual value of the securities sold in this offering. That price is subject to change as a result of market conditions and other factors and we cannot assure you that the securities sold in this offering can be resold at or above the public offering price.

### **Lock-up Agreements**

Our officers, directors and each of their respective affiliates and associated partners have agreed with the underwriters to be subject to a lock-up period of 90 days following the date of this prospectus. This means that, during the applicable lock-up period, such persons may not offer for sale, contract to sell, sell, distribute, grant any option, right or warrant to purchase, pledge, hypothecate or otherwise dispose of, directly or indirectly, any shares of our common stock or any securities convertible into, or exercisable or exchangeable for, shares of our common stock. Certain limited transfers are permitted during the lock-up period if the transferee agrees to these lock-up restrictions. We have also agreed, in the underwriting agreement, to similar lock-up restrictions on the issuance and sale of our securities for 90 days following the closing of this offering, although we will be permitted to issue stock options or stock awards to directors, officers and employees under our existing plans. The representative may, in their sole discretion and without notice, waive the terms of any of these lock-up agreements.

### **Transfer Agent and Registrar**

The transfer agent and registrar for our common stock is American Stock Transfer & Trust Company LLC.

### **Stabilization, Short Positions and Penalty Bids**

The underwriters may engage in syndicate covering transactions stabilizing transactions and penalty bids or purchases for the purpose of pegging, fixing or maintaining the price of our common stock;

- Syndicate covering transactions involve purchases of securities in the open market after the distribution has been completed in order to cover syndicate short positions. Such a naked short position would be closed out by buying securities in the open market. A naked short position is more likely to be created if the underwriters are concerned that there could be downward pressure on the price of the securities in the open market after pricing that could adversely affect investors who purchase in the offering.
- Stabilizing transactions permit bids to purchase the underlying security so long as the stabilizing bids do not exceed a specific maximum.
- Penalty bids permit the underwriters to reclaim a selling concession from a syndicate member when the securities originally sold by the syndicate member are purchased in a stabilizing or syndicate covering transaction to cover syndicate short positions.

These syndicate covering transactions, stabilizing transactions, and penalty bids may have the effect of raising or maintaining the market prices of our securities or preventing or retarding a decline in the market prices of our securities. As a result the price of our common stock may be higher than the price that might otherwise exist in the open market. Neither we nor the underwriters make any representation or prediction as to the effect that the transactions described above may have on the price of our common stock. These transactions may be effected on the Nasdaq Capital Market, in the over-the-counter market or on any other trading market and, if commenced, may be discontinued at any time.

In connection with this offering, the underwriters also may engage in passive market making transactions in our common stock in accordance with Regulation M during a period before the commencement of offers or sales of shares of our common stock in this offering and extending through the completion of the distribution. In general, a passive market maker must display its bid at a price not in excess of the highest independent bid for that security. However, if all independent bids are lowered below the passive market maker's bid that bid must then be lowered when specific purchase limits are exceeded. Passive market making may stabilize the market price of the securities at a level above that which might otherwise prevail in the open market and, if commenced, may be discontinued at any time.

Neither we, nor the underwriters make any representation or prediction as to the direction or magnitude of any effect that the transactions described above may have on the prices of our securities. In addition, neither we nor the underwriters make any representation that the underwriters will engage in these transactions or that any transactions, once commenced will not be discontinued without notice.

### **Indemnification**

We have agreed to indemnify the underwriters against certain liabilities, including certain liabilities arising under the Securities Act or to contribute to payments that the underwriters may be required to make for these liabilities.

## MATERIAL U.S. FEDERAL INCOME TAX CONSIDERATIONS

The following is a general discussion of material U.S. federal income considerations relating to the purchase, ownership and disposition of our common stock, Series H Preferred Stock or warrants. This discussion is based on current provisions of the Internal Revenue Code, existing and proposed U.S. Treasury Regulations promulgated or proposed thereunder and current administrative and judicial interpretations thereof, all as in effect as of the date of this prospectus and all of which are subject to change or to differing interpretation, possibly with retroactive effect. We have not sought and will not seek any rulings from the Internal Revenue Service (the “IRS”) regarding the matters discussed below. There can be no assurance that the IRS or a court will not take a contrary position.

This discussion is limited to U.S. holders and non-U.S. holders who hold our common stock, Series H Preferred Stock or warrants as capital assets within the meaning of Section 1221 of the Internal Revenue Code (generally, as property held for investment). This discussion does not address all aspects of U.S. federal income taxation, such as the U.S. alternative minimum income tax and the additional tax on net investment income, nor does it address any aspect of state, local or non-U.S. taxes, or U.S. federal taxes other than income taxes, such as federal estate taxes. This discussion does not consider any specific facts or circumstances that may apply to a holder and does not address the special tax considerations that may be applicable to particular holders, such as:

- insurance companies;
- tax-exempt organizations;
- financial institutions;
- brokers or dealers in securities;
- regulated investment companies;
- pension plans;
- controlled foreign corporations;
- passive foreign investment companies;
- corporations that accumulate earnings to avoid U.S. federal income tax;
- certain U.S. expatriates;
- U.S. persons that have a “functional currency” other than the U.S. dollar;
- persons that acquire our common stock as compensation for services;
- owners that hold our common stock, Series H Preferred Stock or warrants as part of a straddle, hedge, conversion transaction, synthetic security or other integrated investment;
- entities that are treated as disregarded entities for U.S. federal income tax purposes (regardless of their places of organization or formation) and their investors; and
- partnerships or other entities treated as partnerships for U.S. federal income tax purposes and their investors.

If any entity taxable as a partnership for U.S. federal income tax purposes holds our common stock, Series H Preferred Stock or warrants, the U.S. federal income tax treatment of a partner in the partnership generally will depend on the status of the partner, the activities of the partnership and certain determinations made at the partner level. An investor in a partnership or entity treated as disregarded for U.S. federal income tax purposes should consult his, her or its own tax advisor regarding the applicable tax consequences relating to the purchase, ownership and disposition of our common stock, Series H Preferred Stock or warrants.

For purposes of this discussion, the term “U.S. holder” means a beneficial owner of our common stock, Series H Preferred Stock or warrants that is, for U.S. federal income tax purposes:

- an individual who is a citizen or resident of the United States;
- a corporation created or organized in or under the laws of the United States or of any political subdivision of the United States;

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- an estate the income of which is subject to U.S. federal income taxation regardless of its source; or
- a trust, if (i) a U.S. court is able to exercise primary supervision over the administration of the trust and one or more U.S. persons have authority to control all substantial decisions of the trust or (ii) the trust has a valid election to be treated as a U.S. person under applicable U.S. Treasury Regulations.

A “non-U.S. holder” is a beneficial owner of our common stock, Series H Preferred Stock or warrants that is, for U.S. federal income tax purposes, an individual, corporation, estate or trust that is not a U.S. holder.

**Prospective investors should consult their own tax advisors regarding the U.S. federal, state, local and non-U.S. income and other tax considerations of purchasing, holding and disposing of our common stock, Series H Preferred Stock or warrants.**

### **U.S. Holders**

#### ***Purchase of Units***

For U.S. federal income tax purposes, the purchase of a Class A Unit will be treated as the purchase of two components: a component consisting of one share of our common stock and a component consisting of one warrant to purchase one share of our common stock. The purchase of a Class B Unit will be treated as the purchase of two components: a component consisting of one share of our Series H Preferred Stock and a component consisting of a warrant to purchase one share of common stock. The purchase price for each Unit will be allocated between its components in proportion to the relative fair market value of each at the time the Unit is purchased by the holder. This allocation of the purchase price for each Unit will establish a holder’s initial tax basis for U.S. federal income tax purposes in the shares and warrants that compose each Unit.

#### ***Exercise of Warrants***

A U.S. holder generally will not recognize gain or loss on the exercise of a warrant and related receipt of shares of our common stock (unless cash is received in lieu of the issuance of a fractional share of our common stock). A U.S. holder’s initial tax basis in the shares of our common stock received upon the exercise of a warrant will be equal to the sum of (a) such U.S. holder’s tax basis in such warrant plus (b) the exercise price paid by such U.S. holder on the exercise of such warrant. A U.S. holder’s holding period for the shares of our common stock received upon the exercise of a warrant will begin on the day after the date that the warrant is exercised.

In certain limited circumstances, a U.S. holder may be permitted to undertake a cashless exercise of warrants into shares of our common stock. The U.S. federal income tax treatment of a cashless exercise of warrants into shares of common stock is unclear, and the tax consequences of a cashless exercise could differ from the consequences upon the exercise of a warrant described in the preceding paragraph. U.S. holders should consult their own tax advisors regarding the U.S. federal income tax consequences of a cashless exercise of warrants.

#### ***Certain Adjustments to the Warrants or Series H Preferred Stock***

An adjustment to the number of shares of our common stock that will be issued upon the exercise of a warrant or conversion of a share of Series H Preferred Stock, or an adjustment to the exercise price of a warrant, may be treated as a constructive distribution to a U.S. holder of the warrant or share depending on the circumstances of such adjustment (for example, if such adjustment is to compensate for a distribution of cash or other property to our shareholders). Adjustments to the exercise price of warrants or conversion price of Series H Preferred Stock made pursuant to a bona fide reasonable adjustment formula that has the effect of preventing dilution of the interest of the holders thereof generally should not be considered to result in a constructive distribution. Any such constructive distribution would be taxable whether or not there is an actual distribution of cash or other property. See the more detailed discussion of the rules applicable to distributions made by us under the heading “Distributions on Common Stock or Series H Preferred Stock” below.

#### ***Expiration of the Warrants without Exercise***

Upon the lapse or expiration of a warrant, a U.S. holder will recognize a loss in an amount equal to such U.S. holder’s tax basis in the warrant. Any such loss generally will be a capital loss and will be long-term capital loss if the warrant is held for more than one year. Deductions for capital losses are subject to certain limitations.

### ***Conversion of Series H Preferred Stock***

A U.S. holder generally will not recognize gain or loss upon the conversion of a share of Series H Preferred Stock into common stock. A U.S. holder's initial tax basis in the shares of our common stock received upon the conversion of a share of Series H Preferred Stock will be equal to such U.S. holder's tax basis in the share of Series H Preferred Stock. A U.S. holder's holding period for the shares of our common stock received upon the conversion of a share of Series H Preferred Stock will include the U.S. holder's holding period in such share of Series H Preferred Stock.

### ***Distributions on Common Stock or Series H Preferred Stock***

If we pay distributions of cash or property with respect to our common stock or Series H Preferred Stock (including constructive distributions as described above under the heading "Certain Adjustments to the Warrants or Series H Preferred Stock"), those distributions generally will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. If a distribution exceeds our current and accumulated earnings and profits, the excess will be treated as a tax-free return of the U.S. holder's investment, up to such holder's tax basis in its shares of our common stock or Series H Preferred Stock. Any remaining excess will be treated as capital gain, subject to the tax treatment described below under the heading "—Gain on Sale, Exchange or Other Taxable Disposition."

### ***Gain on Sale, Exchange or Other Taxable Disposition***

Upon the sale or other taxable disposition of common shares, Series H Preferred Stock or warrants, a U.S. holder generally will recognize capital gain or loss in an amount equal to the difference between (a) the amount of cash plus the fair market value of any property received and (b) such U.S. holder's tax basis in such common shares, Series H Preferred Stock or warrants sold or otherwise disposed of. Such gain or loss generally will be long-term capital gain or loss if, at the time of the sale or other disposition, the common shares, Series H Preferred Stock or warrants have been held by the U.S. holder for more than one year. Preferential tax rates may apply to long-term capital gain of a U.S. holder that is an individual, estate, or trust. Deductions for capital losses are subject to certain limitations.

### ***Non-U.S. Holders***

#### ***Distributions on Common Stock or Series H Preferred Stock***

If we pay distributions of cash or property with respect to our common stock or Series H Preferred Stock (including constructive distributions as described above under the heading "Certain Adjustments to the Warrants or Series H Preferred Stock"), those distributions generally will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. If a distribution exceeds our current and accumulated earnings and profits, the excess will be treated as a tax-free return of the non-U.S. holder's investment, up to such holder's tax basis in its shares of our common stock or Series H Preferred Stock. Any remaining excess will be treated as capital gain, subject to the tax treatment described below under the heading "—Gain on Sale, Exchange or Other Taxable Disposition." Dividends paid to a non-U.S. holder generally will be subject to withholding of U.S. federal income tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence. In the case of any constructive distribution, it is possible that this tax would be withheld from any amount owed to the non-U.S. holder, including, but not limited to, distributions of cash, common stock or sales proceeds subsequently paid or credited to that holder. If we are unable to determine, at the time of payment of a distribution, whether the distribution will constitute a dividend, we may nonetheless choose to withhold any U.S. federal income tax on the distribution as permitted by U.S. Treasury Regulations.

Distributions that are treated as effectively connected with a trade or business conducted by a non-U.S. holder within the United States are generally not subject to the 30% withholding tax if the non-U.S. holder provides a properly executed IRS Form W-8ECI stating that the distributions are not subject to withholding because they are effectively connected with the non-U.S. holder's conduct of a trade or business in the United States. If a non-U.S. holder is engaged in a trade or business in the United States and the distribution is effectively connected with the conduct of that trade or business, the distribution will generally have the consequences described above for a U.S. holder (subject to any modification provided under an applicable income tax treaty). Any U.S. effectively connected income received by a non-U.S. holder that is treated as a corporation for U.S. federal income tax purposes may also, under certain circumstances, be subject to an additional "branch profits tax" at a 30% rate (or such lower rate as may be specified by an applicable income tax treaty).

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A non-U.S. holder who claims the benefit of an applicable income tax treaty between the United States and such holder's country of residence generally will be required to provide a properly executed IRS Form W-8BEN or W-8BEN-E, as applicable, and satisfy applicable certification and other requirements. A non-U.S. holder that is eligible for a reduced rate of U.S. withholding tax under an income tax treaty generally may obtain a refund or credit of any excess amounts withheld by timely filing an appropriate claim with the IRS. Non-U.S. holders should consult their own tax advisors regarding their entitlement to benefits under a relevant income tax treaty.

### ***Gain on Sale, Exchange or Other Taxable Disposition***

Subject to the discussion below in “—Information Reporting and Backup Withholding” and “—Foreign Account Tax Compliance Act,” a non-U.S. holder generally will not be subject to U.S. federal income tax on gain recognized on a sale, exchange or other taxable disposition of our common stock, Series H Preferred Stock or warrants unless:

- the gain is effectively connected with the non-U.S. holder's conduct of a trade or business in the United States and, if an applicable income tax treaty so provides, the gain is attributable to a permanent establishment maintained by the non-U.S. holder in the United States; in these cases, the non-U.S. holder will be taxed on a net income basis at the regular graduated rates and in the manner applicable to a U.S. holder, and, if the non-U.S. holder is a corporation, an additional branch profits tax at a rate of 30%, or a lower rate as may be specified by an applicable income tax treaty, may also apply;
- the non-U.S. holder is an individual present in the United States for 183 days or more in the taxable year of the disposition and certain other conditions are met, in which case the non-U.S. holder will be subject to a 30% tax (or such lower rate as may be specified by an applicable income tax treaty) on the amount by which such non-U.S. holder's capital gains allocable to U.S. sources exceed capital losses allocable to U.S. sources during the taxable year of the disposition; or
- we are or were a “U.S. real property holding corporation” during the shorter of the five-year period ending on the date of the disposition or the period that the non-U.S. holder held our common stock. Generally, a corporation is a “U.S. real property holding corporation” if the fair market value of its “U.S. real property interests” (within the meaning of the Internal Revenue Code) equals or exceeds 50% of the sum of the fair market value of its worldwide real property interests plus its other assets used or held for use in a trade or business. We believe that we are not currently, and we do not anticipate becoming, a “U.S. real property holding corporation” for U.S. federal income tax purposes.

### **Information Reporting and Backup Withholding**

Distributions on, and the payment of the proceeds of a disposition of, our common stock, Series H Preferred Stock or warrants generally will be subject to information reporting if made within the United States or through certain U.S.-related financial intermediaries. Information returns are required to be filed with the IRS and copies of information returns may be made available to the tax authorities of the country in which a holder resides or is incorporated under the provisions of a specific treaty or agreement.

Backup withholding may also apply if the holder fails to provide certification of exempt status or a correct U.S. taxpayer identification number and otherwise comply with the applicable backup withholding requirements. Generally, a holder will not be subject to backup withholding if it provides a properly completed and executed IRS Form W-9 or appropriate IRS Form W-8, as applicable. Backup withholding is not an additional tax. Amounts withheld under the backup withholding rules may be refunded or credited against the holder's U.S. federal income tax liability, if any, provided certain information is timely filed with the IRS.

### **Foreign Account Tax Compliance Act**

Legislation commonly referred to as the Foreign Account Tax Compliance Act, or FATCA, generally imposes a U.S. federal withholding tax of 30% on dividends paid to certain non-U.S. entities (including certain intermediaries) unless such persons comply with FATCA's information reporting and withholding regime. We will not pay any additional amounts to stockholders in respect of any amounts withheld. This regime and its requirements are different from, and in addition to, the certification requirements described elsewhere in this discussion. If a payment is both subject to withholding under FATCA and subject to withholding tax discussed above, the withholding under FATCA may be credited against, and therefore reduce, such other withholding tax.

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The United States has entered into, and continues to negotiate, intergovernmental agreements (each, an “IGA”) with a number of other jurisdictions to facilitate the implementation of FATCA. An IGA may significantly alter the application of FATCA and its information reporting and withholding requirements with respect to any particular investor. FATCA is particularly complex and its application remains uncertain. Prospective investors should consult their own tax advisors regarding how these rules may apply in their particular circumstances.

**LEGAL MATTERS**

Honigman LLP, Kalamazoo, Michigan, will issue a legal opinion as to the validity of the securities offered by this prospectus. Ellenoff Grossman & Schole LLP, New York, New York is acting as counsel for the underwriters in connection with certain legal matters in connection with this offering.

**EXPERTS**

The consolidated financial statements of CHF Solutions, Inc. and its subsidiaries as of December 31, 2018 and 2017 and for the years then ended, included in this Prospectus have been audited by Baker Tilly Virchow Krause LLP, our independent registered public accounting firm, as set forth in their report in the Form 10-K (which contains an explanatory paragraph describing conditions that raise substantial doubt about the Company’s ability to continue as a going concern as described in Note 1 to the consolidated financial statements), and are included in reliance upon such report given on the authority of such firm as experts in accounting and auditing.

**CHF SOLUTIONS, INC. AND SUBSIDIARIES**

**CONSOLIDATED FINANCIAL STATEMENTS**

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**REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

To the shareholders and the board of directors of CHF Solutions, Inc.:

**Opinion on the Financial Statements**

We have audited the accompanying consolidated balance sheets of CHF Solutions, Inc. and subsidiaries (the “Company”) as of December 31, 2018 and 2017, the related consolidated statements of operations and comprehensive loss, stockholders’ equity and cash flows, for the years then ended, and the related notes (collectively referred to as the “consolidated financial statements”). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of their operations and their cash flows for the years then ended, in conformity with accounting principles generally accepted in the United States of America.

**Going concern**

The accompanying consolidated financial statements have been prepared assuming the Company will continue as a going concern. As discussed in Note 1 of the consolidated financial statements, the Company has recurring losses from operations, an accumulated deficit, expects to incur losses for the foreseeable future and needs additional working capital. These are the reasons that raise substantial doubt about their ability to continue as a going concern. Management’s plans in regard to these matters are also described in Note 1. The consolidated financial statements do not contain any adjustments that might result from the outcome of this uncertainty.

**Basis for Opinion**

These consolidated financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on the Company’s consolidated financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (“PCAOB”) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company’s internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Baker Tilly Virchow Krause, LLP

We have served as the Company’s auditor since 2017.

Minneapolis, Minnesota  
February 21, 2019

**CHF SOLUTIONS, INC. AND SUBSIDIARIES**

*Consolidated Balance Sheets*

(In thousands, except share and per share amounts)

	December 31, 2018	December 31, 2017
<b>ASSETS</b>		
<b>Current assets</b>		
Cash and cash equivalents	\$ 5,480	\$ 15,595
Accounts receivable	786	545
Inventories	1,658	1,588
Other current assets	203	136
<b>Total current assets</b>	<b>8,127</b>	<b>17,864</b>
Property, plant and equipment, net	536	570
Other assets	113	21
<b>TOTAL ASSETS</b>	<b>\$ 8,776</b>	<b>\$ 18,455</b>
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
<b>Current liabilities</b>		
Accounts payable	\$ 1,133	\$ 862
Accrued compensation	1,498	1,021
Other current liabilities	209	208
<b>Total current liabilities</b>	<b>2,840</b>	<b>2,091</b>
Other liabilities	—	126
<b>Total liabilities</b>	<b>2,840</b>	<b>2,217</b>
Commitments and contingencies		
<b>Stockholders' equity</b>		
Series A junior participating preferred stock as of December 31, 2018 and December 31, 2017, par value \$0.0001 per share; authorized 30,000 shares, none outstanding	—	—
Series F convertible preferred stock as of December 31, 2018 and December 31, 2017, par value \$0.0001 per share; authorized 535 and 3,780 shares, respectively, issued and outstanding 535 and 3,780, respectively		
Preferred stock as of December 31, 2018 and December 31, 2017, par value \$0.0001 per share; authorized 39,969,465 and 39,966,220 shares, respectively, none outstanding	—	—
Common stock as of December 31, 2018 and December 31, 2017, par value \$0.0001 per share; authorized 100,000,000 shares, issued and outstanding 513,445 and 271,357, respectively	—	—
Additional paid-in capital	204,101	197,367
Accumulated other comprehensive income:		
Foreign currency translation adjustment	1,223	1,227
Accumulated deficit	(199,388)	(182,356)
<b>Total stockholders' equity</b>	<b>5,936</b>	<b>16,238</b>
<b>TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY</b>	<b>\$ 8,776</b>	<b>\$ 18,455</b>

See notes to the consolidated financial statements

CHF SOLUTIONS, INC. AND SUBSIDIARIES

*Consolidated Statements of Operations and Comprehensive Loss*

(In thousands, except per share amounts)

	Year Ended December 31,	
	2018	2017
<b>Net sales</b>	\$ 4,998	\$ 3,553
<b>Costs and Expenses:</b>		
Cost of goods sold	3,670	2,763
Selling, general and administrative	15,311	10,170
Research and development	3,053	1,481
Goodwill and intangibles impairment	—	3,951
Total costs and expenses	<u>22,034</u>	<u>18,365</u>
Loss from operations	<u>(17,036)</u>	<u>(14,812)</u>
Other income (expense):		
Other income, net	10	28
Warrant valuation expense	—	(67)
Change in fair value of warrant liability	—	1,475
Total other income, net	<u>10</u>	<u>1,436</u>
Loss before income taxes	<u>(17,026)</u>	<u>(13,376)</u>
Income tax expense	<u>(6)</u>	<u>(6)</u>
<b>Net loss</b>	<u>\$ (17,032)</u>	<u>\$ (13,382)</u>
<b>Basic and diluted loss per share</b>	<u>\$ (42.14)</u>	<u>\$ (525.01)</u>
Weighted average shares outstanding – basic and diluted	404	48
<b>Other comprehensive loss:</b>		
Foreign currency translation adjustment	<u>\$ (4)</u>	<u>\$ (8)</u>
<b>Total comprehensive loss</b>	<u>\$ (17,036)</u>	<u>\$ (13,390)</u>

See notes to the consolidated financial statements

**CHF SOLUTIONS, INC. AND SUBSIDIARIES**

***Consolidated Statements of Stockholders' Equity***

(In thousands, except share amounts)

	Outstanding Shares of Common Stock	Common Stock	Additional Paid in Capital	Accumulated Other Comprehensive Income	Accumulated Deficit	Stockholders' Equity
<b>Balance December 31, 2016</b>	<b>2,801</b>	<b>\$ —</b>	<b>\$ 169,496</b>	<b>\$ 1,235</b>	<b>\$ (168,974)</b>	<b>\$ 1,757</b>
Net loss	—	—	—	—	(13,382)	(13,382)
Foreign currency translation adjustment	—	—	—	(8)	—	(8)
Stock-based compensation, net	17	—	499	—	—	499
Issuance of common stock, net	42,017	—	5,399	—	—	5,399
Issuance of preferred stock, net	—	—	21,973	—	—	21,973
Conversion of preferred stock into common stock	226,522	—	—	—	—	—
<b>Balance December 31, 2017</b>	<b>271,357</b>	<b>\$ —</b>	<b>\$ 197,367</b>	<b>\$ 1,227</b>	<b>\$ (182,356)</b>	<b>\$ 16,238</b>
Net loss	—	—	—	—	(17,032)	(17,032)
Foreign currency translation adjustment	—	—	—	(4)	—	(4)
Stock-based compensation, net	12	—	2,087	—	—	2,087
Issuance of unregistered shares	7,116	—	—	—	—	—
Issuance of common stock, net	181,941	—	4,647	—	—	4,647
Conversion of preferred stock into common stock	53,019	—	—	—	—	—
<b>Balance December 31, 2018</b>	<b>513,445</b>	<b>\$ —</b>	<b>\$ 204,101</b>	<b>\$ 1,223</b>	<b>\$ (199,388)</b>	<b>\$ 5,936</b>

See notes to the consolidated financial statements

CHF SOLUTIONS, INC. AND SUBSIDIARIES

*Consolidated Statements of Cash Flows*  
(In thousands)

	For the years ended December 31,	
	2018	2017
<b>Operating Activities</b>		
Net loss	\$ (17,032)	\$ (13,382)
Adjustments to reconcile net loss to cash flows from operating activities:		
Depreciation and amortization	232	769
Stock-based compensation expense	2,087	499
Goodwill and intangibles impairment	—	3,951
Change in fair value of warrant liability	—	(1,475)
Warrant valuation expense	—	67
Changes in assets and liabilities:		
Accounts receivable	(241)	(263)
Inventories	(70)	(911)
Other current assets	(67)	1
Other assets and liabilities	(14)	—
Accounts payable and accrued expenses	545	(1,176)
<b>Net cash used in operations</b>	<b>(14,560)</b>	<b>(11,920)</b>
<b>Investing activities:</b>		
Purchase of property and equipment	(198)	(259)
<b>Net cash used in investing activities</b>	<b>(198)</b>	<b>(259)</b>
<b>Financing activities:</b>		
Net proceeds from public stock offerings	4,647	24,281
Net proceeds from exercise of warrants	—	1,989
Net proceeds from the sale of preferred stock, common stock and warrants	—	184
<b>Net cash provided by financing activities</b>	<b>4,647</b>	<b>26,454</b>
Effect of exchange rate changes on cash	(4)	(3)
Net increase (decrease) in cash and cash equivalents	(10,115)	14,272
Cash and cash equivalents—beginning of period	15,595	1,323
<b>Cash and cash equivalents—end of period</b>	<b>\$ 5,480</b>	<b>\$ 15,595</b>
<b>Supplemental schedule of non-cash activities</b>		
Financing fees incurred for subsequent equity financing included in other assets and accounts payable	\$ 78	\$ —
Warrants issued as inducement to warrant exercise	\$ —	\$ 509
Conversion of temporary equity to permanent equity	\$ —	\$ 485
<b>Supplemental cash flow information</b>		
Cash paid for income taxes	\$ 2	\$ 6

See notes to the consolidated financial statements

**CHF SOLUTIONS, INC. AND SUBSIDIARIES****Notes to Consolidated Financial Statements****Note 1—Nature of Business and Significant Accounting Policies*****Nature of Business***

CHF Solutions, Inc. (the “Company”) is a medical device company focused on commercializing the Aquadex FlexFlow® system for aquapheresis therapy. The Aquadex FlexFlow system (Aquadex) is indicated for temporary (up to eight hours) ultrafiltration treatment of patients with fluid overload who have failed diuretic therapy and extended (longer than 8 hours) ultrafiltration treatment of patients with fluid overload who have failed diuretic therapy and require hospitalization. CHF Solutions, Inc. is a Delaware corporation headquartered in Minneapolis with wholly owned subsidiaries in Australia, Ireland and Delaware. The Company has been listed on Nasdaq since February 2012.

Prior to July 2016, the Company was focused on developing the C-Pulse® Heart Assist System for treatment of Class III and ambulatory Class IV heart failure. In August 2016, the Company acquired the Aquadex FlexFlow business from a subsidiary of Baxter International, Inc. (“Baxter”), a global leader in the hospital products and dialysis markets (herein referred to as the “Aquadex Business”). In September 2016, the Company announced a strategic refocus of its strategy that included halting all clinical evaluations of its C-Pulse related technology to fully focus all of its resources on its recently acquired Aquadex Business.

On May 23, 2017, the Company announced it was changing its name from Sunshine Heart, Inc. to CHF Solutions, Inc. to more appropriately reflect the direction of its business.

In December 2018, the Company’s stockholders approved a reverse split of its outstanding common stock at a ratio in the range of 1-for-2 to 1-for-14 and, in January 2019, the board of directors approved a 1-for-14 reverse split of the Company’s outstanding common stock that became effective after trading on January 2, 2019. In addition, during 2017, the Company’s stockholders and board of directors approved two reverse stock splits. The first reverse stock split was a 1-for-30 reverse split of the Company’s outstanding common stock that became effective after trading on January 12, 2017. The second reverse stock split was a 1-for-20 reverse split of the Company’s outstanding common stock that became effective after trading on October 12, 2017. These reverse stock splits did not change the par value of the Company’s common stock or the number of common or preferred shares authorized by the Company’s Fourth Amended and Restated Certificate of Incorporation. All share and per-share amounts have been retroactively adjusted to reflect the reverse stock splits for all periods presented.

***Going Concern***

The Company’s financial statements have been prepared and presented on a basis assuming it continues as a going concern. During the years ended December 31, 2018 and 2017, the Company incurred losses from operations and net cash outflows from operating activities as disclosed in the consolidated statements of operations and cash flows, respectively. At December 31, 2018, the Company had an accumulated deficit of \$199.4 million and it expects to incur losses for the foreseeable future. To date, the Company has been funded by debt and equity financings, and although the Company believes that it will be able to successfully fund its operations, there can be no assurance that it will be able to do so or that it will ever operate profitably. These factors raise substantial doubt about the Company’s ability to continue as a going concern through at least twelve months from the report date.

The Company became a revenue generating company after acquiring the Aquadex Business in August 2016. The Company expects to incur additional losses in the near-term as it grows the Aquadex Business, including investments in expanding its sales and marketing capabilities, purchasing inventory, manufacturing components, and complying with the requirements related to being a U.S. public company. To become and remain profitable, the Company must succeed in expanding the adoption and market acceptance of the Aquadex FlexFlow system. This will require the Company to succeed in training personnel at hospitals and effectively and efficiently manufacturing, marketing and distributing the Aquadex FlexFlow system and related components. There can be no assurance that the Company will succeed in these activities, and it may never generate revenues sufficient to achieve profitability.

On April 24, 2017, November 27, 2017, and on July 3, 2018, the Company closed on underwritten public equity offerings for aggregate net proceeds of approximately \$28.8 million after deducting the underwriting discounts and commissions and other costs associated with the offerings (see Note 6 – Shareholder’s Equity). The Company will

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require additional funding to grow its Aquadex Business, which may not be available on terms favorable to the Company, or at all. The Company may receive those funds from the proceeds from future warrant exercises, issuances of equity securities, or other financing transactions. Should warrant exercises not materialize or future capital raising be unsuccessful, the Company may not be able to continue as a going concern. No adjustments have been made relating to the recoverability and classification of recorded asset amounts and classification of liabilities that might be necessary should the Company not continue as a going concern.

### ***Basis of Presentation***

The accompanying consolidated financial statements include the accounts of CHF Solutions, Inc. and its wholly-owned subsidiaries, CHF Solutions, LLC, Sunshine Heart Company Pty Limited, and Sunshine Heart Ireland Limited. All intercompany accounts and transactions between consolidated entities have been eliminated.

### ***Use of Estimates***

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amounts and disclosures in the consolidated financial statements and accompanying notes. Actual results could differ from those estimates.

### ***Cash and Cash Equivalents***

Cash and cash equivalents consist of cash and term deposits with original maturities of three months or less. The carrying value of these instruments approximate fair value. The balances, at times, may exceed federally insured limits. The Company has not experienced any losses on its cash and cash equivalents.

### ***Accounts Receivable***

Accounts receivable are unsecured, are recorded at net realizable value, and do not bear interest. The Company makes judgments as to its ability to collect outstanding receivables based upon significant patterns of uncollectability, historical experience, and managements' evaluation of specific accounts and will provide an allowance for credit losses when collection becomes doubtful. The Company performs credit evaluations of its customers' financial condition on an as-needed basis. Payment is generally due 30 days from the invoice date and accounts past 30 days are individually analyzed for collectability. When all collection efforts have been exhausted, the account is written off against the related allowance. To date the Company has not experienced any write-offs or significant deterioration of its accounts receivable aging, and therefore, no allowance for doubtful accounts was considered necessary as of December 31, 2018 or 2017.

### ***Inventories***

Inventories are recorded at the lower of cost or net realizable value using the first-in, first out method. Inventories consisted of the following as of December 31 (in thousands):

	<u>2018</u>	<u>2017</u>
Finished Goods	\$ 517	\$ 902
Work in Process	34	217
Raw Materials	1,107	469
Total	<u>\$ 1,658</u>	<u>\$ 1,588</u>

### ***Other Current Assets***

Other current assets represent prepayments and deposits made by the Company.

### ***Property, Plant and Equipment***

Property and equipment is stated at cost less accumulated depreciation. Depreciation is computed based upon the estimated useful lives of the respective assets. Leasehold improvements and capital lease assets are amortized using the straight-line method over the shorter of the lease term or the estimated useful life of the assets. Repairs and

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maintenance costs are expensed as incurred. The cost and accumulated depreciation of property, plant and equipment retired, or otherwise disposed of are removed from the related accounts, and any residual values are charged to expense. Depreciation expense has been calculated using the following estimated useful lives:

Office furniture and equipment	3-5 years
Computer software and equipment	3-4 years
Laboratory and research equipment	3-5 years
Production equipment	3-7 years
Leasehold improvements and capital lease asset	3-5 years

Depreciation expense was \$232,000 and \$229,000 for the years ended December 31, 2018, and 2017, respectively.

Property and equipment are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset or asset group may not be recoverable. If the impairment tests indicate that the carrying value of the asset, or asset group is greater than the expected undiscounted cash flows to be generated by such asset or asset group, further analysis is performed to determine the fair value of the asset or asset group. To the extent the fair value of the asset or asset group is less than its carrying value, an impairment loss is recognized equal to the amount the fair value of the asset or asset group exceeds its carrying amount. The Company generally measures fair value by considering sale prices for similar assets or asset groups, or by discounting estimated future cash flows from such assets or asset groups using an appropriate discount rate. Assets to be disposed of are carried at the lower of their carrying value or fair value less costs to sell. Considerable management judgment is necessary to estimate the fair value of assets or asset groups, and accordingly, actual results could vary significantly from such estimates. The Company periodically reviews its property and equipment for potential impairment and determines if the fair value of property and equipment equals or exceeds its carrying value. There have been no impairment losses recognized for the years ended December 31, 2018 or 2017.

### ***Intangible assets***

The Company's intangible assets consisted of customer relationships, developed technology, and trademarks and tradenames. All intangible assets recognized by the Company resulted from the acquisition of the Aquadex Business. All intangible assets were estimated to have a useful life of 7 years. The Company reviewed its definite lived intangible assets for impairment when impairment indicators existed. When impairment indicators existed, the Company determined if the carrying value of the intangible assets exceeded the related undiscounted cash flows. In cases where the carrying value exceeded the undiscounted cash flows, and the carrying amount was not considered recoverable, the carrying value was written down to its fair value, generally using a discounted cash flow analysis. An impairment loss was recognized for the amount that the intangible assets exceeded their fair value, generally based on discounted cash flow methods and other fair market value indicators. The Company's review of its intangible assets during the year ended December 31, 2017 resulted in \$3.8 million of impairment charges related to its definite lived intangible assets.

The Company had a single reporting unit. The impairment charges were based on fair values determined using market value indicators such as the quoted market prices of the Company's common stock on Nasdaq, as well discounted cash flow models. Discounted cash flow models included assumptions related to the Company's product revenues, gross margins, and operating margins, under varying assumptions about the Company's ability to either achieve profitability or obtain the necessary financings to realize such projections. As discussed above, the Company became a revenue generating company after acquiring the Aquadex Business in August 2016 and expects to incur losses in the near-term as it grows the Aquadex Business. To become and remain profitable, and to generate cash flows from operations, the Company must succeed in expanding the adoption and market acceptance of its products. This will require that the Company succeed in training personnel at hospitals and in effectively and efficiently manufacturing, marketing, and distributing its products. There can be no assurance that the Company will succeed in these activities, and it may never generate revenues sufficient to achieve profitability or positive cash flows. The discounted cash flow models reflected these uncertainties by assigning future cash flow estimations probability factors and an overall discount rate of 30%.

Amortization expense was \$0 and \$540,000 for the years ended December 31, 2018 and 2017, respectively.



### **Goodwill**

Goodwill was the cost paid for the Aquadex Business in excess of the fair value of acquired assets and liabilities, and was recorded as an asset on the balance sheet. Goodwill was not subject to amortization but was to be tested for impairment at least annually. This test required the Company to determine if the implied fair value of the goodwill was less than its carrying amount.

The Company evaluated its recorded goodwill for impairment annually on November 1<sup>st</sup> of each calendar year, or to the extent events or conditions indicate a risk of possible impairment during the interim periods prior to its annual impairment test. As described below, the Company early adopted Accounting Standards Update No, 2017-04, *Simplifying the Test for Goodwill Impairment*, and performed a single step in performing its impairment analysis, which is to determine the estimated fair value of its reporting unit and compare it to the carrying value of the reporting unit, including goodwill. The remaining implied goodwill was then compared to the actual carrying amount of the goodwill for the reporting unit. To the extent the carrying amount of goodwill exceeded the implied goodwill, the difference was the amount of the goodwill impairment. The Company's annual impairment test on November 1, 2017, resulted in \$0.2 million of impairment charges related to goodwill.

The Company had a single reporting unit. The impairment charge was based on fair values determined using market value indicators such as the quoted market prices of the Company's common stock on Nasdaq, as well discounted cash flow models. Discounted cash flow models included assumptions related to the Company's product revenues, gross margins, and operating margins, under varying assumptions about the Company's ability to either achieve profitability or obtain the necessary financings to realize such projections. As discussed above, the Company became a revenue generating company after acquiring the Aquadex Business in August 2016 and expects to incur losses in the near-term as it grows the Aquadex Business. To become and remain profitable, and to generate cash flows from operations, the Company must succeed in expanding the adoption and market acceptance of its products. This will require that the Company succeed in training personnel at hospitals and in effectively and efficiently manufacturing, marketing, and distributing its products. There can be no assurance that the Company will succeed in these activities, and it may never generate revenues sufficient to achieve profitability or positive cash flows. The discounted cash flow models reflected these uncertainties by assigning future cash flow estimations probability factors and an overall discount rate of 30%.

### **Contingent consideration**

In connection with the Company's purchase of the Aquadex Business in August 2016, the Company has an obligation to pay additional consideration that is contingent upon the occurrence of certain future events (see Note 10- Commitments and Contingencies). Contingent consideration is recognized at the acquisition date at the estimated fair value of the contingent milestone payments. The fair value of the contingent consideration is remeasured to its estimated fair value at the end of each reporting period, with changes recorded to earnings. As of December 31, 2018, the contingent consideration was recorded in current liabilities in the accompanying balance sheet to reflect its maturity during 2019.

### **Common stock warrant liability**

The Company recorded its common stock warrant liability at fair value at the date of issuance using primarily a Monte Carlo valuation model. The fair value was remeasured to its estimated fair value at the end of each reporting period with changes recorded to earnings.

### **Revenue Recognition**

The Company recognizes revenue in accordance with Accounting Standards Codification ("ASC"), Topic 606, *Revenue from Contracts with Customers*, which the Company adopted effective January 1, 2018. Accordingly, the Company recognizes revenue when its customers obtain control of their products or services, in an amount that reflects the consideration that the Company expects to receive in exchange for those goods and services. See Note 2 – Revenue Recognition for additional accounting policies and transition disclosures.

### **Foreign Currency Translation**

Sales and expenses denominated in foreign currencies are translated at average exchange rates in effect throughout the year. Assets and liabilities of foreign operations are translated at period-end exchange rates with the impacts of

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foreign currency translation recognized to cumulative translation adjustment, a component of *accumulated other comprehensive income*. Foreign currency transactions gains and losses are included in *other expense, net* in the consolidated statements of operations and other comprehensive loss.

### ***Stock-Based Compensation***

The Company recognizes all share-based payments to employees and directors, including grants of stock options, restricted stock units (RSUs) and common stock awards in the consolidated statements of operations and other comprehensive loss as an operating expense, based on their fair value. The Company's stock awards use a graded vesting schedule. The Company recognizes the option expense over the requisite service period, which is generally the vesting period.

The Company computes the estimated fair values of stock options and certain of its warrants using the Black-Scholes option pricing model. The closing market price of the Company's common stock at the date of grant is used to calculate the fair value of restricted stock units and common stock awards. Stock-based compensation expense is based on awards ultimately expected to vest and is reduced for estimated forfeitures. Forfeitures are estimated at the time of grant and revised, if necessary, in subsequent periods if actual forfeitures differ from those estimates.

Equity instruments issued to non-employees include RSUs or warrants to purchase shares of the Company's common stock. These RSUs or warrants are either fully-vested and exercisable at the date of grant or vest over a certain period during which services are provided. The Company expenses the fair market value of fully vested awards at the time of grant, and of unvested awards over the period in which the related services are received. Unvested awards are remeasured to fair value until they vest.

See Note 7- Stock-Based Compensation, for further information regarding the assumptions used to calculate the fair value of share-based compensation.

### ***Income Taxes***

Deferred income taxes are provided on a liability method, whereby deferred tax assets are recognized for deductible temporary differences and operating loss and tax credit carryforwards. Deferred tax liabilities are recognized for taxable temporary differences, which are the differences between the reported amounts of assets and liabilities and their tax bases. Deferred tax assets are reduced by a valuation allowance when, in the opinion of management, it is more likely than not that some portion or all the deferred tax assets will not be realized. Deferred tax assets and liabilities are adjusted for the effects of changes in tax laws and rates on the date of enactment. The Tax Reform Act was enacted December 22, 2017. The new legislation made significant changes to U.S. tax law including a reduction in the corporate tax rates, changes to operating loss carry-forwards and carrybacks, and a repeal of the corporate alternative minimum tax. The legislation reduced the U.S corporate income tax rates from 34% to 21%. As a result of the enacted law, the Company was required to revalue its deferred tax assets and liabilities at the new enacted rate. There was no income tax impact from the re-measurement due to the 100% valuation allowance on the Company's deferred tax assets.

### ***Loss per share***

Basic loss per share is computed based on the net loss for each period divided by the weighted average number of common shares outstanding. The net loss allocable to common stockholders for the year ended December 31, 2017, reflects increases for net deemed dividends to preferred stockholders provided in connection with the close of the public offering of Series E Convertible Preferred Stock in April of 2017, and the close of the public offering of Series F Convertible Preferred Stock in November of 2017, of \$1.0 million and \$8.7 million, respectively, representing the intrinsic value of the shares at the time of issuance. In addition, the net loss allocable to common stockholders for the year ended December 31, 2017, reflects an increase for net deemed dividends of \$1.8 million to preferred stockholders provided in connection with the shareholder approval of the Series C and D Convertible Preferred Stock transactions in January of 2017, representing the intrinsic value of the shares at the time of issuance. (See Note 6). There were no deemed dividends during 2018.

Diluted earnings per share is computed based on the net loss allocable to common stockholders for each period divided by the weighted average number of common shares outstanding, increased by the number of additional shares that would have been outstanding had the potentially dilutive common shares been issued, and reduced by the number of shares the Company could have repurchased from the proceeds from issuance of the potentially dilutive shares. Potentially dilutive shares of common stock include shares underlying outstanding convertible preferred stock, warrants, stock options and other stock-based awards granted under stock-based compensation plans.

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The following table sets forth the potential shares of common stock that are not included in the calculation of diluted net loss per share because to do so would be anti-dilutive as of the end of each year presented:

	December 31,	
	2018	2017
Stock options	140,546	2,766
Restricted stock units	3	15
Warrants to purchase common stock	599,293	608,787
Series F convertible preferred stock	18,190	60,480
Total	<u>758,032</u>	<u>672,048</u>

The following table reconciles reported net loss with reported net loss per share for the years ended December 31:

<i>(in thousands, except per share amounts)</i>	2018	2017
Net loss	\$ (17,032)	\$ (13,382)
Deemed dividend to preferred shareholders (see Note 6)	—	(11,590)
Net loss after deemed dividend	(17,032)	(24,972)
Weighted average shares outstanding	404	48
Basic and diluted loss per share	<u>\$ (42.14)</u>	<u>\$ (525.01)</u>

### **Research and Development**

Research and development costs include activities related to research, development, design, and testing improvements of the Aquadex FlexFlow system and potential related products. Research and development costs also include expenses related to clinical research that the Company may sponsor or conduct to enhance understanding of the product and its use. Research and development expenses are expensed as incurred.

### **Recent Accounting Pronouncements**

In May 2014, August 2015, March 2016, April 2016 and May 2016, the Financial Accounting Standards Board (“FASB”) issued amended revenue recognition guidance to clarify the principles for recognizing revenue from contracts with customers. The guidance requires an entity to recognize revenue to depict the transfer of goods or services to customers in an amount that reflects the consideration to which an entity expects to be entitled in exchange for those goods or services. The guidance also requires expanded disclosures relating to the nature, amount, timing, and uncertainty of revenue and cash flows arising from contracts with customers. Additionally, qualitative and quantitative disclosures are required about customer contracts, significant judgments and changes in judgments, and assets recognized from the costs to obtain or fulfill a contract. The Company adopted this new standard on January 1, 2018, utilizing the modified retrospective approach. There was no impact to the amount or timing of revenue that the Company had recognized in prior periods. See Note 2 - Revenue Recognition for additional accounting policy and transition disclosures.

In January 2017, the FASB issued amended guidance to simplify the accounting for goodwill impairment by removing Step 2 of the goodwill impairment test. A goodwill impairment will now be measured as the amount by which a reporting unit’s carrying value exceeds its fair value, limited to the amount of goodwill allocated to that reporting unit. This guidance was to be applied on a prospective basis effective for the Company’s interim and annual periods beginning after January 1, 2019, with early adoption permitted for any impairment tests performed after January 1, 2017. The Company adopted this amended guidance during the year ended December 31, 2017, and recognized a \$0.2 million impairment loss related to its goodwill.

In February 2016, the FASB issued updated guidance to improve financial reporting about leasing transactions. This guidance will require organizations that lease assets to recognize on the balance sheet the assets and liabilities for the rights and obligations created by those leases. The original guidance required application on a modified retrospective basis with the earliest period presented. In August 2018, the FASB issued new guidance which includes an option to not restate comparative periods in transition. This guidance is effective for the Company’s annual and quarterly periods beginning January 1, 2019. The Company has nearly completed evaluating the impact that the adoption of this standard will have on its consolidated financial statements. The Company expects that the adoption of this

guidance will result in an increase in both the assets and liabilities recorded on its consolidated balance sheets in an amount ranging from \$575,000 to \$625,000. The Company does not expect that the adoption of this standard will have a material impact on the consolidated statement of operations and comprehensive loss or in the statement of cash flows. We do expect to include additional qualitative and quantitative disclosures as required. The Company expects to use the effective date of this standard as the date of initial application, with no retrospective adjustments to prior comparative periods.

The Company evaluates events through the date the consolidated financial statements are filed for events requiring adjustment to or disclosure in the consolidated financial statements.

## **Note 2 – Revenue Recognition**

### ***Net Sales***

The Company sells its products in the United States primarily through a direct sales force. Customers who purchase the Company's products include hospitals and clinics throughout the United States. In countries outside the United States, the Company sells its products through a limited number of specialty healthcare distributors in the United Kingdom, Italy, Spain, Germany, Southeast Asia, Brazil and India. The majority of these distributors resell the Company's products to hospitals and clinics in their respective geographies.

Revenue from product sales are recognized when the customer or distributor obtains control of the product, which occurs at a point in time, most frequently upon shipment of the product or receipt of the product, depending on shipment terms. The Company's standard shipping terms are FOB shipping point, unless the customer requests that control and title to the inventory transfer upon delivery. Revenue includes shipment and handling fees charged to customers.

Revenue is measured as the amount of consideration the Company expects to receive, adjusted for any applicable estimates of variable consideration and other factors affecting the transaction price, which is based on the invoiced price, in exchange for transferring products. All revenue is recognized when the Company satisfies its performance obligations under the contract. The majority of the Company's contracts have a single performance obligation and are short-term in nature. The Company has entered into extended service plans with customers that are recognized over time. Revenue from extended service plans represented less than 1% of net sales during each of the years ended December 31, 2018 and 2017. The unfulfilled performance obligations related to these extended service plans is included in deferred revenue in the amount of \$43,000 and \$38,000 as of December 31, 2018 and 2017, respectively. Deferred revenue is included in other current liabilities on the consolidated balance sheets. The majority of the deferred revenue is expected to be recognized within one year.

Sales taxes and value added taxes in foreign jurisdictions that are collected from customers and remitted to governmental authorities are accounted for on a net basis and therefore are excluded from net sales. Revenue includes shipment and handling fees charged to customers. Shipping and handling costs associated with outbound freight after control over a product has transferred to a customer are accounted for as a fulfillment cost and are included in cost of goods sold.

*Product Returns:* The Company offers customers a limited right of return for its product in case of non-conformity or performance issues. The Company estimates the amount of its product sales that may be returned by its customers and records this estimate as a reduction of revenue in the period the related product revenue is recognized. The Company currently estimates product return liabilities using available industry data and its own historical sales and returns information. The Company has not received any returns to date and believes that future returns of its products will be minimal. Therefore, revenue recognized is not currently impacted by variable consideration related to product returns.

**Note 3—Property, Plant and Equipment**

Property, plant and equipment were as follows:

<i>(in thousands)</i>	December 31, 2018	December 31, 2017
Office Furniture & Fixtures	\$ 291	\$ 287
Leasehold Improvements	224	224
Software	142	129
Production Equipment	991	926
Computer Equipment	357	277
Capital Lease Asset	309	307
Total	2,314	2,150
Accumulated Depreciation	(1,778)	(1,580)
	<u>\$ 536</u>	<u>\$ 570</u>

**Note 4—Intangible Assets**

The Company’s review of its intangible assets during the year ended December 31, 2017, resulted in \$3.8 million of impairment charges related to its definite lived intangible assets. The impairment charges were based on fair values determined using market value indicators such as the quoted market prices of the Company’s common stock on Nasdaq, as well discounted cash flow models. Discounted cash flow models included assumptions related to the Company’s product revenues, gross margins, and operating margins, under varying assumptions about the Company’s ability to either achieve profitability or obtain the necessary financings to realize such projections. As discussed in Note 1, the Company became a revenue generating company after acquiring the Aquadex Business in August 2016 and expects to incur losses in the near-term as it grows the Aquadex Business. To become and remain profitable, and to generate cash flows from operations, the Company must succeed in expanding the adoption and market acceptance of its products. This will require that the Company succeed in training personnel at hospitals and in effectively and efficiently manufacturing, marketing, and distributing its products. There can be no assurance that the Company will succeed in these activities, and it may never generate revenues sufficient to achieve profitability or positive cash flows. The discounted cash flow models reflected these uncertainties by assigning future cash flow estimations probability factors and an overall discount rate of 30%.

**Note 5—Debt**

On August 5, 2016, the Company entered into a loan and security agreement with Silicon Valley Bank (the Bank). Under the agreement, the Bank agreed to provide the Company with up to \$5.0 million in debt financing, consisting of a term loan in an aggregate original principal amount not to exceed \$4.0 million (the “Term Loan”) and a revolving line of credit in an aggregate principal amount not to exceed \$1.0 million outstanding at any time (the “Revolving Line”; together with the Term Loan, the “Loans”). Proceeds from the Loans were to be used for general corporate and working capital purposes. The Term Loan expired unused on November 30, 2016. Advances under the Revolving Line, if any, are available to the Company until March 31, 2020 and accrue interest at a floating annual rate equal to 1.75% or 1.0% above the prime rate, depending on liquidity factors. Outstanding borrowings, if any, are collateralized by all of the Company’s assets, excluding intellectual property which is subject to a negative pledge. There were no borrowings outstanding under this facility as of December 31, 2018 or 2017.

*Warrants:* In connection with the funding of term loans under prior agreements, the Company issued warrants to the Bank and one of its affiliates to purchase 9 shares of common stock at an exercise price of \$43,848 per share and warrants to purchase 4 shares of common stock at an exercise price of \$30,912 per share. The Company valued these warrants at \$32,424 per share and \$22,764 per share, respectively, utilizing the Black Scholes option pricing model and the following assumptions: an expected dividend yield of 0%, an expected stock price volatility of 88.07% and 87.04%, a risk-free interest rate of 1.86% and 2.20%, and an expected life of 6.25 years. The warrants were fully vested on the date of grant and expire on February 2025, and June 2025, respectively.

**Note 6—Shareholder’s Equity**

*Series B/B-1 Convertible Preferred Stock:* On July 20, 2016, the Company entered into a securities purchase agreement with an institutional investor for an offering of shares of convertible preferred stock and warrants with gross proceeds of approximately \$3.5 million in a registered direct offering. The Series B issued under the securities

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purchase agreement was exchanged for Series B-1 Convertible Preferred Stock on October 30, 2016. The Series B-1 Convertible Preferred Stock was non-voting and was convertible into shares of common stock at the holder's election at any time. Approximately \$1.6 million of the proceeds were allocated to the preferred stock, representing the residual proceeds after the warrants were recorded at fair value (see below.) As of both December 31, 2018, and 2017, all Series B/B-1-Convertible Preferred Stock had been converted into common stock and none were outstanding.

*Series C and D Convertible Preferred Stock:* On October 30, 2016, the Company entered into a securities purchase agreement with an institutional investor for shares of convertible preferred stock and warrants with an aggregate purchase price of \$3.8 million in a registered direct offering and simultaneous private placement. The first closing of the transaction occurred on November 3, 2016, whereby the Company received \$3.6 million in gross proceeds and the second closing occurred on January 10, 2017, whereby the Company received gross proceeds of \$0.2 million. The Series C and D Convertible Preferred Stock included a contingent beneficial conversion amount of \$1.3 million and \$0.5 million, respectively, representing the intrinsic value of the shares at the time of issuance. This amount is reflected as an increase to the loss per share allocable to common stockholders in the first quarter of 2017 when the contingency for the conversion was resolved with the shareholder approval allowing for the conversion of the preferred stock into common stock. As of both December 31, 2018, and 2017, all shares of the Series C and D Convertible Preferred Stock had been converted into shares of common stock and none remained outstanding.

*Series E Convertible Preferred Stock:* On April 24, 2017, the Company closed on an underwritten public offering of common stock, Series E Convertible Preferred Stock and warrants to purchase shares of common stock for gross proceeds of \$9.2 million, which included the full exercise of the underwriter's over-allotment option to purchase additional shares and warrants. Net proceeds totaled approximately \$8.0 million after deducting the underwriting discounts and commissions and other costs associated with the offering.

The Series E Convertible Preferred Stock included a beneficial conversion amount of \$1.0 million, representing the intrinsic value of the shares at the time of issuance. This amount is reflected as an increase to the loss per share allocable to common stockholders in the year ended December 31, 2017. As of both December 31, 2018, and 2017, all shares of the Series E Convertible Preferred Stock had been converted into common stock and none remained outstanding.

*Series F Convertible Preferred Stock:* On November 27, 2017, the Company closed on an underwritten public offering Series F Convertible Preferred Stock and warrants to purchase shares of common stock for gross proceeds of \$18.0 million. Net proceeds totaled approximately \$16.2 million after deducting the underwriting discounts and commissions and other costs associated with the offering.

The offering was comprised of Series F preferred stock, convertible into shares of the Company's common stock at an initial conversion price of \$63.00 per share. Each share of Series F preferred stock was accompanied by a Series 1 warrant, which was to expire on the first anniversary of its issuance, to purchase 16 shares of the Company's common stock at an exercise price of \$63.00 per share, and a Series 2 warrant, which expires on the seventh anniversary of its issuance, to purchase 16 shares of the Company's common stock at an exercise price of \$63.00 per share. The Series F preferred stock and the warrants were immediately separable and were issued separately. The conversion price of the Series F preferred stock will be adjusted in the event of a stock split, combination, reclassification or stock dividend or if the Company consummates a fundamental transaction. The Series F preferred stock also has full ratchet price based anti-dilution protection, subject to customary carve outs, in the event of a down-round financing at a price per share below the conversion price of the Series F preferred stock (which protection will expire if, during any 20 of 30 consecutive trading days, the volume weighted average price of the Company's common stock exceeds 300% of the then-effective conversion price of the Series F preferred stock and the daily dollar trading volume for each trading day during such period exceeds \$200,000). The exercise price of the warrants are fixed and do not contain any variable pricing features, nor any price based anti-dilutive features, apart from customary adjustments for stock splits, combinations, reclassifications, stock dividends or fundamental transactions. A total of 18,000 shares of Series F Convertible Preferred Stock initially convertible into 286,714 shares of common stock and warrants to purchase approximately 573,310 shares of common stock were issued in the offering. The Series F Convertible Preferred Stock included a beneficial conversion amount of \$8.7 million, representing the intrinsic value of the shares at the time of issuance. This amount is reflected as an increase to the loss per share allocable to common stockholders in the year ended December 31, 2017.

As noted below, effective July 3, 2018, the conversion price of the Series F preferred stock was reduced from \$63.00 to \$29.68, the per share price to public in the July 2018 Offering described below, and now each share of the

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remaining Series F preferred stock is convertible into 34 shares of the Company's common stock. As of December 31, 2018, and 2017, 17,465 and 14,220 shares of the Series F Convertible Preferred Stock had been converted into an aggregate of 279,526 and 226,504 shares of common stock and 535 and 3,780 remained outstanding, respectively.

*July 2018 Offering:* On July 3, 2018, the Company closed on an underwritten public offering of 181,941 shares of its common stock at a public offering price of \$29.68 per share, for gross proceeds of \$5.4 million, including the full exercise of the underwriters' over-allotment option to purchase additional shares of the Company's common stock, prior to deducting underwriting discounts and commissions and offering expenses (the "July 2018 Offering").

In connection with the July 2018 Offering, and to induce certain institutional investors who hold warrants issued by the Company in November 2017 ("November 2017 Warrants") to participate in the July 2018 Offering, the Company entered into letter agreements with such institutional investors. Pursuant to the terms of these agreements, the Company agreed, effective July 3, 2018, to reduce the per share exercise price of the November 2017 Warrants held by such institutional investors to \$29.68 and to extend the expiration date of the warrants that were to expire on November 27, 2018 to November 27, 2019. The number of common shares underlying the warrants that were repriced did not change. The repriced warrants are exercisable for 554,322 shares of common stock in the aggregate, of which, following such amendment, half expire on November 27, 2019 and half expire on November 27, 2024. The repricing of the warrants was accounted as an equity financing cost, with no impact to net proceeds from the offering.

As noted above, the Company's outstanding Series F preferred stock is subject to full-ratchet anti-dilution protection in the event the Company sells any common stock at a price lower than the then-conversion price of the Series F preferred stock. As a result of the July 2018 Offering, effective July 3, 2018, the conversion price of the Series F preferred stock was reduced from \$63.00 to \$29.68, the per share price to public in the July 2018 Offering.

*Placement Agent Fees* In connection with the issuance of the Series B, C and D Convertible Preferred Shares, the Company paid the placement agent an aggregate cash placement fee equal to 6% of the aggregate gross proceeds raised in the offering and issued warrants as described below. In connection with the financings completed in April 2017, November 2017, and July 2018, the Company paid the placement agent an aggregate cash placement fee equal to 9%, 8%, and 8%, respectively, of the aggregate gross proceeds raised in the offering and issued no warrants to the placement agent.

*Investor Warrants:* In connection with the issuance of the Series B Convertible Preferred Stock in July 2016, the Company issued the investor, at no additional cost, warrants to purchase 440 shares of common stock at an exercise price of \$7,896 per share. The warrants were exercisable for 36 months commencing six months from the closing date and were subject to a reduction of the exercise price if the Company subsequently issued common stock or equivalents at an effective price less than the current exercise price of such warrants. Concurrently with the closing of the Series C and D Convertible Preferred Stock and warrant financing on November 3, 2016, the exercise price for these warrants was adjusted to \$1,428 per share.

In connection with the issuance of the Series C and D Convertible Preferred Stock in November 2016, the Company issued the investor, at no additional cost, warrants to purchase 2,522 shares of common stock at an exercise price of \$1,512 per share. In connection with the issuance of the Series D Convertible Preferred Stock at the second closing in January 2017, the Company issued the investor, at no additional cost, warrants to purchase 141 shares of common stock at an exercise price of \$1,512 per share. The warrants were exercisable for 60 months commencing on the earlier of the day of the receipt of approval of the Company's stockholders of a proposal to approve the issuance of the shares of common stock underlying the warrants, or the six-month anniversary of the date of issuance. These warrants were subject to a reduction of the exercise price if the Company subsequently issued common stock or equivalents at an effective price less than the current exercise price of such warrants.

*Warrant Exercise Agreement:* On February 15, 2017, the Company entered into a letter agreement with the institutional investors that held the majority of its outstanding warrants (the "Original Warrants"), to incent the cash exercise of these warrants on or before March 31, 2017. In exchange for any such exercise, the Company agreed to provide the investors a replacement warrant (the "Replacement Warrants") to purchase the same number of shares of common stock as were issued upon exercise of the Original Warrants, with an exercise price equal to the consolidated closing bid price of its common stock on the date of issuance. The Replacement Warrants were issued in the same form as the Original Warrants except the exercise prices are not subject to reduction for subsequent equity issuances and the Replacement Warrants do not allow the investor to demand that the Company purchase the

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Replacement Warrants in the event of a fundamental transaction involving the Company. In connection with this agreement, between February and March 2017, the investors exercised all of the Original Warrants for gross cash proceeds to the Company of \$2.0 million, and the Company issued 3,105 Replacement Warrants with exercise prices ranging from \$484.4 per share to \$1,397.2 per share.

The Company entered into the letter agreement with the investors to incent the exercise of the Original Warrants in order to receive the cash proceeds from the exercise of the Original Warrants and because the exercise of the Original Warrants would allow the Company to remove the warrant liability from its balance sheet and avoid future fair value adjustments and associated volatility in its consolidated financial statements, as the Replacement Warrants are not accounted for as liabilities based on their terms. As of December 31, 2018, and 2017, there were no Original Warrants outstanding and all Replacement Warrants under the letter agreement had been issued.

*Warrant Valuation:* Both the Original Warrants and placement agent warrants were accounted for as liabilities and were recorded at fair value on the date of issuance. These warrants must be measured and recorded at fair value for each subsequent reporting period that the warrants remain outstanding, and any changes in fair value must be recognized in the consolidated statement of operations. In connection with the warrant exchange agreement described above, the Company remeasured each Original Warrant as of the date of exercise and recorded \$1.5 million for the change in fair value of these warrants as an unrealized gain in the accompanying consolidated statement of operations for year ended December 31, 2017. There were no warrants outstanding at December 31, 2018 or 2017 that were accounted for as liabilities.

The Replacement Warrants were valued at \$0.5 million using the Black Scholes option pricing model with the following assumptions: an expected dividend yield of 0%, expected stock price volatility of 49.65%-50.38%, risk-free interest rates of 1.95%-1.97% and an expected life of 5 years. The warrants have a five-year life and were fully vested at the date of grant. The terms of the Replacement Warrants do not require them to be accounted for as liabilities and are therefore recorded in equity. As an incentive to early exercise the Original Warrants, the fair value provided to investors through the Replacement Warrants exceeded the fair value of the Original Warrants that was relinquished by the warrant holders by approximately \$0.1 million, which has been reflected as an expense in the consolidated statement of operations for the year ended December 31, 2017.

### **Note 7— Stock-Based Compensation**

#### **Stock Options and Restricted Stock Awards**

The Company has various share-based compensation plans, including the Amended and Restated 2002 Stock Plan, the Third Amended and Restated 2017 Equity Incentive Plan, the 2013 Non-Employee Directors' Equity Incentive Plan and the New-Hire Equity Incentive Plan (collectively, the "**Plans**"). The Plans are designed to assist in attracting, motivating and retaining employees and directors and to recognize the importance of employees to the long-term performance and success of the Company. The Company has also granted stock options to certain non-employees outside of the Plans.

The Company recognized stock-based compensation expense related to grants of stock options, RSUs and common stock awards to employees, directors and consultants of \$2.1 million, and \$0.5 million during the years ended December 31, 2018 and 2017, respectively. The following table summarizes the stock-based compensation expense which was recognized in the consolidated statements of operations for the years ended December 31,

<b>(Dollars in thousands)</b>	<b>2018</b>	<b>2017</b>
Selling, general and administrative	\$ 1,958	\$ 452
Research and development	129	50
<b>Total</b>	<b>\$ 2,087</b>	<b>\$ 502</b>

The majority of the RSUs and options to purchase common stock vest on the anniversary of the date of grant, which ranges from one to four years. Stock-based compensation expense related to these awards is recognized on a straight-line basis over the related vesting term in most cases, which generally is the service period. It is the Company's policy to issue new shares upon the exercise of options.



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**Stock Options:** The following is a summary of the Plans' stock option activity during the years ended December 31:

	2018		2017	
	Options Outstanding	Weighted Average Exercise Price	Options Outstanding	Weighted Average Exercise Price
<b>Beginning Balance</b>	2,562	\$ 1,049.93	272	\$ 31,021.57
Granted	163,997	45.76	2,461	167.30
Exercised	—	—	—	—
Forfeited/expired	(26,013)	61.01	(171)	36,429.90
<b>Outstanding at December 31</b>	<b>140,546</b>	<b>\$ 61.25</b>	<b>2,562</b>	<b>\$ 1,049.93</b>
<b>Vested at December 31</b>	<b>16,206</b>	<b>\$ 169.07</b>	<b>148</b>	<b>\$ 11,338.37</b>

For options outstanding and vested at December 31, 2018, the weighted average remaining contractual life was 9.12 years and 9.07 years, respectively. There were no option exercises in 2018 or 2017. The total fair value of options that vested in 2018 and 2017 was \$0.9 million, and \$0.7 million, respectively, at the fair value of the options as of the date of grant.

**Valuation Assumptions:** The fair value of each stock option is estimated at the grant date using the Black-Scholes option pricing model. The fair value of stock options under the Black-Scholes option pricing model requires management to make assumptions regarding projected employee stock option exercise behaviors, risk-free interest rates, volatility of the Company's stock price, and expected dividends.

The Company has not historically paid cash dividends to its stockholders, and currently does not anticipate paying any cash dividends in the foreseeable future. As a result, the Company has assumed a dividend yield of 0%. The risk-free interest rate is based upon the rates of U.S. Treasury bills with a term that approximates the expected life of the option. Since the Company has limited historical exercise data to reasonably estimate the expected life of its option awards, the expected life is calculated using a simplified method. Expected volatility is based on historical volatility of the Company's stock.

The following table provides the weighted average assumptions used in the Black-Scholes option pricing model for the years ended December 31:

	2018	2017
Expected dividend yield	0%	0%
Risk-free interest rate	2.49%	1.97%
Expected volatility	120.54%	103%
Expected life (in years)	6.23	6.25

The weighted-average fair value of stock options granted in 2018 and 2017 was \$41.04 and \$167.3, respectively. As of December 31, 2018, the total compensation cost related to all non-vested stock option awards not yet recognized was approximately \$3.9 and is expected to be recognized over the remaining weighted-average period of 3.1 years.

**Restricted Stock Awards:** The following table summarizes restricted stock award activity during 2018 and 2017:

	2018		2017	
	RSUs	Weighted Average Grant Price	RSUs	Weighted Average Grant Price
<b>Nonvested, beginning balance</b>	15	\$ 7,297.22	33	\$ 9,052.37
Granted	—	—	11	1,514.80
Vested	(12)	7,297.22	(29)	1,854.56
Forfeited	—	—	—	—
<b>Nonvested at December 31</b>	<b>3</b>	<b>\$ 7,297.22</b>	<b>15</b>	<b>\$ 7,297.22</b>

**Warrants**

Warrants to purchase 599,293, and 608,764 shares of common stock were outstanding at December 31, 2018 and 2017, respectively. As of December 31, 2018, warrants outstanding were exercisable at prices ranging from \$29.68 to \$43,848 per share, and are exercisable over a period ranging from eleven months to 6.5 years.

**Note 8 - Fair Value of Financial Instruments**

The Company’s financial instruments consist of cash and cash equivalents, warrants, and contingent consideration.

Pursuant to the requirements of ASC Topic 820 “*Fair Value Measurement*,” the Company’s financial assets and liabilities measured at fair value on a recurring basis are classified and disclosed in one of the following three categories:

- *Level 1* - Financial instruments with unadjusted quoted prices listed on active market exchanges.
- *Level 2* - Financial instruments lacking unadjusted, quoted prices from active market exchanges, including over the counter traded financial instruments. The prices for the financial instruments are determined using prices for recently traded financial instruments with similar underlying terms as well as directly or indirectly observable inputs, such as interest rates and yield curves that are observable at commonly quoted intervals.
- *Level 3* - Financial instruments that are not actively traded on a market exchange. This category includes situations where there is little, if any, market activity for the financial instrument. The prices are determined using significant unobservable inputs or valuation techniques.

The fair value of the Company’s common stock warrant liability related to the investor warrants was calculated using a Monte Carlo valuation model and was classified as Level 3 in the fair value hierarchy. The fair value of the Company’s common stock warrant liability related to the placement agent warrants is calculated using a Black Scholes option pricing model and was classified as Level 3 in the fair value hierarchy.

The following is a rollforward of the fair value of Level 3 warrants:

*(in thousands)*

Balance December 31, 2016	\$ 1,843
Change in fair value	(1,475)
Exercise of warrants	(368)
Balance as of December 31, 2017	\$ —

A significant change in the inputs used for the Monte Carlo and Black Scholes option pricing models such as the expected volatility, bond yield of equivalent securities, or probability of future equity financings, in isolation, would result in significantly higher or lower fair value measurements. In combination, changes in these inputs could result in a significantly higher or lower fair value measurement if the input changes were to be aligned or could result in a minimally higher or lower fair value measurement if the input changes were of a compensating nature.

The fair value of the Company’s contingent consideration, was initially measured based on the consideration expected to be transferred (probability-weighted), discounted back to present value, and it is considered a Level 3 instrument. The discount rate used was determined at the time of measurement in accordance with accepted valuation methods. The Company measures the liability on a recurring basis using Level 3 inputs including probabilities of payment and projected payment dates. Changes to any of the inputs may result in significantly higher or lower fair value measurements. There were no changes in the fair value of the contingent consideration subsequent to the initial measurement.

All cash equivalents are considered Level 1 measurements for all periods presented. The Company does not have any financial instruments classified as Level 2 or any other classified as Level 3 and there were no movements between these categories during the periods ended December 31, 2018 and 2017. The Company believes that the carrying amounts of all remaining financial instruments approximate their fair value due to their relatively short maturities.

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**Note 9—Income Taxes**

Domestic and foreign loss before income taxes, consists of the following for the years ended December 31:

<i>(in thousands)</i>	2018	2017
Domestic	\$ (17,027)	\$ (13,367)
Foreign	1	(9)
<b>Loss before income taxes</b>	<b>\$ (17,026)</b>	<b>\$ (13,376)</b>

The components of income tax expense consist of the following for the years ended December 31:

<i>(in thousands)</i>	2018	2017
<b>Current:</b>		
United States and state	\$ —	\$ —
Foreign, net	(6)	(6)
<b>Deferred:</b>		
United States and state	—	—
Foreign	—	—
<b>Total income tax expense</b>	<b>\$ (6)</b>	<b>\$ (6)</b>

Actual income tax expense differs from statutory federal income tax expense as follows for the years ended December 31:

<i>(in thousands)</i>	2018	2017
Statutory federal income tax benefit	\$ 3,578	\$ 4,548
State tax benefit, net of federal taxes	45	48
Foreign tax	(2)	—
Foreign deferred exchange rate adjustments	(1,112)	899
Nondeductible/nontaxable items	(259)	(114)
New federal rate adjustment	—	(16,081)
Other	(72)	(1,085)
Valuation allowance decrease (increase)	(2,184)	11,779
<b>Total income tax benefit expense</b>	<b>\$ (6)</b>	<b>\$ (6)</b>

Deferred taxes consist of the following as of December 31:

<i>(in thousands)</i>	2018	2017
<b>Deferred tax assets:</b>		
<b>Noncurrent:</b>		
Accrued leave	\$ 50	\$ 32
Other accrued expenses	—	28
Stock based compensation	483	336
Net operating loss carryforward	41,032	38,947
Other	125	115
Intangibles	847	895
R&D credit carryforward	531	531
Total deferred tax assets	43,068	40,884
Less: valuation allowance	(43,068)	(40,884)
<b>Total</b>	<b>\$ —</b>	<b>\$ —</b>

As of December 31, 2017, the Company had federal net operating loss (“*NOLs*”) carryforwards of approximately \$135.2 million and \$29.5 million of state NOL carryforwards. Approximately \$120.1 million of federal NOL carryforwards will expire between 2024 and 2037. Pursuant to the Tax Cuts and Jobs Act of 2017, the NOL generated during the current year of approximately \$15.1 million does not expire. The expiration of state NOL carryforwards

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will vary by jurisdiction. As of December 31, 2018, the Company had tax losses in the Commonwealth of Australia of approximately AU\$49.0 million which can carry forward indefinitely. Federal or state NOLs cannot be used to offset taxable income in foreign jurisdictions. In addition, future utilization of NOL carryforwards in the U.S. may be subject to certain limitations under Section 382 of the Internal Revenue Code.

The Company provides for a valuation allowance when it is more likely than not that it will not realize a portion of the deferred tax assets. The Company has established a valuation allowance for U.S. and foreign deferred tax assets due to the uncertainty that enough taxable income will be generated in those taxing jurisdictions to utilize the assets. Therefore, the Company has not reflected any benefit of such deferred tax assets in the accompanying consolidated financial statements. For the year ended December 31, 2018, the valuation allowance increased by \$2.2 million primarily due to current year operating losses. For the year ended December 31, 2017, the valuation allowance decreased by \$11.8 million primarily as result of the impact of the 2017 tax reform re-measurement of deferred tax assets.

During 2017 and 2018, the Company believes it experienced an ownership change as defined in Section 382 of the Internal Revenue Code which will limit the ability to utilize the Company's net operating losses (NOLs). The Company may have experienced additional ownership changes in earlier years further limiting the NOL carry-forwards that may be utilized. The Company has not yet completed a formal Section 382 analysis. The general limitation rules allow the Company to utilize its NOLs subject to an annual limitation that is determined by multiplying the federal long-term tax-exempt rate by the Company's value immediately before the ownership change.

The accounting guidance related to uncertain tax positions prescribes a recognition threshold and measurement attribute for recognition and measurement of a tax position taken or expected to be taken in a tax return. It also provides guidance on de-recognition, classification, interest and penalties, accounting in interim periods, disclosure and transition. The Company had no material uncertain tax positions as of December 31, 2018 or 2017.

The Company recognizes interest and penalties on unrecognized tax benefits as well as interest received from favorable tax settlements within income tax expense. At December 31, 2018 and 2017, the Company recorded no accrued interest or penalties related to uncertain tax positions.

The tax years ended December 31, 2015 through December 31, 2018 remain open to examination by the Internal Revenue Service and for the various states where we are subject to taxation. Additionally, the returns of the Company's Australian and Irish subsidiary are subject to examination by tax authorities of those jurisdictions for the tax years ended and subsequent to June 30, 2013 and December 31, 2014, respectively.

### **Note 10—Commitments and Contingencies**

#### ***Leases***

The Company leases office space under a non-cancelable operating lease that expires in March 2022. In August 2018, the Company entered into a Third Amendment to the lease, extending the term of the lease from March 31, 2019 to March 31, 2022. Beginning on April 1, 2019, the annual base rent shall be \$9.00 per square foot, subject to annual increases of \$0.25 per square foot. Rent expense is recognized using the straight-line method over the term of the lease.

The Company leases office equipment under non-cancelable operating leases that expire at various times through September 2020.

Rent expense related to operating leases was approximately \$293,000, and \$290,000 for the years ended December 31, 2018 and 2017, respectively. Future minimum lease payments under non-cancelable operating leases as of December 31, 2018, were approximately \$217,000, \$220,000, \$219,000, \$55,000, and \$0 for each of the years ended December 31, 2019, through 2023, respectively.

#### ***Employee Retirement Plan***

The Company has a 401(k)-profit sharing plan that provides retirement benefit to substantially all full-time U.S. employees. Eligible employees may contribute a percentage of their annual compensation, subject to Internal Revenue Service limitations, with the Company matching a portion of the employee's contributions at the discretion of the Company. Matching contributions totaled \$197,000 and \$138,000 for the years ended December 31, 2018 and 2017, respectively.

***Contingent Consideration***

The Company agreed that if it disposes of any of the Aquadex assets for a price that exceeds \$4.0 million within three years of the closing of the purchase of the Aquadex Business, it will pay Baxter 40% of the amount of such excess. In addition, it also agreed that if shares of its common stock cease to be publicly traded on Nasdaq, Baxter has the option to require the Company to repurchase, in cash, all or any part of the common shares held by Baxter at a price equal to their fair market value, as determined by a third-party appraiser.

**Note 11—Segment and Geographic Information**

The Company has one reportable segment, cardiac and coronary disease products.

At December 31, 2018, long-lived assets were located primarily in the United States.

**Note 12 – Subsequent Event**

The Company filed an S-1 on December 31, 2018, which was amended January 22, 2019, to raise additional capital. Changing circumstances may cause the Company to consume capital significantly faster than it currently anticipates and could adversely affect the Company's ability to raise additional capital. Additional financing may not be available when the Company needs it or may not be available on favorable terms.

**PART I—FINANCIAL INFORMATION**  
**ITEM 1. FINANCIAL STATEMENTS**  
**CHF SOLUTIONS, INC. AND SUBSIDIARIES**  
*Condensed Consolidated Balance Sheets*  
(In thousands, except share and per share amounts)

	September 30, 2019 (unaudited)	December 31, 2018
<b>ASSETS</b>		
<b>Current assets</b>		
Cash and cash equivalents	\$ 3,634	\$ 5,480
Accounts receivable	528	786
Inventory	1,612	1,658
Other current assets	277	203
<b>Total current assets</b>	<b>6,051</b>	<b>8,127</b>
Property, plant and equipment, net	1,025	536
Operating lease right-of-use asset, net	487	—
Other assets	21	113
<b>TOTAL ASSETS</b>	<b>\$ 7,584</b>	<b>\$ 8,776</b>
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
<b>Current liabilities</b>		
Accounts payable	\$ 1,427	\$ 1,133
Accrued compensation	1,242	1,498
Current portion of operating lease liability	181	—
Other current liabilities	87	209
<b>Total current liabilities</b>	<b>2,937</b>	<b>2,840</b>
Operating lease liability	309	—
<b>Total liabilities</b>	<b>3,246</b>	<b>2,840</b>
Commitments and contingencies	—	—
<b>Stockholders' equity</b>		
Series A junior participating preferred stock as of September 30, 2019 and December 31, 2018, par value \$0.0001 per share; authorized 30,000 shares, none outstanding	—	—
Series F convertible preferred stock as of September 30, 2019 and December 31, 2018, par value \$0.0001 per share; authorized 535 and 535 shares, respectively, issued and outstanding 535 and 535, respectively	—	—
Series G convertible preferred stock as of September 30, 2019 and December 31, 2018, par value \$0.0001 per share; authorized 0 and 0 shares, respectively, issued and outstanding 0 and 0, respectively	—	—
Preferred stock as of September 30, 2019 and December 31, 2018, par value \$0.0001 per share; authorized 39,969,465 and 39,969,465 shares, respectively, none outstanding	—	—
Common stock as of September 30, 2019 and December 31, 2018, par value \$0.0001 per share; authorized 100,000,000 shares, issued and outstanding 2,879,162 and 513,445, respectively	—	—
Additional paid-in capital	216,173	204,101
Accumulated other comprehensive income:		
Foreign currency translation adjustment	1,219	1,223
Accumulated deficit	(213,054)	(199,388)
<b>Total stockholders' equity</b>	<b>4,338</b>	<b>5,936</b>
<b>TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY</b>	<b>\$ 7,584</b>	<b>\$ 8,776</b>

See notes to the condensed consolidated financial statements.

**CHF SOLUTIONS, INC. AND SUBSIDIARIES**  
**Condensed Consolidated Statements of Operations and Comprehensive Loss**  
**(Unaudited)**

(In thousands, except per share amounts)

	Three months ended September 30,		Nine months ended September 30,	
	2019	2018	2019	2018
<b>Net sales</b>	\$ 1,252	\$ 1,363	\$ 4,144	\$ 3,499
<b>Costs and expenses:</b>				
Cost of goods sold	540	915	1,987	2,686
Selling, general and administrative	4,107	3,713	12,098	11,489
Research and development	1,112	985	3,719	2,107
Total costs and expenses	5,759	5,613	17,804	16,282
Loss from operations	(4,507)	(4,250)	(13,660)	(12,783)
Other income (loss), net	(1)	10	(1)	10
Loss before income taxes	(4,508)	(4,240)	(13,661)	(12,773)
Income tax expense	(1)	(1)	(5)	(3)
<b>Net loss</b>	<b>\$ (4,509)</b>	<b>\$ (4,241)</b>	<b>\$ (13,666)</b>	<b>\$ (12,776)</b>
<b>Basic and diluted loss per share</b>	<b>\$ (1.70)</b>	<b>\$ (8.50)</b>	<b>\$ (9.49)</b>	<b>\$ (34.59)</b>
Weighted average shares outstanding – basic and diluted	2,646	499	1,915	369
<b>Other comprehensive loss:</b>				
Foreign currency translation adjustments	\$ 1	\$ (1)	\$ (4)	\$ (2)
<b>Total comprehensive loss</b>	<b>\$ (4,508)</b>	<b>\$ (4,242)</b>	<b>\$ (13,670)</b>	<b>\$ (12,778)</b>

See notes to the condensed consolidated financial statements.

**CHF SOLUTIONS, INC. AND SUBSIDIARIES**  
**Condensed Consolidated Statements of Stockholders' Equity**  
(In thousands, except share amounts)

	Outstanding Shares of Common Stock	Common Stock	Additional Paid in Capital	Accumulated Other Comprehensive Income	Accumulated Deficit	Stockholders' Equity
<b>Balance December 31, 2017</b>	<b>271,357</b>	<b>\$ —</b>	<b>\$197,367</b>	<b>\$ 1,227</b>	<b>\$ (182,356)</b>	<b>\$ 16,238</b>
Net loss	—	—	—	—	(4,354)	(4,354)
Foreign currency translation adjustment	—	—	—	1	—	1
Stock-based compensation, net	3	—	501	—	—	501
Conversion of preferred stock into common stock	32,365	—	—	—	—	—
<b>Balance March 31, 2018</b>	<b>303,725</b>	<b>\$ —</b>	<b>\$197,868</b>	<b>\$ 1,228</b>	<b>\$ (186,710)</b>	<b>\$ 12,386</b>
Net loss	—	—	—	—	(4,181)	(4,181)
Foreign currency translation adjustment	—	—	—	(2)	—	(2)
Stock-based compensation and stock awards, net	3	—	606	—	—	606
Conversion of preferred stock into common stock	18,127	—	—	—	—	—
<b>Balance June 30, 2018</b>	<b>321,855</b>	<b>\$ —</b>	<b>\$198,474</b>	<b>\$ 1,226</b>	<b>\$ (190,891)</b>	<b>\$ 8,809</b>
Net loss	—	—	—	—	(4,241)	(4,241)
Foreign currency translation adjustment	—	—	—	(1)	—	(1)
Stock-based compensation and stock awards, net	3	—	437	—	—	437
Issuance of common stock, net	181,941	—	4,649	—	—	4,649
Conversion of preferred stock into common stock	1,516	—	—	—	—	—
<b>Balance September 30, 2018</b>	<b>505,315</b>	<b>\$ —</b>	<b>\$203,560</b>	<b>\$ 1,225</b>	<b>\$ (195,132)</b>	<b>\$ 9,653</b>
	Outstanding Shares of Common Stock	Common Stock	Additional Paid in Capital	Accumulated Other Comprehensive Income	Accumulated Deficit	Stockholders' Equity
<b>Balance December 31, 2018</b>	<b>513,445</b>	<b>\$ —</b>	<b>\$204,101</b>	<b>\$ 1,223</b>	<b>\$ (199,388)</b>	<b>\$ 5,936</b>
Net loss	—	—	—	—	(4,727)	(4,727)
Foreign currency translation adjustment	—	—	—	(2)	—	(2)
Stock-based compensation, net	3	—	362	—	—	362
Issuance of common and preferred stock, net	455,178	—	10,959	—	—	10,959
Conversion of preferred stock into common stock	1,100,394	—	—	—	—	—
<b>Balance March 31, 2019</b>	<b>2,069,020</b>	<b>\$ —</b>	<b>\$215,422</b>	<b>\$ 1,221</b>	<b>\$ (204,115)</b>	<b>\$ 12,528</b>
Net loss	—	—	—	—	(4,430)	(4,430)
Foreign currency translation adjustment	—	—	—	(3)	—	(3)
Stock-based compensation, net	—	—	339	—	—	339
Conversion of preferred stock into common stock	259,300	—	—	—	—	—
<b>Balance June 30, 2019</b>	<b>2,328,320</b>	<b>\$ —</b>	<b>\$215,761</b>	<b>\$ 1,218</b>	<b>\$ (208,545)</b>	<b>\$ 8,434</b>
Net loss	—	—	—	—	(4,509)	(4,509)
Foreign currency translation adjustment	—	—	—	1	—	1
Stock-based compensation, net	—	—	412	—	—	412
Conversion of preferred stock into common stock	550,842	—	—	—	—	—
<b>Balance September 30, 2019</b>	<b>2,879,162</b>	<b>\$ —</b>	<b>\$216,173</b>	<b>\$ 1,219</b>	<b>\$ (213,054)</b>	<b>\$ 4,338</b>

See notes to the condensed consolidated financial statements.



**CHF SOLUTIONS, INC. AND SUBSIDIARIES**  
**Condensed Consolidated Statements of Cash Flows**  
**(Unaudited)**  
(in thousands)

	Nine months ended September 30,	
	2019	2018
<b>Operating Activities:</b>		
Net loss	\$ (13,666)	\$ (12,776)
Adjustments to reconcile net loss to cash flows used in operating activities:		
Depreciation and amortization	179	174
Stock-based compensation expense, net	1,113	1,544
Changes in operating assets and liabilities:		
Accounts receivable	258	(242)
Inventory	(158)	(360)
Other current assets	(74)	(104)
Other assets and liabilities	(27)	—
Accounts payable and accrued expenses	38	(79)
<b>Net cash used in operating activities</b>	<b>(12,337)</b>	<b>(11,843)</b>
<b>Investing Activities:</b>		
Purchases of property, plant and equipment	(464)	(177)
<b>Net cash used in investing activities</b>	<b>(464)</b>	<b>(177)</b>
<b>Financing Activities:</b>		
Net proceeds from public stock offering, net	10,959	4,649
<b>Net cash provided by financing activities</b>	<b>10,959</b>	<b>4,649</b>
Effect of exchange rate changes on cash	(4)	(2)
Net decrease in cash and cash equivalents	(1,846)	(7,373)
Cash and cash equivalents - beginning of period	5,480	15,595
<b>Cash and cash equivalents - end of period</b>	<b>\$ 3,634</b>	<b>\$ 8,222</b>
<b>Supplemental schedule of non-cash activities:</b>		
Inventory transferred to property, plant and equipment	\$ 204	\$ —

See notes to the condensed consolidated financial statements.

**CHF SOLUTIONS, INC. AND SUBSIDIARIES**  
**Notes to Condensed Consolidated Financial Statements**  
(Unaudited)

**Note 1 – Nature of Business and Basis of Presentation**

*Nature of Business:* CHF Solutions, Inc. (the “Company”) is a medical device company focused on developing, manufacturing and commercializing the Aquadex FlexFlow® system for aquapheresis therapy. The Aquadex FlexFlow system (“Aquadex FlexFlow”) is indicated for temporary (up to eight hours) ultrafiltration treatment of patients with fluid overload who have failed diuretic therapy and extended (longer than 8 hours) ultrafiltration treatment of patients with fluid overload who have failed diuretic therapy and require hospitalization. The Company has submitted an application to the FDA requesting for 510(k) clearance of the Aquadex FlexFlow system to include pediatric patients who weigh 20kg or more. CHF Solutions, Inc. is a Delaware corporation headquartered in Minneapolis with wholly owned subsidiaries in Australia, Ireland and Delaware. The Company has been listed on Nasdaq since February 2012.

Previously, the Company was focused on developing the C-Pulse® Heart Assist System for treatment of Class III and ambulatory Class IV heart failure. In August 2016, the Company acquired the business associated with the Aquadex FlexFlow system (herein referred to as the “Aquadex Business”) from a subsidiary of Baxter International, Inc. (“Baxter”), and refocused its strategy to fully devote its resources to the Aquadex Business.

In December 2018, the Company’s stockholders approved a reverse split of its outstanding common stock at a ratio in the range of 1-for-2 to 1-for 14 and, in January 2019, the board of directors approved a 1-for-14 reverse split of the Company’s outstanding common stock that became effective after trading on January 2, 2019. This reverse stock split did not change the par value of the Company’s common stock or the number of common or preferred shares authorized by the Company’s Fourth Amended and Restated Certificate of Incorporation. All share and per-share amounts have been retroactively adjusted to reflect the reverse stock split for all periods presented.

*Principles of Consolidation:* The accompanying unaudited condensed consolidated financial statements have been prepared in accordance with accounting principles generally accepted in the United States of America (“U.S. GAAP”) for interim financial information and with the instructions to Form 10-Q and Article 8 of Regulation S-X. Certain information and note disclosures normally included in the audited annual consolidated financial statements have been condensed or omitted pursuant to those rules and regulations. Accordingly, they do not include all of the information necessary for a fair presentation of results of operations, comprehensive loss, financial condition, and cash flows in conformity with U.S. GAAP. In the opinion of management, the condensed consolidated financial statements reflect all adjustments (consisting of normal recurring adjustments) considered necessary for a fair presentation of the results of the Company for the periods presented. Operating results for interim periods are not necessarily indicative of results that may be expected for the year as a whole. The preparation of the consolidated financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues, expenses, and the related disclosures at the date of the consolidated financial statements and during the reporting period. Actual results could materially differ from these estimates.

For further information, refer to the consolidated financial statements and notes thereto included in the Company’s Annual Report on Form 10-K for the year ended December 31, 2018.

*Going Concern:* The Company’s consolidated financial statements have been prepared and presented on a basis assuming it continues as a going concern. During the years ended December 31, 2018 and 2017 and through September 30, 2019, the Company incurred losses from operations and net cash outflows from operating activities as disclosed in the consolidated statements of operations and cash flows, respectively. As of September 30, 2019, the Company had an accumulated deficit of \$213.1 million and it expects to incur losses for the immediate future. To date, the Company has been funded by debt and equity financings, and although the Company believes that it will be able to successfully fund its operations, there can be no assurance that it will be able to do so or that it will ever operate profitably. These factors raise substantial doubt about the Company’s ability to continue as a going concern through the next twelve months.

The Company became a revenue generating company after acquiring the Aquadex Business in August 2016. The Company expects to incur additional losses in the near-term as it grows the Aquadex Business, including investments in expanding its sales and marketing capabilities, purchasing inventory, manufacturing components, and complying with the requirements related to being a U.S. public company. To become and remain profitable, the

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Company must succeed in expanding the adoption and market acceptance of the Aquadex FlexFlow. This will require the Company to succeed in training personnel at hospitals and effectively and efficiently manufacturing, marketing and distributing the Aquadex FlexFlow and related components. There can be no assurance that the Company will succeed in these activities, and it may never generate revenues sufficient to achieve profitability.

On April 24, 2017, November 27, 2017, July 3, 2018, March 12, 2019, October 25, 2019 and November 6, 2019, the Company closed on underwritten public equity offerings for aggregate net proceeds of approximately \$41.4 million after deducting the underwriting discounts and commissions and other costs associated with the offerings (see Note 4 –Equity and Note 10-Subsequent Events). The Company will require additional funding to grow its Aquadex Business, which may not be available on terms favorable to the Company, or at all. The Company may receive those funds from the proceeds from future warrant exercises, issuances of equity securities, or other financing transactions. Should warrant exercises not materialize or future capital raising be unsuccessful, the Company may not be able to continue as a going concern. No adjustments have been made relating to the recoverability and classification of recorded asset amounts and classification of liabilities that might be necessary should the Company not continue as a going concern.

*Revenue Recognition:* The Company recognizes revenue in accordance with Accounting Standards Codification (“ASC”), Topic 606, *Revenue from Contracts with Customers*, which the Company adopted effective January 1, 2018. Accordingly, the Company recognizes revenue when its customers obtain control of its products or services, in an amount that reflects the consideration that the Company expects to receive in exchange for those goods and services. See Note 2 – Revenue Recognition, for additional disclosures. For the three months ended September 30, 2019, three customers represented 11%, 12% and 12% of net sales. For the nine months ended September 30, 2019, one customer represented 10% of net sales. For the three months ended September 30, 2018, two customers represented 15% and 10% of net sales. For the nine months ended September 30, 2018, one customer represented 10% of net sales.

*Accounts Receivable:* Accounts receivable are unsecured, recorded at net realizable value, and do not bear interest. The Company makes judgments as to its ability to collect outstanding receivables based upon significant patterns of collectability, historical experience, and managements’ evaluation of specific accounts and will provide an allowance for credit losses when collection becomes doubtful. The Company performs credit evaluations of its customers’ financial condition on an as-needed basis. Payment is generally due 30 days from the invoice date and accounts past 30 days are individually analyzed for collectability. When all collection efforts have been exhausted, the account is written off against the related allowance. To date the Company has not experienced any write-offs or significant deterioration of the aging of its accounts receivable, and therefore, no allowance for doubtful accounts was considered necessary as of September 30, 2019 or December 31, 2018. As of September 30, 2019, two customers represented 14% and 12% of the accounts receivable balance. As of December 31, 2018, three customers represented 18%, 13% and 13% of the accounts receivable balance.

*Inventories:* Inventories are recorded as the lower of cost or net realizable value using the first-in, first out method. Overhead is allocated to manufactured finished goods inventory based on the normal capacity of the Company’s production facilities. Abnormal amounts of overhead, if any, are expensed as incurred. Inventories consisted of the following:

<i>(in thousands)</i>	September 30, 2019	December 31, 2018
Finished Goods	\$ 468	\$ 517
Work in Process	185	34
Raw Materials	959	1,107
Total	<u>\$ 1,612</u>	<u>\$ 1,658</u>

*Contingent consideration:* In connection with the Company’s purchase of the Aquadex Business in August 2016, the Company had an obligation to pay additional consideration that was contingent upon the occurrence of certain future events (see Note 9 - Commitments and Contingencies). Contingent consideration was recognized at the acquisition date at \$126,000, the estimated fair value of the contingent milestone payments. The fair value of the contingent consideration was remeasured to its estimated fair value at the end of each reporting period, with changes recorded to earnings. As of September 30, 2019, this contingency had expired, therefore its fair value was \$0.

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*Loss per share:* Basic loss per share is computed based on the net loss for each period divided by the weighted average number of common shares outstanding. The net loss allocable to common stockholders for the nine months ended September 30, 2019, reflects a \$4.5 million increase for the net deemed dividend to preferred stockholders provided in connection with the close of the public offering of Series G Convertible Preferred Stock on March 12, 2019 (see Note 4 - Equity), representing the intrinsic value of the shares at the time of issuance.

Diluted earnings per share is computed based on the net loss allocable to common stockholders for each period divided by the weighted average number of common shares outstanding, increased by the number of additional shares that would have been outstanding had the potentially dilutive common shares been issued, and reduced by the number of shares the Company could have repurchased from the proceeds from issuance of the potentially dilutive shares. Potentially dilutive shares of common stock include shares underlying outstanding convertible preferred stock, warrants, stock options and other stock-based awards granted under stock-based compensation plans.

The following table sets forth the potential shares of common stock that are not included in the calculation of diluted net loss per share because to do so would be anti-dilutive as of the end of each period presented:

	September 30,	
	2019	2018
Warrants to purchase common stock	5,430,721	608,787
Series F convertible preferred stock	102,185	19,210
Stock options	332,722	139,439
Restricted stock units	—	3
Total	<u>5,865,628</u>	<u>767,439</u>

The following table reconciles reported net loss with reported net loss per share for the periods ended September 30, 2019:

<i>(in thousands, except per share amounts)</i>	Three months	Nine months
Net loss	\$ (4,509)	\$ (13,666)
Deemed dividend to preferred shareholders (see Note 4)	—	(4,509)
Net loss after deemed dividend	(4,509)	(18,175)
Weighted average shares outstanding	2,646	1,915
Basic and diluted loss per share	<u>\$ (1.70)</u>	<u>\$ (9.49)</u>

*New Accounting Pronouncements:* In February 2016, the Financial Accounting Standards Board (“FASB”) issued updated guidance to improve financial reporting about leasing transactions. This guidance required organizations that lease assets to recognize on the balance sheet the assets and liabilities for the rights and obligations created by those leases. The original guidance required application on a modified retrospective basis with the earliest period presented. In August 2018, the FASB issued new guidance which included an option to not restate comparative periods in transition. The Company adopted this new standard on January 1, 2019 with no retrospective adjustments to prior comparative periods. The adoption of this standard on January 1, 2019 resulted in an increase of approximately \$0.6 million in the Company’s other long-term assets and in short and long-term liabilities recorded on its consolidated balance sheet. In addition, the Company elected the package of practical expedients permitted under the transition guidance within the new standard which allowed it to carry forward the historical lease classification. See Note 7 –Operating Leases for additional qualitative and quantitative disclosures.

In August 2018, the FASB issued updated guidance to improve and simplify the disclosure requirements on fair value measurements for level 3 assets and liabilities valued at fair value. The Company early-adopted the guidance effective in its second quarter and the effect on the consolidated financial statements was not material.

## Note 2 – Revenue Recognition

### Net Sales

The Company sells its products in the United States primarily through a direct sales force. Customers who purchase the Company’s products include hospitals and clinics throughout the United States. In countries outside the United States, the Company sells its products through a limited number of specialty healthcare distributors in the United

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Kingdom, Italy, Spain, Germany, Southeast Asia, Brazil, India and Greece. These distributors resell the Company's products to hospitals and clinics in their respective geographies.

Revenue from product sales are recognized when the customer or distributor obtains control of the product, which occurs at a point in time, most frequently upon shipment of the product or receipt of the product, depending on shipment terms. The Company's standard shipping terms are FOB shipping point, unless the customer requests that control and title to the inventory transfer upon delivery. Revenue includes shipment and handling fees charged to customers.

Revenue is measured as the amount of consideration we expect to receive, adjusted for any applicable estimates of variable consideration and other factors affecting the transaction price, which is based on the invoiced price, in exchange for transferring products. All revenue is recognized when we satisfy our performance obligations under the contract. The majority of our contracts have a single performance obligation and are short term in nature. The Company has entered into extended service plans with customers which are recognized over time. This revenue represents less than 1% of net sales for the three and nine months ended September 30, 2019 and 2018. The unfulfilled performance obligations related to these extended service plans is included in deferred revenue, which is included in other current liabilities on the condensed consolidated balance sheet. The majority of the deferred revenue is expected to be recognized within one year.

Sales taxes and value added taxes in foreign jurisdictions that are collected from customers and remitted to governmental authorities are accounted for on a net basis and therefore are excluded from net sales. Revenue includes shipment and handling fees charged to customers. Shipping and handling costs associated with outbound freight after control over a product has transferred to a customer are accounted for as a fulfillment cost and are included in cost of goods sold.

*Product Returns:* The Company offers customers a limited right of return for its product in case of non-conformity or performance issues. The Company estimates the amount of its product sales that may be returned by its customers and records this estimate as a reduction of revenue in the period the related product revenue is recognized. The Company currently estimates product return liabilities using available industry data and its own historical sales and returns information. The Company has not received any returns to date and believes that future returns of its products will be minimal. Therefore, revenue recognized is not currently impacted by variable consideration related to product returns.

### **Note 3 – Debt**

On August 5, 2016, the Company entered into a loan and security agreement with Silicon Valley Bank (the Bank). Under this agreement, the Bank agreed to provide the Company with up to \$5.0 million in debt financing, consisting of a term loan in an aggregate original principal amount not to exceed \$4.0 million (the "Term Loan") and a revolving line of credit in an aggregate principal amount not to exceed \$1.0 million outstanding at any time (the "Revolving Line"). Proceeds from the loans were to be used for general corporate and working capital purposes. Advances under the Term Loan were available to the Company until November 30, 2016 and were subject to the Company's compliance with liquidity covenants. The Term Loan expired unused on November 30, 2016 and the Term Loan is no longer available to be drawn. Advances under the Revolving Line are available to the Company until March 31, 2020 and accrue interest at a floating annual rate equal to 1.75% or 1.0% above the prime rate, depending on liquidity factors. Outstanding borrowings, if any, are collateralized by all of the Company's assets, excluding intellectual property which is subject to a negative pledge. There were no borrowings outstanding under this facility as of September 30, 2019 or December 31, 2018.

### **Note 4 – Equity**

*Series F Convertible Preferred Stock:* On November 27, 2017, the Company closed on an underwritten public offering of Series F convertible preferred stock and warrants to purchase shares of common stock for gross proceeds of \$18.0 million. Net proceeds totaled approximately \$16.2 million after deducting the underwriting discounts and commissions and other costs associated with the offering.

The offering was comprised of Series F convertible preferred stock, convertible into shares of the Company's common stock at an initial conversion price of \$63.00 per share. Each share of Series F preferred stock was accompanied by a Series 1 warrant, which was to expire on the first anniversary of its issuance, to purchase 16 shares of the Company's common stock at an exercise price of \$63.00 per share, and a Series 2 warrant, which expires on the seventh anniversary of its issuance, to purchase 16 shares of the Company's common stock at an exercise price

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of \$63.00 per share. The Series F preferred stock and the warrants were immediately separable and were issued separately. The conversion price of the Series F preferred stock will be adjusted in the event of a stock split, combination, reclassification or stock dividend or if the Company consummates a fundamental transaction. The Series F preferred stock also has full ratchet price based anti-dilution protection, subject to customary carve outs, in the event of a down-round financing at a price per share below the conversion price of the Series F preferred stock (which protection will expire if, during any 20 of 30 consecutive trading days, the volume weighted average price of the Company's common stock exceeds 300% of the then-effective conversion price of the Series F preferred stock and the daily dollar trading volume for each trading day during such period exceeds \$200,000). The exercise price of the warrants is fixed and does not contain any variable pricing features, nor any price based anti-dilutive features, apart from customary adjustments for stock splits, combinations, reclassifications, stock dividends or fundamental transactions. A total of 18,000 shares of Series F Convertible Preferred Stock initially convertible into 286,714 shares of common stock and warrants to purchase 573,310 shares of common stock were issued in the offering.

As noted below, effective July 3, 2018, the conversion price of the Series F convertible preferred stock was reduced from \$63.00 to \$29.68, the per share price in the July 2018 Offering described below. Effective March 12, 2019, the conversion price of the Series F convertible preferred stock was reduced again from \$29.68 to \$5.25, the per share price to the public of the Series G convertible preferred stock which closed in an underwritten public offering on March 12, 2019, and each share of the remaining Series F convertible preferred stock is convertible into 191 shares of the Company's common stock. As of both September 30, 2019, and December 31, 2018, 535 shares of the Series F convertible preferred stock remained outstanding.

*July 2018 Offering:* On July 3, 2018, the Company closed on an underwritten public offering of 181,941 shares of its common stock at a public offering price of \$29.68 per share, for gross proceeds of \$5.4 million, including the full exercise of the underwriters' over-allotment option to purchase additional shares of the Company's common stock (the "July 2018 Offering"). Net proceeds totaled approximately \$4.6 million after deducting underwriting discounts and commissions and offering expenses.

In connection with the July 2018 Offering, and to induce certain institutional investors who hold warrants issued by the Company in November 2017 ("November 2017 Warrants") to participate in the July 2018 Offering, the Company entered into letter agreements with such institutional investors. Pursuant to the terms of these agreements, the Company agreed, effective July 3, 2018, to reduce the per share exercise price of the November 2017 Warrants held by such institutional investors to \$29.68 and to extend the expiration date of the warrants that were to expire on November 27, 2018 to November 27, 2019. The number of common shares underlying the warrants that were repriced did not change. The repriced warrants are exercisable for 554,322 shares of common stock in the aggregate, of which, following such amendment, half expire on November 27, 2019 and half expire on November 27, 2024. The repricing of the warrants was accounted as an equity financing cost, with no impact to net proceeds from the offering.

As noted above, the Company's outstanding Series F preferred stock is subject to full-ratchet anti-dilution protection in the event the Company sells any common stock at a price lower than the then-conversion price of the Series F preferred stock. As a result of the July 2018 Offering, effective July 3, 2018, the conversion price of the Series F preferred stock was reduced from \$63.00 to \$29.68, the per share price in the July 2018 Offering.

*Series G Convertible Preferred Stock and March 2019 Offering:* On March 12, 2019, the Company closed on an underwritten public offering of common stock, Series G convertible preferred stock and warrants to purchase shares of common stock for gross proceeds of \$12.4 million, which included the full exercise of the underwriter's over-allotment option to purchase additional shares and warrants ("March 2019 Offering"). Net proceeds totaled approximately \$11.0 million after deducting the underwriting discounts and commissions and other costs associated with the offering. The Series G convertible preferred stock included a beneficial conversion amount of \$4.5 million, representing the intrinsic value of the shares at the time of issuance. This amount is reflected as an increase to the loss per share allocable to common stockholders in the nine months ended September 30, 2019.

The March 2019 Offering was comprised of 455,178 shares of common stock priced at \$5.25 per share and 1,910,536 shares of Series G convertible preferred stock, convertible into common stock at \$5.25 per share. Each share of Series G convertible preferred stock and each share of common stock was accompanied by a Series 1 warrant and a Series 2 warrant. The Series 1 warrants are exercisable into 2,365,714 shares of common stock and the Series 2 warrants are exercisable into 2,365,714 shares of common stock. Series 1 warrants expire on the fifth anniversary of the date of issuance and are exercisable at \$5.25 to purchase one share of common stock. Series 2 warrants expire on the earlier of: (i) the eighteen-month anniversary of the date of issuance and (ii) the 30<sup>th</sup> trading day following the public

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announcement of the receipt from the U.S. Food and Drug Administration of clearance or approval of a modification to the product label for the Aquadex FlexFlow system to include pediatric patients. Series 2 warrants are exercisable at \$5.25 per share of common stock. The conversion price of the Series G convertible preferred stock as well as the exercise price of the warrants are fixed and do not contain any variable pricing features, nor any price based anti-dilutive features apart from customary adjustments for splits and reverse splits of common stock. The Series G convertible preferred stock included a beneficial ownership limitation of 4.99% but had no dividend preference (except to extent dividends are also paid on the common stock), liquidation preference or other preferences over common stock. The securities comprising the units were immediately separable and were issued separately.

As of September 30, 2019, all 1,910,536 shares of the Series G convertible preferred stock had been converted into common stock and none remained outstanding.

As noted above, the Company's outstanding Series F convertible preferred stock is subject to full-ratchet anti-dilution protection in the event the Company sells any common stock at a price lower than the then-conversion price of the Series F convertible preferred stock. As a result of the March 2019 Offering, the conversion price of the Series F convertible preferred stock was reduced from \$29.68, to \$5.25, the per share price of the Series G convertible preferred stock.

*Placement Agent Fees:* In connection with the issuance of the Series F convertible preferred stock, the July 2018 Offering, and the March 2019 Offering, the Company paid the placement agent an aggregate cash placement fee equal to 8% of the aggregate gross proceeds raised in the offering and issued no warrants to the placement agent.

*Market-Based Warrants:* On May 30, 2019, the Company granted a market-based warrant to a consultant in exchange for investor relations services. The warrant represents the right to acquire up to 100,000 shares of the Company's common stock at an exercise price of \$3.18 per share, the closing stock price of the Company's common shares on May 30, 2019. The warrant is subject to a vesting schedule based on the Company achieving certain market stock prices within a specified period of time. The warrant expires on May 30, 2024. The warrant was valued at \$1.93 per share using the Monte Carlo valuation methodology and is being expensed over the term of the consulting engagement which is twelve months. Significant inputs used for the Monte Carlo valuation were the expected stock price volatility of 136.21%, and management's expectations regarding the timing of regulatory clearance for an expanded label in pediatrics.

### Note 5 – Stock-Based Compensation

Under the fair value recognition provisions of U.S. GAAP for accounting for stock-based compensation, the Company measures stock-based compensation expense at the grant date based on the fair value of the award and recognizes the compensation expense over the requisite service period, which is generally the vesting period.

The following table presents the classification of stock-based compensation expense recognized for the periods below:

<i>(in thousands)</i>	Three months ended September 30,		Nine months ended September 30,	
	2019	2018	2019	2018
Selling, general and administrative expense	\$ 383	\$ 440	\$ 1,018	\$ 1,446
Research and development expense	29	(3)	95	98
<b>Total stock-based compensation expense</b>	<b>\$ 412</b>	<b>\$ 437</b>	<b>\$ 1,113</b>	<b>\$ 1,544</b>

### Note 6 – Fair Value of Financial Instruments

The Company's financial instruments consist of cash and cash equivalents, warrants, and contingent consideration.

Pursuant to the requirements of ASC Topic 820 "Fair Value Measurement," the Company's financial assets and liabilities measured at fair value on a recurring basis are classified and disclosed in one of the following three categories:

- *Level 1* - Financial instruments with unadjusted quoted prices listed on active market exchanges.

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- *Level 2* - Financial instruments lacking unadjusted, quoted prices from active market exchanges, including over the counter traded financial instruments. The prices for the financial instruments are determined using prices for recently traded financial instruments with similar underlying terms as well as directly or indirectly observable inputs, such as interest rates and yield curves that are observable at commonly quoted intervals.
- *Level 3* - Financial instruments that are not actively traded on a market exchange. This category includes situations where there is little, if any, market activity for the financial instrument. The prices are determined using significant unobservable inputs or valuation techniques.

The fair value of the Company's contingent consideration, as described in Note 1, was initially measured based on the consideration expected to be transferred (probability-weighted), discounted back to present value, and it was considered a Level 3 instrument. The discount rate used was determined at the time of measurement in accordance with accepted valuation methods. The Company measured the liability on a recurring basis using Level 3 inputs including probabilities of payment and projected payment dates. As of September 30, 2019, this contingency had expired, therefore its fair value was recorded at \$0.

The following is a rollforward of the fair value of Level 3 items:

*(in thousands)*

Balance December 31, 2018	\$ 126
Change in fair value	(126)
Balance as of September 30, 2019	<u>\$ —</u>

The fair value of the market-based warrants described in Note 4 was calculated using a Monte Carlo valuation model and was classified as Level 3 in the fair value hierarchy. These warrants are classified as permanent equity and as a result, were measured at the grant date and are not required to be remeasured to fair value at each reporting period end.

All cash equivalents are considered Level 1 measurements for all periods presented. The Company does not have any financial instruments classified as Level 2 or any other classified as Level 3 and there were no movements between these categories during the periods ended September 30, 2019 and December 31, 2018. The Company believes that the carrying amounts of all remaining financial instruments approximate their fair value due to their relatively short maturities.

### Note 7 – Operating Leases

The Company leases office and manufacturing space under a non-cancelable operating lease that expires in March 2022. In August 2018, the Company entered into a third amendment to the lease, extending the term of the lease from March 31, 2019 to March 31, 2022. Beginning on April 1, 2019, the annual base rent is \$9.00 per square foot, subject to annual increases of \$0.25 per square foot.

The cost components of the Company's operating lease were as follows for the three and nine months ended September 30, 2019:

<i>(in thousands)</i>	Three Months	Nine Months
Operating lease cost	\$ 53	\$ 158
Variable lease cost	26	85
<b>Total</b>	<u>\$ 79</u>	<u>\$ 243</u>

Variable lease costs consist primarily of taxes, insurance, and common area or other maintenance costs for our leased office and manufacturing space.



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Maturities of our lease liability for the Company's operating lease are as follows as of September 30, 2019:

(in thousands)

2019	\$ 52
2020	213
2021	219
2022	55
Total lease payments	539
Less: Interest	(49)
<b>Present value of lease liability</b>	<b><u>\$ 490</u></b>

As of September 30, 2019, the remaining lease term was 2.5 years and discount rate was 7.5%. For the nine months ended September 30, 2019, the operating cash outflows from the Company's operating lease for office and manufacturing space were \$154,000.

Rent expense related to operating leases for office and manufacturing space and office equipment was approximately \$54,000 and \$160,000 for the three and nine months ended September 30, 2018, respectively. Future minimum lease payments, under non-cancelable operating leases as of December 31, 2018, were approximately \$217,000, \$220,000, \$219,000, \$55,000, and \$0 for each of the years ended December 31, 2019, through 2023, respectively.

### Note 8 – Income Taxes

The Company provides for a valuation allowance when it is more likely than not that it will not realize a portion of the deferred tax assets. The Company has established a full valuation allowance for U.S. and foreign deferred tax assets due to the uncertainty that enough taxable income will be generated in those taxing jurisdictions to utilize the assets. Therefore, the Company has not reflected any benefit of such deferred tax assets in the accompanying condensed consolidated financial statements.

As of September 30, 2019, there were no material changes to what the Company disclosed regarding tax uncertainties or penalties in its Annual Report on Form 10-K for the year ended December 31, 2018.

### Note 9 – Commitments and Contingencies

*Employee Retirement Plan:* The Company has a 401(k)-profit sharing plan that provides retirement benefit to substantially all full-time U.S. employees. Eligible employees may contribute a percentage of their annual compensation, subject to Internal Revenue Service ("IRS") limitations, with the Company matching a portion of the employee's contributions at the discretion of the Company.

*Contingent Consideration:* As part of the acquisition of the Aquadex Business from Baxter in August 2016, the Company agreed that if it disposed of any of the Aquadex assets for a price that exceeded \$4.0 million within three years of the closing, it would pay Baxter 40% of the amount of such excess. This commitment expired on August 6, 2019.

In addition, it also agreed that if shares of its common stock cease to be publicly traded on the Nasdaq Capital Market, Baxter has the option to require the Company to repurchase, in cash, all or any part of the common shares held by Baxter at a price equal to their fair market value, as determined by a third-party appraiser.

### Note 10 – Subsequent Events

On October 25, 2019, the Company closed on a registered direct offering of 575,830 shares of its common stock at a price of \$1.15 per share, for gross proceeds of approximately \$660,000, prior to deducting commissions and expenses related to the transaction. In a concurrent private placement, the Company agreed to issue to the investors in the registered direct offering unregistered warrants to purchase up to 575,830 shares of the Company's common stock at an exercise price of \$1.41 per share, which will be exercisable six months from the date of issuance, and will expire five years from the initial exercise date.

Additionally, the Company's outstanding Series F preferred stock is subject to full-ratchet anti-dilution protection in the event the Company sells any common stock at a price lower than the then-conversion price of the Series F preferred stock. As a result of this offering, effective October 25, 2019, the conversion price of the Series F preferred stock was reduced from \$5.25 to \$1.15 per share, the per share price to the public in this transaction.

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On November 6, 2019, the Company closed on a registered direct offering of 1,219,076 shares of its common stock, or common equivalents, at a price of \$1.12 per share, for gross proceeds of approximately \$1.36 million prior to deduction of commissions and offering expenses related to the transaction. In a concurrent private placement, the Company agreed to issue to the investors in the registered direct offering unregistered warrants to purchase up to 1,219,076 shares of the Company's common stock at an exercise price of \$0.9942 per share, which will be exercisable upon the date of issuance, and will expire five years from the initial exercise date. Effective November 6, 2019, the conversion price of the Series F preferred stock was reduced from \$1.15 to \$0.9942, the exercise price of the warrants issued in connection with this financing.

**PART II****INFORMATION NOT REQUIRED IN PROSPECTUS****Item 13. Other Expenses of Issuance and Distribution.**

The following table sets forth the estimated costs and expenses to be incurred in connection with the issuance and distribution of the securities registered under this Registration Statement. All amounts are estimates except the Securities and Exchange Commission registration fee.

	<u>Amount to be Paid</u>
SEC registration fee	\$ 2,090
FINRA filing fee	\$ 2,415
Legal fees and expenses	\$ 150,000
Printing expenses	\$ 30,000
Accountant's fees and expenses	\$ 40,000
Transfer agent and registrar fees	\$ 7,500
Miscellaneous expenses	\$ 13,160
Total	\$ 245,165

**Item 14. Indemnification of Directors and Officers.**

Our certificate of incorporation and bylaws provide that each person who was or is made a party or is threatened to be made a party to or is otherwise involved (including, without limitation, as a witness) in any action, suit or proceeding, whether civil, criminal, administrative or investigative, by reason of the fact that he or she is or was a director or an officer of CHF Solutions, Inc. or is or was serving at our request as a director, officer, or trustee of another corporation, or of a partnership, joint venture, trust or other enterprise, including service with respect to an employee benefit plan, whether the basis of such proceeding is alleged action in an official capacity as a director, officer or trustee or in any other capacity while serving as a director, officer or trustee, shall be indemnified and held harmless by us to the fullest extent authorized by the Delaware General Corporation Law, as amended (the "DGCL"), against all expense, liability and loss (including attorneys' fees, judgments, fines, ERISA excise taxes or penalties and amounts paid in settlement) reasonably incurred or suffered by such.

Section 145 of the DGCL permits a corporation to indemnify any director or officer of the corporation against expenses (including attorney's fees), judgments, fines and amounts paid in settlement actually and reasonably incurred in connection with any action, suit or proceeding brought by reason of the fact that such person is or was a director or officer of the corporation, if such person acted in good faith and in a manner that he or she reasonably believed to be in, or not opposed to, the best interests of the corporation, and, with respect to any criminal action or proceeding, if he or she had no reason to believe his or her conduct was unlawful. In a derivative action, (i.e., one brought by or on behalf of the corporation), indemnification may be provided only for expenses actually and reasonably incurred by any director or officer in connection with the defense or settlement of such an action or suit if such person acted in good faith and in a manner that he or she reasonably believed to be in, or not opposed to, the best interests of the corporation, except that no indemnification shall be provided if such person shall have been adjudged to be liable to the corporation, unless and only to the extent that the court in which the action or suit was brought shall determine that the defendant is fairly and reasonably entitled to indemnity for such expenses despite such adjudication of liability.

Pursuant to Section 102(b)(7) of the DGCL, our certificate of incorporation eliminates the liability of a director to us or our stockholders for monetary damages for such a breach of fiduciary duty as a director, except for liabilities arising:

- from any breach of the director's duty of loyalty to us or our stockholders;
- from acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law;
- under Section 174 of the DGCL; and
- from any transaction from which the director derived an improper personal benefit.

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We carry insurance policies insuring our directors and officers against certain liabilities that they may incur in their capacities as directors and officers.

The Company has entered into indemnification agreements with each of its directors and executive officers. Pursuant to the indemnification agreements, the Company agrees to hold harmless and indemnify its directors and executive officers to the fullest extent authorized or permitted by the provisions of the Company's certificate of incorporation and bylaws and the DGCL, including for any amounts that such director or officer becomes obligated to pay because of any claim to which such director or officer is made or threatened to be made a party, witness or participant, by reason of such director's or officer's service as a director, officer, employee or other agent of the Company.

There are certain exceptions from the Company's obligation to indemnify its directors and executive officers pursuant to the indemnification agreements, including for "short-swing" profit claims under Section 16(b) of the Exchange Act, losses that result from conduct that is established by a final judgment as knowingly fraudulent or deliberately dishonest or that constituted willful misconduct, or that constituted a breach of the duty of loyalty to the Company or resulted in any improper personal profit or advantage, where payment is actually made to a director or officer under an insurance policy, indemnity clause, bylaw or agreement, except in respect of any excess beyond payment under such insurance, clause, bylaw or agreement, for indemnification which is not lawful, or in connection with any proceeding initiated by such director or officer, or any proceeding against the Company or its directors, officers, employees or other agents, unless (i) such indemnification is expressly required to be made by law, (ii) the proceeding was authorized by the board of directors of the Company, (iii) such indemnification is provided by the Company, in its sole discretion, pursuant to the powers vested in the Company under the DGCL, or (iv) the proceeding is initiated to enforce a claim for indemnification pursuant to the indemnification agreement.

All agreements and obligations of the Company contained in the indemnification agreements shall continue during the period when the director or officer who is a party to an indemnification agreement is a director, officer, employee or other agent of the Company (or is or is serving at the request of the Company as a director, officer, employee or other agent of another corporation, partnership, joint venture, trust, employee benefit plan or other enterprise) and shall continue thereafter so long as such director or officer shall be subject to any possible claim or threatened, pending or completed action, suit or proceeding, whether civil, criminal, arbitrational, administrative or investigative. In addition, the indemnification agreements provide for partial indemnification and advance of expenses.

Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to our directors, officers or controlling persons pursuant to the foregoing provisions, or otherwise, we have been advised that in the opinion of the Securities and Exchange Commission this indemnification is against public policy as expressed in the Securities Act, and is, therefore, unenforceable.

### **Item 15. Recent Sales of Unregistered Securities.**

The following sets forth information regarding all unregistered securities sold by the registrant in the three years preceding the date of this registration statement. This information has been retroactively adjusted to reflect the reverse stock splits for all periods presented.

- On July 20, 2016, the registrant entered into a securities purchase agreement with Sabby Healthcare Master Fund Ltd. and Sabby Volatility Warrant Master Fund Ltd. (collectively, Sabby) under which the registrant issued and sold, on July 26, 2016, 3,468 shares of Series B Convertible Preferred Stock at \$1,000 per share directly to Sabby in a registered direct offering. In a concurrent private placement, the registrant issued warrants to purchase an aggregate of 440 shares of its common stock to Sabby. Each warrant was exercisable beginning on the six month anniversary of the date of issuance at an exercise price of \$7,896 per share (as adjusted), subject to further adjustment as provided therein and for 36 months from the initial exercise date, but not thereafter. Northland Securities, Inc. acted as placement agent and the registrant issued Northland Securities, Inc. and its designees warrants to purchase an aggregate of 27 shares of common stock. The Northland warrants were exercisable beginning immediately upon the closing at an exercise price of \$11,340 per share, subject to adjustment as provided there in, and for 5 years thereafter. The warrants were issued under an exemption from the registration requirements of the Securities Act provided in Section 4(a)(2) of the Securities Act and/or Regulation D.

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- On August 5, 2016, the registrant entered into and consummated the transactions contemplated by an asset purchase agreement with Gambro UF Solutions, Inc. (the “Seller”), pursuant to which the registrant acquired certain assets exclusively related to the production and sale of Seller’s Aquadex FlexFlow products for consideration consisting of \$4.0 million paid in cash and 120 shares of the registrant’s common stock. The shares of common stock were issued to Seller under an exemption from the registration requirement of the Securities Act provided in Section 4(a)(2) of the Securities Act and/or Regulation D.
- On October 30, 2016, the registrant entered into a securities exchange agreement with Sabby, as holder of the registrant’s Series B Convertible Preferred Stock pursuant to which the registrant agreed to issue Sabby 2,227.2 shares of Series B-1 Convertible Preferred Stock in exchange for the cancellation of all shares of Series B Convertible Preferred Stock held by Sabby in reliance on an exemption from registration provided by Section 3(a)(9) of the Securities Act, and consummated such exchange on November 3, 2016.
- On October 30, 2016, the registrant entered into securities purchase agreements with Sabby under which it agreed to issue and sell 2,900 shares of Series C Convertible Preferred Stock at \$1,000 per share directly to Sabby in a registered direct offering. In a concurrent private placement, the registrant agreed to issue and sell 900 shares of Series D Convertible Preferred Stock at \$1,000 per share directly to Sabby and warrants to purchase an aggregate of 2,662 shares of common stock. The registered direct offering closed on November 3, 2016, and the registrant concurrently sold 700 shares of the Series D Convertible Preferred Stock and warrants to purchase 2,522 shares of common stock. The remaining 200 shares of Series D Convertible Preferred Stock and warrants to purchase 141 shares of common stock were issued and sold at a second closing on January 11, 2017. The Series D Convertible Preferred Stock had a stated value of \$1,000 per share and a conversion price of \$1,428 (as adjusted) subject to further adjustment and may be converted to shares of common stock at any time following the receipt of stockholder approval of such issuance upon conversion. Each warrant became exercisable beginning on the day that is the later of the date stockholder approval of the issuance of common stock underlying such warrants is obtained or the six month anniversary of the date of issuance at an exercise price of \$1,512 per share (as adjusted), subject to further adjustment as provided therein, and terminate five years thereafter. Northland Securities, Inc. acted as placement agent and the registrant issued Northland Securities, Inc. and its designees warrants to purchase an aggregate of 160 shares of common stock, with an exercise price of \$1,786.40 per share. Subject to limited exceptions, a holder of Series D Convertible Preferred Stock or warrants will not have the right to convert or exercise if the holder, together with its affiliates, would beneficially own over 4.99% of the number of shares of the registrant’s common stock outstanding immediately after giving effect to such exercise; provided, however, that upon not less than 61 days’ prior notice, the holder may increase the limitation, provided that in no event will the limitation exceed 9.99%. The Series D Convertible Preferred Stock and the warrants were issued pursuant to an exemption from the registration requirement of the Securities Act provided in Section 4(a)(2) of the Securities Act and/or Regulation D.
- On February 15, 2017, the registrant entered into a letter agreement with Sabby, to incent the cash exercise of the warrants held by Sabby on or before March 31, 2017 (the “Exercise Period”). In exchange for any such exercise, the registrant agreed to provide Sabby replacement warrants (the “Replacement Warrants”) to purchase the same number of shares of common stock as were issued upon exercise of the exercised warrants, with an exercise price equal to the consolidated closing bid price of the registrant’s common stock on the date of issuance. The agreement also (i) amends the definition of “Beneficial Ownership” in the existing warrants to mean, solely for purposes of any exercises of warrants that occur during the Exercise Period, “9.99%” and (ii) amends the Initial Exercise Date of the existing warrants issued on November 3, 2016 and January 11, 2017 so that such warrants are exercisable on or after the receipt of stockholder approval. Since such stockholder approval was received on January 9, 2017, such warrants were immediately exercisable as of the date of the agreement. The Replacement Warrants will be in the same form as the exercised warrants except the exercise price will not be subject to reduction for subsequent equity issuances and (ii) the Replacement Warrants will not allow Sabby to demand that the registrant purchase the Replacement Warrants in the event of a fundamental transaction involving the registrant. Concurrent with the signing of the agreement, Sabby exercised warrants to purchase 373 shares of common stock for cash proceeds of approximately \$564,000, and the registrant issued Replacement Warrants to purchase 373 shares of common stock at an exercise price of \$1,397.20 per share. From March 10, 2017 to March 28, 2017, Sabby exercised warrants to purchase 2,727 shares of common stock for cash proceeds of approximately \$1.4 million, and the registrant issued Replacement Warrants to purchase 2,727 shares of

common stock with exercise prices equal to the closing consolidated bid price of its common stock available on the date of issuance (ranging from \$484.40 to \$1,055.60 per share). The Replacement Warrants were issued pursuant to an exemption from the registration requirement of the Securities Act provided in Section 4(a)(2) of the Securities Act and/or Regulation D.

- On, November 15, 2018, the registrant entered into a letter agreement with Maxim Group LLC (“Maxim”), under which Maxim would provide general financial advisory and investment banking services to the registrant on a non-exclusive basis. In exchange for such services, the registrant agreed to issue to Maxim, 7,143 shares of its common stock. The shares were issued pursuant to an exemption from the registration requirement of the Securities Act provided in Section 4(a)(2) of the Securities Act and/or Regulation D.
- On May 30, 2019, the registrant granted a market-based warrant to a consultant in exchange for investor relations services. The warrant represents the right to acquire up to 100,000 shares of the registrant’s common stock at an exercise price \$3.18 per share, the closing stock price of the registrant’s common shares on May 30, 2019. The warrant is subject to a vesting schedule based on the registrant achieving certain market stock prices within a specified period of time. The warrant expires on May 30, 2024. This issuance was made pursuant to the exemption from registration contained in Section 4(a)(2) of the Securities Act.
- On October 25, 2019, the registrant closed on a registered direct offering of its common stock and in a concurrent private placement, the registrant agreed to issue to the investors in the registered direct offering unregistered warrants to purchase up to 575,830 shares of the registrant’s common stock at an exercise price of \$1.41 per share, which will be exercisable six months from the date of issuance, and will expire five years from the initial exercise date. This issuance was made pursuant to the exemption from registration contained in Section 4(a)(2) of the Securities Act.
- On November 6, 2019, the registrant closed on a registered direct offering of its common stock, or common equivalents, and in a concurrent private placement, the registrant agreed to issue to the investors in the registered direct offering unregistered warrants to purchase up to 1,219,076 shares of the registrant’s common stock at an exercise price of \$0.9942 per share, which will be exercisable upon the date of issuance, and will expire five years from the initial exercise date. This issuance was made pursuant to the exemption from registration contained in Section 4(a)(2) of the Securities Act.

**Item 16. Exhibits and Financial Statement Schedules.**

*(a) Exhibits*

See the Exhibit Index attached to this Registration Statement, which is incorporated by reference herein.

*(b) Financial Statement Schedules*

No financial statement schedules are provided because the information called for is not required or is shown in the financial statements or the notes thereto.

**Item 17. Undertakings.**

The undersigned registrant hereby undertakes that, for the purpose of determining any liability under the Securities Act of 1933, as amended, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

The undersigned registrant hereby undertakes to remove from registration by means of a post-effective amendment any of the securities being registered that remain unsold at the termination of the offering.

The undersigned registrant hereby undertakes that, for the purposes of determining liability to any purchaser, if the registrant is subject to Rule 430C, each prospectus filed pursuant to Rule 424(b) as part of a registration statement relating to an offering, other than registration statements relying on Rule 430B or other than prospectuses filed in reliance on Rule 430A, shall be deemed to be part of and included in the registration statement as of the date it is first used after effectiveness. Provided, however, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into

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the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such first use, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such date of first use.

The undersigned registrant hereby undertakes that, for the purpose of determining liability of the registrant under the Securities Act of 1933 to any purchaser in the initial distribution of the securities:

The undersigned registrant undertakes that in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:

- (i) Any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424;
- (ii) Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned registrant or used or referred to by the undersigned registrant;
- (iii) The portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of the undersigned registrant; and
- (iv) Any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.

Insofar as indemnification for liabilities arising under the Securities Act of 1933, as amended, may be permitted to directors, officers and controlling persons of the undersigned registrant according the foregoing provisions, or otherwise, the undersigned registrant has been advised that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act of 1933, as amended, and will be governed by the final adjudication of such issue.

The undersigned registrant hereby undertakes that, for purposes of determining any liability under the Securities Act of 1933, each filing of the registrant's annual report pursuant to section 13(a) or section 15(d) of the Securities Exchange Act of 1934 (and, where applicable, each filing of an employee benefit plan's annual report pursuant to section 15(d) of the Securities Exchange Act of 1934) that is incorporated by reference in the registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

**EXHIBIT INDEX**

<b>Exhibit Number</b>	<b>Exhibit Description</b>	<b>Incorporated By Reference</b>			<b>Exhibit Number</b>	<b>Filed Herewith</b>	<b>Furnished Herewith</b>
		<b>Form</b>	<b>File Number</b>	<b>Date of First Filing</b>			
<a href="#">1.1</a>	Form of Underwriting Agreement					X	
<a href="#">2.1</a>	Asset Purchase Agreement between Sunshine Heart, Inc. and Gambro UF Solutions, Inc. dated August 5, 2016	8-K	001-35312	August 8, 2016	2.1		
<a href="#">3.1</a>	Fourth Amended and Restated Certificate of Incorporation	10	001-35312	February 1, 2012	3.1		
<a href="#">3.2</a>	Certificate of Amendment to the Fourth Amended and Restated Certificate of Incorporation	8-K	001-35312	January 13, 2017	3.1		
<a href="#">3.3</a>	Certificate of Amendment to Fourth Amended and Restated Certificate of Incorporation	8-K	001-35312	May 23, 2017	3.1		
<a href="#">3.4</a>	Certificate of Amendment to Fourth Amended and Restated Certificate of Incorporation	8-K	001-35312	October 12, 2017	3.1		
<a href="#">3.5</a>	Certificate of Amendment to Fourth Amended and Restated Certificate of Incorporation	8-K	001-35312	January 2, 2019	3.1		
<a href="#">3.6</a>	Second Amended and Restated Bylaws	8-K	001-35312	May 23, 2017	3.2		
<a href="#">3.7</a>	Form of Certificate of Designation of Series A Junior Participating Preferred Stock	8-K	001-35312	June 14, 2013	3.1		
<a href="#">3.8</a>	Form of Certificate of Designation of Preferences, Rights and Limitations of Series F Convertible Preferred Stock	S-1/A	333-221010	November 17, 2017	3.7		
<a href="#">3.9</a>	Form of Certificate of Designation of Preferences, Rights and Limitations of Series G Convertible Preferred Stock	S-1/A	333-229102	February 25, 2019	3.9		
<a href="#">3.10</a>	Form of Certificate of Designation of Preferences, Rights and Limitations of Series H Convertible Preferred Stock					X	
<a href="#">4.1</a>	Warrant to Purchase Stock, dated February 18, 2015, issued to Silicon Valley Bank	8-K	001-35312	February 19, 2015	4.1		
<a href="#">4.2</a>	Warrant to Purchase Stock, dated February 18, 2015, issued to Life Science Loans, LLC	8-K	001-35312	February 19, 2015	4.2		
<a href="#">4.3</a>	Form of common stock Purchase Warrant issued pursuant to the Securities Purchase Agreement, dated July 20, 2016, among the Company and the purchasers signatory thereto	8-K	001-35312	July 22, 2016	4.2		



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<b>Exhibit Number</b>	<b>Exhibit Description</b>	<b>Incorporated By Reference</b>			<b>Exhibit Number</b>	<b>Filed Herewith</b>	<b>Furnished Herewith</b>
		<b>Form</b>	<b>File Number</b>	<b>Date of First Filing</b>			
<a href="#">4.4</a>	Form of common stock Purchase Warrant issued to Northland Securities, Inc.	8-K	001-35312	July 22, 2016	4.3		
<a href="#">4.5</a>	Registration Rights Agreement between Sunshine Heart, Inc. and Gambro UF Solutions, Inc. dated August 5, 2016	8-K	001-35312	August 8, 2016	4.1		
<a href="#">4.6</a>	Form of common stock Purchase Warrant issued pursuant to the Securities Purchase Agreement, dated October 30, 2016, among the Company and the purchasers signatory thereto	8-K	001-35312	October 31, 2016	4.1		
<a href="#">4.7</a>	Form of common stock Purchase Warrant issued pursuant to the Letter Agreement between the Company and the purchasers signatory thereto, dated February 15, 2017	8-K	001-35312	February 16, 2017	4.1		
<a href="#">4.8</a>	Form of common stock Purchase Warrant issued pursuant to the Underwriting Agreement between the Company and Ladenburg Thalmann & Co. Inc., dated April 19, 2017	S-1/A	333-216841	April 4, 2017	4.8		
<a href="#">4.9</a>	Form of common stock Purchase Warrant issued pursuant to the Underwriting Agreement between the Company and Ladenburg Thalmann & Co. Inc., dated November 22, 2017	S-1/A	333-221010	November 17, 2017	4.9		
<a href="#">4.10</a>	Form of Series 1 and Series 2 common stock Purchase Warrants issued pursuant to the Underwriting Agreement between the Company and Ladenburg Thalmann & Co. Inc., dated March 8, 2019	S-1/A	333-229102	February 25, 2019	4.10		
<a href="#">4.11</a>	Common Stock Purchase Warrant, dated May 30, 2019, between CHF Solutions, Inc. and Redington, Inc.	10-Q	001-35312	August 6, 2019	4.1		
<a href="#">4.12</a>	Form of common stock Purchase Warrant issued pursuant to the Securities Purchase Agreement, dated October 23, 2019, among the Company and the purchasers signatory thereto	8-K	001-35312	October 23, 2019	4.1		
<a href="#">4.13</a>	Form of common stock Purchase Warrant issued pursuant to the Securities Purchase Agreement, dated November 4, 2019, among the Company and the purchasers signatory thereto	8-K	001-35312	November 4, 2019	4.1		
<a href="#">4.14</a>	Form of common stock Pre-Funded Purchase Warrant issued pursuant to the Securities Purchase Agreement, dated November 4, 2019, among the Company and the purchasers signatory thereto	8-K	001-35312	November 4, 2019	4.2		

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<b>Exhibit Number</b>	<b>Exhibit Description</b>	<b>Incorporated By Reference</b>			<b>Exhibit Number</b>	<b>Filed Herewith</b>	<b>Furnished Herewith</b>
		<b>Form</b>	<b>File Number</b>	<b>Date of First Filing</b>			
<a href="#">4.15</a>	Form of Warrant to purchase shares of common stock					X	
<a href="#">5.1</a>	Opinion of Honigman LLP					X	
<a href="#">10.1</a>	Securities Purchase Agreement, dated July 20, 2016 among the Company and the purchasers signatory thereto	8-K	001-35312	July 22, 2016	10.1		
<a href="#">10.2</a>	Patent License Agreement between Sunshine Heart, Inc. and Gambro UF Solutions, Inc. dated August 5, 2016	8-K	001-35312	August 8, 2016	10.1		
<a href="#">10.3</a>	Loan and Security Agreement between Sunshine Heart, Inc. and Silicon Valley Bank dated August 5, 2016	8-K	001-35312	August 8, 2016	10.2		
<a href="#">10.4</a>	Amended and Restated 2002 Stock Plan†	10	001-35312	December 16, 2011	10.2		
<a href="#">10.5</a>	Form of Notice of Stock Option Grant and Option Agreement for Amended and Restated 2002 Stock Plan†	10	001-35312	September 30, 2011	10.3		
<a href="#">10.6</a>	Second Amended and Restated 2011 Equity Incentive Plan, as amended†	14A	001-35312	July 27, 2012	App. A		
<a href="#">10.7</a>	Form of Stock Option Grant Notice and Option Agreement for 2011 Equity Incentive Plan†	10	001-35312	September 30, 2011	10.5		
<a href="#">10.8</a>	Form of Stock Option Grant Notice and Option Agreement (Senior Management) for 2011 Equity Incentive Plan†	10	001-35312	September 30, 2011	10.6		
<a href="#">10.9</a>	Form of Stock Option Grant Notice and Option Agreement (Director) for 2011 Equity Incentive Plan†	8-K	001-35312	September 18, 2012	10.1		
<a href="#">10.10</a>	Form of Stock Grant Notice and Award Agreement for 2011 Equity Incentive Plan†	8-K	001-35312	September 10, 2013	10.1		
<a href="#">10.11</a>	Form of Restricted Stock Unit Grant Notice and Agreement for 2011 Equity Incentive Plan†	8-K	001-35312	September 10, 2013	10.2		
<a href="#">10.12</a>	2013 Non-Employee Directors' Equity Incentive Plan†	14A	001-35312	April 5, 2013	App. A		
<a href="#">10.13</a>	Form of Stock Option Grant Notice and Option Agreement for 2013 Non-Employee Directors' Equity Incentive Plan†	10-K	001-35312	May 29, 2013	10.2		
<a href="#">10.14</a>	Form of Restricted Stock Unit Award Grant Notice and Agreement for 2013 Non-Employee Directors' Equity Incentive Plan†	10-K	001-35312	March 20, 2015	10.11		

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		<b>Form</b>	<b>File Number</b>	<b>Date of First Filing</b>			
<a href="#">10.15</a>	New-Hire Equity Incentive Plan†	10-Q	001-35312	August 8, 2013	10.1		
<a href="#">10.16</a>	First Amendment to New-Hire Equity Incentive Plan†	10-Q	001-35312	November 12, 2013	10.1		
<a href="#">10.17</a>	Second Amendment to New-Hire Equity Incentive Plan†	S-8	333-202904	March 20, 2015	99.12		
<a href="#">10.18</a>	Third Amendment to New-Hire Equity Incentive Plan†	S-8	333-210215	March 15, 2016	99.13		
<a href="#">10.19</a>	Fourth Amendment to New-Hire Equity Incentive Plan†	8-K	001-35312	May 30, 2017	10.4		
<a href="#">10.20</a>	Fifth Amendment to New-Hire Equity Incentive Plan†	8-K	001-35312	January 18, 2018	10.1		
<a href="#">10.21</a>	Form of Stock Option Grant Notice and Option Agreement for New-Hire Equity Incentive Plan†	10-Q	001-35312	November 12, 2013	10.2		
<a href="#">10.22</a>	2017 Equity Incentive Plan†	8-K	001-35312	May 30, 2017	10.1		
<a href="#">10.23</a>	Form of Stock Option Grant Notice and Option Agreement for 2017 Equity Incentive Plan†	8-K	001-35312	May 30, 2017	10.2		
<a href="#">10.24</a>	Form of Restricted Stock Unit Grant Notice and Restricted Stock Unit Agreement for 2017 Equity Incentive Plan†	8-K	001-35312	May 30, 2017	10.3		
<a href="#">10.25</a>	Form of Indemnity Agreement for the Company's executive officers and directors†	10	001-35312	September 30, 2011	10.1		
<a href="#">10.26</a>	Form of Change in Control Agreement for the Company's executive officers†	10-K	001-35312	March 20, 2015	10.16		
<a href="#">10.27</a>	Non-Employee Director Compensation Policy†	10-Q	001-35312	August 8, 2013	10.2		
<a href="#">10.28</a>	Lease Agreement dated October 21, 2011 by and between the Company and Silver Prairie Crossroads, LLC	10	001-35312	December 16, 2011	10.18		
<a href="#">10.29</a>	Sales Agreement dated March 21, 2014 by and between the Company and Cowen and Company, LLC	S-3	333-194731	March 21, 2014	1.2		
<a href="#">10.30</a>	Second Amendment to Lease, dated as of April 20, 2015, by and between the Company and Capital Partners Industrial Fund I, LLLP dba Prairie Crossroads Business Center	8-K	001-35312	April 23, 2015	10.1		
<a href="#">10.31</a>	Third Amendment to Lease, dated as of August 3, 2018, by and between the Company and Capital Partners Industrial Fund I, LLLP	10-Q	001-35312	November 7, 2018	10.2		

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<b>Exhibit Number</b>	<b>Exhibit Description</b>	<b>Incorporated By Reference</b>			<b>Exhibit Number</b>	<b>Filed Herewith</b>	<b>Furnished Herewith</b>
		<b>Form</b>	<b>File Number</b>	<b>Date of First Filing</b>			
<a href="#">10.32</a>	Separation and Release Agreement between the Company and David A. Rosa, dated November 30, 2015†	8-K	001-35312	November 30, 2015	99.1		
<a href="#">10.33</a>	Executive Employment Agreement between Sunshine Heart, Inc. and John L. Erb, dated March 1, 2016†	8-K	001-35312	March 2, 2016	10.1		
<a href="#">10.34</a>	Separation and Release Agreement by and between Sunshine Heart, Inc. and Brian J. Brown, dated February 3, 2016†	10-Q	001-35312	May 5, 2015	10.2		
<a href="#">10.35</a>	Separation and Release Agreement by and between Sunshine Heart, Inc. and Debra Kridner, dated January 24, 2016†	10-Q	001-35312	May 5, 2016	10.3		
<a href="#">10.36</a>	Claudia Drayton Retention Bonus Letter, dated as of December 12, 2016†	8-K	001-35312	December 16, 2016	10.1		
<a href="#">10.37</a>	Molly Wade Retention Bonus Letter, dated as of December 12, 2016†	S-1	333-221010	October 18, 2017	10.35		
<a href="#">10.38</a>	Letter Agreement dated February 15, 2017 among the Company, Sabby Volatility Warrant Master Fund, Ltd. and Sabby Healthcare Master Fund, Ltd.	8-K	003-35312	February 16, 2017	10.1		
<a href="#">10.39</a>	Offer Letter by and between the Company and Jim Breidenstein dated April 12, 2017†	10-Q	001-35312	May 12, 2017	10.4		
<a href="#">10.40</a>	Separation and Release Agreement, dated as of August 6, 2018, between the Company and James Breidenstein†	10-Q	001-35312	November 7, 2018	10.1		
<a href="#">10.41</a>	Warrant Agency Agreement between the Company and American Stock Transfer & Trust Company, LLC dated April 24, 2017	8-K	001-35312	April 25, 2017	10.1		
<a href="#">10.42</a>	Warrant Agency Agreement between the Company and American Stock Transfer & Trust Company, LLC dated November 27, 2017	8-K	001-35312	November 28, 2017	10.1		
<a href="#">10.43</a>	Form of Warrant Reprice Agreement	8-K	001-35312	June 29, 2018	10.1		
<a href="#">10.44</a>	Third Amendment to Lease, dated as of August 3, 2018, by and between the Company and Capital Partners Industrial Fund I, LLLP	10-Q	001-35312	November 7, 2018	10.2		
<a href="#">10.45</a>	Consulting Agreement, dated as of January 28, 2019, between CHF Solutions, Inc. and Steve Brandt†	10-K	001-35312	February 21, 2019	10.44		
<a href="#">10.46</a>	Underwriting Agreement, dated as of March 8, 2019, by and between CHF Solutions, Inc. and Ladenburg Thalmann & Co. Inc.	8-K	001-35312	March 13, 2019	1.1		

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Exhibit Number	Exhibit Description	Incorporated By Reference			Exhibit Number	Filed Herewith	Furnished Herewith
		Form	File Number	Date of First Filing			
<a href="#">10.47</a>	Warrant Agency Agreement between the Company and American Stock Transfer & Trust Company, LLC dated March 12, 2019	8-K	001-35312	March 13, 2019	4.2		
<a href="#">10.48</a>	Form of Employee Proprietary Information, Inventions Assignment and Non-Competition Agreement for the Company's employees, including executive officers†	10-Q	001-35312	May 9, 2019	10.3		
<a href="#">10.49</a>	Offer Letter, by and between CHF Solutions, Inc. and Claudia Drayton, dated December 9, 2014†	10-Q	001-35312	May 9, 2019	10.4		
<a href="#">10.50</a>	Offer Letter, by and between CHF Solutions, Inc. and Nestor Jaramillo, dated May 7, 2019†	10-Q	001-35312	May 9, 2019	10.5		
<a href="#">10.51</a>	Sixth Amendment to New-Hire Equity Incentive Plan†	10-Q	001-35312	August 8, 2019	10.2		
<a href="#">10.52</a>	Placement Agency Agreement, dated as of October 23, 2019, by and between CHF Solutions, Inc. and Ladenburg Thalmann & Co. Inc.	8-K	001-35312	October 23, 2019	1.1		
<a href="#">10.53</a>	Securities Purchase Agreement, dated as of October 23, 2019, by and among CHF Solutions, Inc. and the purchasers identified therein	8-K	001-35312	October 23, 2019	10.1		
<a href="#">10.54</a>	Placement Agency Agreement, dated as of November 4, 2019, by and between CHF Solutions, Inc. and Ladenburg Thalmann & Co. Inc.	8-K	001-35312	November 4, 2019	1.1		
<a href="#">10.55</a>	Securities Purchase Agreement, dated as of November 4, 2019, by and among CHF Solutions, Inc. and the purchasers identified therein	8-K	001-35312	November 4, 2019	10.1		
<a href="#">10.56</a>	Non-Employee Director Compensation Policy†	10-Q	001-35312	November 8, 2019	10.1		
<a href="#">10.57</a>	Seventh Amendment to New-Hire Equity Incentive Plan†	8-K	001-35312	December 6, 2019	10.1		
<a href="#">15.1</a>	Letter regarding unaudited interim financial information	S-1/A	333-221010	November 6, 2017	15.1		
<a href="#">21</a>	List of Subsidiaries	10-K	001-35312	March 22, 2018	21		
<a href="#">23.1</a>	Consent of Baker Tilly Virchow Krause, LLP					X	
<a href="#">23.2</a>	Consent of Honigman LLP					Included in Exhibit 5.1	
<a href="#">24.1</a>	Power of Attorney (included on signature page)	S-1	333-235385	December 6, 2019	24.1		
101.INS	XBRL Instance Document					X	

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		<b>Form</b>	<b>File Number</b>	<b>Date of First Filing</b>			
101.SCH	XBRL Taxonomy Extension Schema Document						X
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document						X
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document						X
101.LAB	XBRL Taxonomy Extension Definition Linkbase Document						X
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document						X

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† Indicates management compensatory plan, contract or arrangement.

**SIGNATURES**

Pursuant to the requirements of the Securities Act of 1933, the registrant has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized in the City of Eden Prairie, State of Minnesota, on this 3<sup>rd</sup> day of January 2020.

**CHF SOLUTIONS, INC.**

By: /s/ John L. Erb  
John L. Erb  
*Chief Executive Officer and Chairman of the Board*

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed by the following persons in the capacities and on the dates indicated.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ John L. Erb</u> John L. Erb	Principal Executive Officer and Chairman of the Board	January 3, 2020
<u>/s/ Claudia Drayton</u> Claudia Drayton	Principal Financial Officer and Principal Accounting Officer	January 3, 2020
<u>*</u> Steve Brandt	Director	January 3, 2020
<u>*</u> Maria Rosa Costanzo	Director	January 3, 2020
<u>*</u> Jon W. Salvesson	Director	January 3, 2020
<u>*</u> Gregory Waller	Director	January 3, 2020
<u>*</u> Warren Watson	Director	January 3, 2020

\*By: /s/ John L. Erb  
John L. Erb  
Attorney-in-fact

\_\_\_\_\_ SHARES OF COMMON STOCK,  
\_\_\_\_\_ SHARES OF SERIES H CONVERTIBLE PREFERRED STOCK  
(CONVERTIBLE INTO \_\_\_\_\_ SHARES OF COMMON STOCK) AND  
WARRANTS EXERCISABLE INTO \_\_\_\_\_ SHARES OF COMMON STOCK  
OF  
CHF SOLUTIONS, INC.  
UNDERWRITING AGREEMENT

\_\_\_\_\_, 2020

Ladenburg Thalmann & Co. Inc.

As the Representative of the

Several underwriters, if any, named in Schedule I hereto

4400 Biscayne Boulevard, 14th Floor

Miami, Florida 33137

Ladies and Gentlemen:

The undersigned, CHF Solutions, Inc., a Delaware corporation (collectively with its subsidiaries, including, without limitation, all entities disclosed or described in the Registration Statement as being subsidiaries of CHF Solutions, Inc., the "Company"), hereby confirms its agreement (this "Agreement") with the several underwriters, if any (such underwriters, including the Representative (as defined below), the "Underwriters" and each an "Underwriter") named in Schedule I hereto for which Ladenburg Thalmann & Co. Inc. is acting as representative to the several Underwriters (the "Representative" and if there are no Underwriters other than the Representative, references to multiple Underwriters shall be disregarded and the term Representative as used herein shall have the same meaning as Underwriter) on the terms and conditions set forth herein.

It is understood that the several Underwriters are to make a public offering of the Public Securities as soon as the Representative deems it advisable to do so. The Public Securities are to be initially offered to the public at the initial public offering price set forth in the Prospectus. The Representative may from time to time thereafter change the public offering price and other selling terms.

It is further understood that you will act as the Representative for the other Underwriters, if any, in the offering and sale of the Closing Securities and, if any, the Option Securities in accordance with this Agreement.

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**ARTICLE I.  
DEFINITIONS**

1.1 Definitions. In addition to the terms defined elsewhere in this Agreement, (a) capitalized terms that are not otherwise defined herein have the meanings given to such terms in the Certificate of Designation (as defined herein) and (b) the following terms have the meanings set forth in this Section 1.1:

“Action” shall have the meaning ascribed to such term in Section 3.1(k).

“Affiliate” means with respect to any Person, any other Person that, directly or indirectly through one or more intermediaries, controls or is controlled by or is under common control with such Person as such terms are used in and construed under Rule 405 under the Securities Act.

“Board of Directors” means the board of directors of the Company.

“Business Day” means any day except any Saturday, any Sunday, any day which is a federal legal holiday in the United States or any day on which banking institutions in the State of New York are authorized or required by law or other governmental action to close.

“Certificate of Designation” means the Certificate of Designation to be filed prior to the Closing by the Company with the Secretary of State of Delaware in the form of Exhibit A attached hereto.

“Closing” means the closing of the purchase and sale of the Closing Securities pursuant to Section 2.1.

“Closing Date” means the hour and the date on the Trading Day on which all conditions precedent to (i) the Underwriters’ obligations to pay the Closing Purchase Price and (ii) the Company’s obligations to deliver the Closing Securities, in each case, have been satisfied or waived, but in no event later than 10:00 a.m. (New York City time) on the second (2<sup>nd</sup>) Trading Day following the date hereof or at such earlier time as shall be agreed upon by the Representative and the Company.

“Closing Preferred Shares” shall have the meaning ascribed to such term in Section 2.1(a)(ii).

“Closing Purchase Price” shall have the meaning ascribed to such term in Section 2.1(b), which aggregate purchase price shall be net of the underwriting discounts and commissions.

“Closing Securities” shall have the meaning ascribed to such term in Section 2.1(a)(iv).

“Closing Shares” shall have the meaning ascribed to such term in Section 2.1(a)(i).

“Closing Warrants” shall have the meaning ascribed to such term in Section 2.1(a)(iv).

“Combined Purchase Price” shall have the meaning ascribed to such term in Section 2.1(b).

“Commission” means the United States Securities and Exchange Commission.

“Common Stock” means the common stock of the Company, par value \$0.0001 per share, and any other class of securities into which such securities may hereafter be reclassified or changed.

“Common Stock Equivalents” means any securities of the Company or the Subsidiaries which would entitle the holder thereof to acquire at any time Common Stock, including, without limitation, any debt, preferred stock, right, option, warrant or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock.

“Company Auditor” means Baker Tilly Virchow Krause, LLP, with offices located at 225 South Sixth Street, Suite 2300, Minneapolis, MN 55402-4661.

“Company Counsel” means Honigman LLP, with offices located at 650 Trade Centre Way, Suite 200, Kalamazoo, Michigan 49002.

“Conversion Price” shall have the meaning ascribed to such term in the Certificate of Designation.

“Conversion Shares” shall have the meaning ascribed to such term in the Certificate of Designation.

“Effective Date” shall have the meaning ascribed to such term in Section 3.1(f).

“EGS” means Ellenoff Grossman & Schole LLP, with offices located at 1345 Avenue of the Americas, New York, New York 10105.

“Exchange Act” means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

“Execution Date” shall mean the date on which the parties execute and enter into this Agreement.

“Exempt Issuance” means the issuance of (a) shares of Common Stock or options to employees, officers or directors of the Company pursuant to any stock or option plan duly adopted for such purpose by a majority of the non-employee members of the Board of Directors or a majority of the members of a committee of non-employee directors established for such purpose and (b) securities upon the exercise or exchange of or conversion of any Securities issued hereunder and/or other securities exercisable or exchangeable for or convertible into shares of Common Stock issued and outstanding on the date of this Agreement, provided that such securities have not been amended since the date of this Agreement to increase the number of such securities or to decrease the exercise price, exchange price or conversion price of such securities (except for such decreases in exercise, exchange or conversion price in accordance with the terms of such securities) or to extend the term of such securities.

“FCPA” means the Foreign Corrupt Practices Act of 1977, as amended.

“FINRA” means the Financial Industry Regulatory Authority.

“GAAP” shall have the meaning ascribed to such term in Section 3.1(i).

“Indebtedness” means (a) any liabilities for borrowed money or amounts owed in excess of \$50,000 (other than trade accounts payable incurred in the ordinary course of business), (b) all guaranties, endorsements and other contingent obligations in respect of indebtedness of others, whether or not the same are or should be reflected in the Company’s consolidated balance sheet (or the notes thereto), except guaranties by endorsement of negotiable instruments for deposit or collection or similar transactions in the ordinary course of business; and (c) the present value of any lease payments in excess of \$50,000 due under leases required to be capitalized in accordance with GAAP.

“Liens” means a lien, charge, pledge, security interest, encumbrance, right of first refusal, preemptive right or other restriction.

“Lock-Up Agreements” means the lock-up agreements, in the form of Exhibit D attached hereto, delivered on the date hereof by each of the Company’s officers and directors.

“Material Adverse Effect” means (i) a material adverse effect on the legality, validity or enforceability of any Transaction Document, (ii) a material adverse effect on the results of operations, assets, business, prospects or condition (financial or otherwise) of the Company and the Subsidiaries, taken as a whole or (iii) a material adverse effect on the Company’s ability to perform in any material respect on a timely basis its obligations under any Transaction Document.

“Offering” shall have the meaning ascribed to such term in Section 2.1(c).

“Option Closing Date” shall have the meaning ascribed to such term in Section 2.2(c).

“Option Closing Purchase Price” shall have the meaning ascribed to such term in Section 2.2(b), which aggregate purchase price shall be net of the underwriting discounts and commissions.

“Option Securities” shall have the meaning ascribed to such term in Section 2.2(a)(ii).

“Option Shares” shall have the meaning ascribed to such term in Section 2.2(a)(i).

“Option Warrants” shall have the meaning ascribed to such term in Section 2.2(a).

“Over-Allotment Option” shall have the meaning ascribed to such term in Section 2.2.

“Person” means an individual or corporation, partnership, trust, incorporated or unincorporated association, joint venture, limited liability company, joint stock company, government (or an agency or subdivision thereof) or other entity of any kind.

“Preferred Stock” means \_\_\_\_\_ shares of the Company’s Series H Convertible Preferred Stock issued or issuable pursuant to Section 2.1(a)(ii) and having the rights, preferences and privileges set forth in the Certificate of Designation.

“Preferred Stock Agency Agreement” means the addendum to the Company’s Transfer Agency and Registrar Services Agreement with the Transfer Agent, pursuant to which the Transfer Agent agrees to act as transfer agent and conversion agent for the Preferred Stock, in the form of Exhibit E attached hereto.

“Preliminary Prospectus” means, if any, any preliminary prospectus relating to the Securities included in the Registration Statement or filed with the Commission pursuant to Rule 424(b).

“Proceeding” means an action, claim, suit, investigation or proceeding (including, without limitation, an informal investigation or partial proceeding, such as a deposition), whether commenced or threatened.

“Prospectus” means the final prospectus filed for the Registration Statement.

“Prospectus Supplement” means, if any, any supplement to the Prospectus complying with Rule 424(b) of the Securities Act that is filed with the Commission.

“Public Securities” means, collectively, the Closing Securities and, if any, the Option Securities.

“Registration Statement” means, collectively, the various parts of the registration statement prepared by the Company on Form S-1 (File No. 333-235658) with respect to the Securities, each as amended as of the date hereof, including the Prospectus and Prospectus Supplement, if any, the Preliminary Prospectus, if any, and all exhibits filed with or incorporated by reference into such registration statement, and includes any Rule 462(b) Registration Statement.

“Required Approvals” shall have the meaning ascribed to such term in Section 3.1(e).

“Required Minimum” means, as of any date, the maximum aggregate number of shares of Common Stock then issued or potentially issuable in the future pursuant to the Transaction Documents, including any Underlying Shares issuable upon exercise in full of all Warrants or conversion in full of all shares of Preferred Stock, ignoring any conversion or exercise limits set forth therein.

“Rule 424” means Rule 424 promulgated by the Commission pursuant to the Securities Act, as such Rule may be amended or interpreted from time to time, or any similar rule or regulation hereafter adopted by the Commission having substantially the same purpose and effect as such Rule.

“Rule 462(b) Registration Statement” means any registration statement prepared by the Company registering additional Public Securities, which was filed with the Commission on or prior to the date hereof and became automatically effective pursuant to Rule 462(b) promulgated by the Commission pursuant to the Securities Act.

“SEC Reports” shall have the meaning ascribed to such term in Section 3.1(i).

“Securities” means the Closing Securities, the Option Securities and the Underlying Shares.

“Securities Act” means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

“Share Purchase Price” shall have the meaning ascribed to such term in Section 2.1(b).

“Shares” means, collectively, the shares of Common Stock delivered to the Underwriters in accordance with Section 2.1(a)(i) and Section 2.2(a).

“Subsidiary” means any subsidiary of the Company and shall, where applicable, also include any direct or indirect subsidiary of the Company formed or acquired after the date hereof.

“Trading Day” means a day on which the principal Trading Market is open for trading.

“Trading Market” means any of the following markets or exchanges on which the Common Stock is listed or quoted for trading on the date in question: the NYSE American, the Nasdaq Capital Market, the Nasdaq Global Market, the Nasdaq Global Select Market, or the New York Stock Exchange (or any successors to any of the foregoing).

“Transaction Documents” means this Agreement, the Certificate of Designation, the Warrants, the Warrant Agency Agreement, the Preferred Stock Agency Agreement, the Lock-Up Agreements, and any other documents or agreements executed in connection with the transactions contemplated hereunder.

“Transfer Agent” means American Stock Transfer & Trust Company, the current transfer agent of the Corporation with a mailing address of 59 Maiden Lane, New York, New York and a facsimile number of 718-236-4588, and any successor transfer agent of the Company.

“Underlying Shares” means, collectively, the Conversion Shares and the Warrant Shares.

“Warrant Agency Agreement” means the warrant agency agreement dated on or about the date hereof, between the Company and the Transfer Agent pursuant to which the Transfer Agent will act as warrant agent for the Warrants, in the form of Exhibit F attached hereto.

“Warrant Purchase Price” shall have the meaning ascribed to such term in Section 2.1(b).

“Warrants” means the Common Stock purchase warrants delivered to the Underwriters in accordance with Section 2.1(a)(iii) and Section 2.2, which Warrants shall be exercisable immediately and have a term of exercise equal to \_\_\_\_\_ ( ) years, in the form of Exhibit C attached hereto.

“Warrant Shares” means the shares of Common Stock issuable upon exercise of the Warrants.

## **ARTICLE II. PURCHASE AND SALE**

### 2.1 Closing.

(a) Upon the terms and subject to the conditions set forth herein, the Company agrees to sell in the aggregate \_\_\_\_\_ shares of Common Stock, \_\_\_\_\_ shares of Preferred Stock, and \_\_\_\_\_ Warrants, and each Underwriter agrees to purchase, severally and not jointly, at the Closing, the following securities of the Company:

(i) the number of shares of Common Stock (the “Closing Shares”) set forth opposite the name of such Underwriter on Schedule I hereof under “Closing Shares”;

(ii) the number of shares of Preferred Stock (the “Closing Preferred Shares”) set forth opposite the name of such Underwriter on Schedule I hereof under “Closing Preferred Shares”; and

(iii) Warrants to purchase up to the number of Warrant Shares equal to 100% of the sum of the number of Closing Shares and the number of shares of Common Stock underlying the Closing Preferred Shares set forth opposite the name of such Underwriter on Schedule I hereof (the “Closing Warrants” and, collectively with the Closing Shares and the Closing Preferred Shares, the “Closing Securities”), which Warrants shall have an exercise price of \$\_\_\_\_, subject to adjustment as provided therein, in the form of Exhibit C attached hereto.

(b) The aggregate purchase price for the Closing Securities purchased by such Underwriter shall equal the amount set forth opposite the name of such Underwriter on Schedule I hereto (the “Closing Purchase Price”). The combined purchase price for one Share and a Warrant to purchase one (1) Warrant Share shall be \$\_\_\_\_ (the “Combined Purchase Price”) which shall be allocated as \$\_\_\_\_ per Share (the “Share Purchase Price”) and \$\_\_\_\_ per Warrant (the “Warrant Purchase Price”). The combined purchase price for one Closing Preferred Share and one Warrant to purchase one Warrant Share shall be \$\_\_\_\_, which shall be allocated as \$\_\_\_\_ per Preferred Share, \$\_\_\_\_ per Warrant.

(c) On the Closing Date, each Underwriter shall deliver or cause to be delivered to the Company, via wire transfer, immediately available funds equal to such Underwriter’s Closing Purchase Price and the Company shall deliver to, or as directed by, such Underwriter its respective Closing Securities and the Company shall deliver the other items required pursuant to Section 2.3 deliverable at the Closing. Upon satisfaction of the covenants and conditions set forth in Sections 2.3 and 2.4, the Closing shall occur at the offices of EGS or such other location as the Company and Representative shall mutually agree. The Public Securities are to be offered initially to the public at the offering price set forth on the cover page of the Prospectus (the “Offering”).

(d) The Company acknowledges and agrees that, with respect to any Notice(s) of Conversion (as defined in the Certificate of Designation) delivered by a Holder (as defined in the Certificate of Designation) on or prior to 9:00 a.m. (New York City time) on the Closing Date, which Notice(s) of Conversion may be delivered at any time after the time of execution of this Agreement, the Company shall deliver the Conversion Shares (as defined in the Certificate of Designation) subject to such notice(s) to the Holder by 4:00 p.m. (New York City time) on the Closing Date and the Closing Date shall be the Share Delivery Date (as defined in the Certificate of Designation) under the Certificate of Designation. The Company acknowledges and agrees that the Holders are third-party beneficiaries of this covenant of the Company.

## 2.2 Over-Allotment Option.

(a) For the purposes of covering any over-allotments in connection with the distribution and sale of the Closing Securities, the Representative is hereby granted an option (the “Over-Allotment Option”) to purchase, in the aggregate, up to \_\_\_\_\_ shares of Common Stock (the “Option Shares”) and Warrants to purchase up to \_\_\_\_\_ shares of Common Stock (the “Option Warrants” and, together with the Option Shares, the “Option Securities”) which may be purchased in any combination of Option Shares and/or Option Warrants at the Share Purchase Price and/or Warrant Purchase Price, respectively.

(b) In connection with an exercise of the Over-Allotment Option, (a) the purchase price to be paid for the Option Shares is equal to the product of the Share Purchase Price multiplied by the number of Option Shares to be purchased, and (b) the purchase price to be paid for the Option Warrants is equal to the product of the Warrant Purchase Price multiplied by the number of Option Warrants to be purchased (the aggregate purchase price to be paid on an Option Closing Date, the “Option Closing Purchase Price”).

(c) The Over-Allotment Option granted pursuant to this Section 2.2 may be exercised by the Representative as to all (at any time) or any part (from time to time) of the Option Securities within 45 days after the Execution Date. An Underwriter will not be under any obligation to purchase any Option Securities prior to the exercise of the Over-Allotment Option by the Representative. The Over-Allotment Option granted hereby may be exercised by the giving of oral notice to the Company from the Representative, which must be confirmed in writing by overnight mail or facsimile or other electronic transmission setting forth the number of Option Shares and/or Option Warrants to be purchased and the date and time for delivery of and payment for the Option Securities (each, an “Option Closing Date”), which will not be later than two (2) full Business Days after the date of the notice or such other time as shall be agreed upon by the Company and the Representative, at the offices of EGS or at such other place (including remotely by facsimile or other electronic transmission) as shall be agreed upon by the Company and the Representative. Each Option Closing Date will be as set forth in the notice. Upon exercise of the Over-Allotment Option, the Company will become obligated to convey to the Underwriters, and, subject to the terms and conditions set forth herein, the Underwriters will become obligated to purchase, the number of Option Shares and/or Option Warrants specified in such notice. The Representative may cancel the Over-Allotment Option at any time prior to the expiration of the Over-Allotment Option by written notice to the Company. On each Option Closing Date, if any, each Underwriter shall deliver or cause to be delivered to the Company, via wire transfer, immediately available funds equal to such Underwriter’s Option Closing Purchase Price and the Company shall deliver to, or as directed by, such Underwriter its respective Option Shares and the Company shall deliver the other items required pursuant to Section 2.3 deliverable at the Option Closing. Upon satisfaction of the covenants and conditions set forth in Sections 2.3 and 2.4, the Option Closing shall occur at the offices of EGS or such other location as the Company and Representative shall mutually agree.

2.3 Deliveries. The Company shall deliver or cause to be delivered to each Underwriter (if applicable) the following:

(i) At the Closing Date, the Closing Shares and, as to each Option Closing Date, if any, the applicable Option Shares, which shares shall be delivered via The Depository Trust Company Deposit or Withdrawal at Custodian system for the accounts of the several Underwriters;



(ii) At the Closing Date, the Closing Preferred Shares shall be delivered via The Depository Trust Company Deposit or Withdrawal at Custodian system for the accounts of the several Underwriters;

(iii) At the Closing Date, the Closing Warrants and, as to each Option Closing Date, if any, the applicable Option Warrants via The Depository Trust Company Deposit or Withdrawal at Custodian system for the accounts of the several Underwriters;

(iv) At the Closing Date, the Warrant Agency Agreement duly executed by the parties thereto;

(v) At the Closing Date, the Preferred Stock Agency Agreement duly executed by the parties thereto;

(vi) At the Closing Date, evidence of the filing and acceptance of the Certificate of Designation from the Secretary of State of Delaware;

(vii) At the Closing Date, a legal opinion of Company Counsel addressed to the Underwriters, including, without limitation, a negative assurance letter, in form and substance reasonably satisfactory to the Representative and as to each Option Closing Date, if any, a bring-down opinion from Company Counsel in form and substance reasonably satisfactory to the Representative, including, without limitation, a negative assurance letter, in form and substance reasonably satisfactory to the Representative;

(viii) Contemporaneously herewith, a cold comfort letter, addressed to the Underwriters and in form and substance satisfactory in all respects to the Representative from the Company Auditor dated, respectively, as of the date of this Agreement and a bring-down letter dated as of the Closing Date and each Option Closing Date, if any;

(ix) On the Closing Date and on each Option Closing Date, if any, the duly executed and delivered Officer's Certificate, substantially in the form required by Exhibit B-1 attached hereto;

(x) On the Closing Date and on each Option Closing Date, if any, the duly executed and delivered Secretary's Certificate, substantially in the form required by Exhibit B-2 attached hereto; and

(xi) Contemporaneously herewith, the duly executed and delivered Lock-Up Agreements.

2.4 Closing Conditions. The respective obligations of each Underwriter hereunder in connection with the Closing and each Option Closing Date are subject to the following conditions being met:

- (i) the accuracy in all material respects when made and on the date in question (other than representations and warranties of the Company already qualified by materiality, which shall be true and correct in all respects) of the representations and warranties of the Company contained herein (unless as of a specific date therein);
- (ii) all obligations, covenants and agreements of the Company required to be performed at or prior to the date in question shall have been performed;
- (iii) the delivery by the Company of the items set forth in Section 2.3 of this Agreement;
- (iv) the Registration Statement shall be effective on the date of this Agreement and at each of the Closing Date and each Option Closing Date, if any, no stop order suspending the effectiveness of the Registration Statement shall have been issued and no proceedings for that purpose shall have been instituted or shall be pending or contemplated by the Commission and any request on the part of the Commission for additional information shall have been complied with to the reasonable satisfaction of the Representative;
- (v) by the Execution Date, if required by FINRA, the Underwriters shall have received clearance from FINRA as to the amount of compensation allowable or payable to the Underwriters as described in the Registration Statement;
- (vi) the Closing Shares, the Option Shares and the Underlying Shares have been approved for listing on the Trading Market; and
- (vii) prior to and on each of the Closing Date and each Option Closing Date, if any: (i) there shall have been no material adverse change or development involving a prospective material adverse change in the condition or prospects or the business activities, financial or otherwise, of the Company from the latest dates as of which such condition is set forth in the Registration Statement and Prospectus; (ii) no action suit or proceeding, at law or in equity, shall have been pending or threatened against the Company or any Affiliate of the Company before or by any court or federal or state commission, board or other administrative agency wherein an unfavorable decision, ruling or finding may materially adversely affect the business, operations, prospects or financial condition or income of the Company, except as set forth in the Registration Statement and Prospectus; (iii) no stop order shall have been issued under the Securities Act and no proceedings therefor shall have been initiated or threatened by the Commission; and (iv) the Registration Statement and the Prospectus and any amendments or supplements thereto shall contain all material statements which are required to be stated therein in accordance with the Securities Act and the rules and regulations thereunder and shall conform in all material respects to the requirements of the Securities Act and the rules and regulations thereunder, and neither the Registration Statement nor the Prospectus nor any amendment or supplement thereto shall contain any untrue statement of a material fact or omit to state any material fact required to be stated therein or necessary to make the statements therein, in light of the circumstances under which they were made, not misleading.

**ARTICLE III.  
REPRESENTATIONS AND WARRANTIES**

3.1 Representations and Warranties of the Company. The Company represents and warrants to the Underwriters as of the Execution Date, as of the Closing Date and as of each Option Closing Date, if any, as follows:

(a) Subsidiaries. None of the Subsidiaries is a “significant subsidiary” as defined in Rule 1-02(w) of Regulation S-X promulgated under the Securities Act. If the Company has no “significant subsidiaries”, all other references, except as set forth in this Section 3.1(a), to the Subsidiaries or any of them in the Transaction Documents shall be disregarded. No Subsidiary owns any material assets or incurs any material liabilities.

(b) Organization and Qualification. The Company and each of the Subsidiaries is an entity duly incorporated or otherwise organized, validly existing and in good standing under the laws of the jurisdiction of its incorporation or organization, with the requisite power and authority to own and use its properties and assets and to carry on its business as currently conducted. Neither the Company nor any Subsidiary is in violation nor default of any of the provisions of its respective certificate or articles of incorporation, bylaws or other organizational or charter documents. Each of the Company and the Subsidiaries is duly qualified to conduct business and is in good standing as a foreign corporation or other entity in each jurisdiction in which the nature of the business conducted or property owned by it makes such qualification necessary, except where the failure to be so qualified or in good standing, as the case may be, could not have or reasonably be expected to result in a Material Adverse Effect and no Proceeding has been instituted in any such jurisdiction revoking, limiting or curtailing or seeking to revoke, limit or curtail such power and authority or qualification.

(c) Authorization; Enforcement. The Company has the requisite corporate power and authority to enter into and to consummate the transactions contemplated by this Agreement and each of the other Transaction Documents to which it is a party and otherwise to carry out its obligations hereunder and thereunder. The execution and delivery of this Agreement and each of the other Transaction Documents by the Company and the consummation by it of the transactions contemplated hereby and thereby have been duly authorized by all necessary action on the part of the Company and no further action is required by the Company, the Board of Directors or the Company’s stockholders in connection herewith or therewith other than in connection with the Required Approvals. This Agreement and each other Transaction Document to which the Company is a party has been (or upon delivery will have been) duly executed by the Company and, when delivered in accordance with the terms hereof and thereof, will constitute the valid and binding obligation of the Company enforceable against the Company in accordance with its terms, except (i) as limited by general equitable principles and applicable bankruptcy, insolvency, reorganization, moratorium and other laws of general application affecting enforcement of creditors’ rights generally, (ii) as limited by laws relating to the availability of specific performance, injunctive relief or other equitable remedies and (iii) insofar as indemnification and contribution provisions may be limited by applicable law.

(d) No Conflicts. Except as set forth in the SEC Reports, the Registration Statement or the Prospectus, the execution, delivery and performance by the Company of this Agreement and the other Transaction Documents to which it is a party, the issuance and sale of the Securities and the consummation by it of the transactions contemplated hereby and thereby do not and will not (i) conflict with or violate any provision of the Company's or any Subsidiary's certificate or articles of incorporation, bylaws or other organizational or charter documents, or (ii) conflict with, or constitute a default (or an event that with notice or lapse of time or both would become a default) under, result in the creation of any Lien upon any of the properties or assets of the Company or any Subsidiary, or give to others any rights of termination, amendment, anti-dilution or similar adjustments, acceleration or cancellation (with or without notice, lapse of time or both) of, any agreement, credit facility, debt or other instrument (evidencing a Company or Subsidiary debt or otherwise) or other understanding to which the Company or any Subsidiary is a party or by which any property or asset of the Company or any Subsidiary is bound or affected, or (iii) subject to the Required Approvals, conflict with or result in a violation of any law, rule, regulation, order, judgment, injunction, decree or other restriction of any court or governmental authority to which the Company or a Subsidiary is subject (including federal and state securities laws and regulations), or by which any property or asset of the Company or a Subsidiary is bound or affected; except in the case of each of clauses (ii) and (iii), such as could not have or reasonably be expected to result in a Material Adverse Effect.

(e) Filings, Consents and Approvals. The Company is not required to obtain any consent, waiver, authorization or order of, give any notice to, or make any filing or registration with, any court or other federal, state, local or other governmental authority or other Person in connection with the execution, delivery and performance by the Company of the Transaction Documents, other than such as have been obtained or made by the Company and are in full force and effect under the Securities Act and such as may be required under applicable state securities or blue sky laws, FINRA or the Trading Market (collectively, the "Required Approvals").

(f) Registration Statement. The Company has filed with the Commission the Registration Statement, including any related Prospectus or Prospectuses, for the registration of the Securities under the Securities Act, which Registration Statement has been prepared by the Company in all material respects in conformity with the requirements of the Securities Act and the rules and regulations of the Commission under the Securities Act. The Registration Statement has been declared effective by the Commission on \_\_\_\_\_, 2020 (the "Effective Date"). The Company has advised the Representative of all further information (financial and other) with respect to the Company required to be set forth therein in the Registration Statement and Prospectus. Any reference in this Agreement to the Registration Statement, the Prospectus or any Prospectus Supplement shall be deemed to refer to and include the documents incorporated by reference therein; and any reference in this Agreement to the terms "amend," "amendment" or "supplement" with respect to the Registration Statement, the Prospectus or any Prospectus Supplement shall be deemed to refer to and include the filing of any document under the Exchange Act after the date of this Agreement, or the issue date of the Prospectus as the case may be, deemed to be incorporated therein by reference. All references in this Agreement to financial statements and schedules and other information which is "contained," "included," "described," "referenced," "set forth" or "stated" in the Registration Statement, the Prospectus (and all other references of like import) shall be deemed to mean and include all such financial statements and schedules and other information, if any, that is or is deemed to be incorporated by reference in the Registration Statement, or the Prospectus, as the case may be. No stop order suspending the effectiveness of the Registration Statement or the use of the Prospectus has been issued, and no proceeding for any such purpose is pending or has been initiated or, to the Company's knowledge, is threatened by the Commission. For purposes of this Agreement, "free writing prospectus" has the meaning set forth in Rule 405 under the Securities Act. The Company will not, without the prior consent of the Representative, prepare, use or refer to, any free writing prospectus.

(g) Issuance of Securities. The Securities are duly authorized and, when issued and paid for in accordance with the applicable Transaction Documents, will be duly and validly issued, fully paid and nonassessable, and free and clear of all Liens imposed by the Company. The Underlying Shares, when issued in accordance with the terms of the Transaction Documents, will be validly issued, fully paid and nonassessable, free and clear of all Liens imposed by the Company. The Company has reserved from its duly authorized capital stock a number of shares of Common Stock for issuance of the Underlying Shares at least equal to the Required Minimum on the date hereof. The holder of the Securities will not be subject to personal liability by reason of being such holders. The Securities are not and will not be subject to the preemptive rights of any holders of any security of the Company or similar contractual rights granted by the Company. All corporate action required to be taken for the authorization, issuance and sale of the Securities has been duly and validly taken. The Securities conform in all material respects to all statements with respect thereto contained in the Registration Statement.

(h) Capitalization. The capitalization of the Company is as set forth in the SEC Reports. The Company has not issued any capital stock since its most recently filed periodic or current report under the Exchange Act, other than pursuant to the exercise of employee stock options under the Company's stock option plans, the issuance of shares of Common Stock to employees pursuant to the Company's employee stock purchase plans and pursuant to the conversion and/or exercise of Common Stock Equivalents outstanding as of the date of the most recently filed periodic report under the Exchange Act. No Person has any right of first refusal, preemptive right, right of participation, or any similar right to participate in the transactions contemplated by the Transaction Documents, except for such rights as have been waived. Except as a result of the purchase and sale of the Securities and as set forth in the Registration Statement and the SEC Reports, there are no outstanding options, warrants, scrip rights to subscribe to, calls or commitments of any character whatsoever relating to, or securities, rights or obligations convertible into or exercisable or exchangeable for, or giving any Person any right to subscribe for or acquire, any shares of Common Stock, or contracts, commitments, understandings or arrangements by which the Company or any Subsidiary is or may become bound to issue additional shares of Common Stock or Common Stock Equivalents. Except as set forth in the Registration Statement and Prospectus, the issuance and sale of the Securities will not obligate the Company to issue shares of Common Stock or other securities to any Person (other than the Underwriters). Except as set forth in the SEC Reports, the Registration Statement or the Prospectus, there are no outstanding securities or instruments of the Company or any Subsidiary with any provision that adjusts the exercise, conversion, exchange or reset price of such security or instrument upon an issuance of securities by the Company or any Subsidiary. All of the outstanding shares of capital stock of the Company are duly authorized, validly issued, fully paid and nonassessable, have been issued in compliance with all federal and state securities laws, and none of such outstanding shares was issued in violation of any preemptive rights or similar rights to subscribe for or purchase securities. The authorized shares of the Company conform in all material respects to all statements relating thereto contained in the Registration Statement and the Prospectus. The offers and sales of the Company's securities were at all relevant times either registered under the Securities Act and the applicable state securities or Blue Sky laws or, based in part on the representations and warranties of the purchasers, exempt from such registration requirements. No further approval or authorization of any stockholder, the Board of Directors or others is required for the issuance and sale of the Securities. Except as set forth in the Registration Statement and the SEC Reports, there are no stockholders agreements, voting agreements or other similar agreements with respect to the Company's capital stock to which the Company is a party or, to the knowledge of the Company, between or among any of the Company's stockholders.

(i) SEC Reports; Financial Statements. The Company has filed all reports, schedules, forms, statements and other documents required to be filed by the Company under the Securities Act and the Exchange Act, including pursuant to Section 13(a) or 15(d) thereof, for the two years preceding the date hereof (or such shorter period as the Company was required by law or regulation to file such material) (the foregoing materials, including the exhibits thereto and documents incorporated by reference therein, together with the Prospectus and any Prospectus Supplement, being collectively referred to herein as the “SEC Reports”) on a timely basis or has received a valid extension of such time of filing and has filed any such SEC Reports prior to the expiration of any such extension, except as could not have or reasonably be expected to result in a Material Adverse Effect. As of their respective dates, the SEC Reports complied in all material respects with the requirements of the Securities Act and the Exchange Act, as applicable, and none of the SEC Reports, when filed, contained any untrue statement of a material fact or omitted to state a material fact required to be stated therein or necessary in order to make the statements therein, in light of the circumstances under which they were made, not misleading. The financial statements of the Company included in the SEC Reports comply in all material respects with applicable accounting requirements and the rules and regulations of the Commission with respect thereto as in effect at the time of filing. Such financial statements have been prepared in accordance with United States generally accepted accounting principles applied on a consistent basis during the periods involved (“GAAP”), except as may be otherwise specified in such financial statements or the notes thereto and except that unaudited financial statements may not contain all footnotes required by GAAP, and fairly present in all material respects the financial position of the Company and its consolidated Subsidiaries as of and for the dates thereof and the results of operations and cash flows for the periods then ended, subject, in the case of unaudited statements, to normal, immaterial, year-end audit adjustments. The agreements and documents described in the Registration Statement, the Prospectus, any Prospectus Supplement and the SEC Reports conform to the descriptions thereof contained therein and there are no agreements or other documents required by the Securities Act and the rules and regulations thereunder to be described in the Registration Statement, the Prospectus, any Prospectus Supplement or the SEC Reports or to be filed with the Commission as exhibits to the Registration Statement, that have not been so described or filed. Each agreement or other instrument (however characterized or described) to which the Company is a party or by which it is or may be bound or affected and (i) that is referred to in the Registration Statement, the Prospectus, or the SEC Reports, or (ii) is material to the Company’s business, has been duly authorized and validly executed by the Company, is in full force and effect in all material respects and is enforceable against the Company and, to the Company’s knowledge, the other parties thereto, in accordance with its terms, except (x) as such enforceability may be limited by bankruptcy, insolvency, reorganization or similar laws affecting creditors’ rights generally, (y) as enforceability of any indemnification or contribution provision may be limited under the federal and state securities laws, and (z) that the remedy of specific performance and injunctive and other forms of equitable relief may be subject to the equitable defenses and to the discretion of the court before which any proceeding therefore may be brought. None of such agreements or instruments has been assigned by the Company, and neither the Company nor, to the best of the Company’s knowledge, any other party is in default thereunder and, to the best of the Company’s knowledge, no event has occurred that, with the lapse of time or the giving of notice, or both, would constitute a default thereunder. To the best of the Company’s knowledge, performance by the Company of the material provisions of such agreements or instruments will not result in a violation of any existing applicable law, rule, regulation, judgment, order or decree of any governmental agency or court, domestic or foreign, having jurisdiction over the Company or any of its assets or businesses, including, without limitation, those relating to environmental laws and regulations.

(j) **Material Changes; Undisclosed Events, Liabilities or Developments.** Since the date of the latest audited financial statements included within the SEC Reports, except as specifically disclosed in a subsequent SEC Report filed prior to the date hereof, (i) there has been no event, occurrence or development that has had or that could reasonably be expected to result in a Material Adverse Effect, (ii) the Company has not incurred any liabilities (contingent or otherwise) other than (A) trade payables and accrued expenses incurred in the ordinary course of business consistent with past practice and (B) liabilities not required to be reflected in the Company's financial statements pursuant to GAAP or disclosed in filings made with the Commission, (iii) the Company has not altered its method of accounting, (iv) the Company has not declared or made any dividend or distribution of cash or other property to its stockholders or purchased, redeemed or made any agreements to purchase or redeem any shares of its capital stock, (v) the Company has not issued any equity securities to any officer, director or Affiliate, except pursuant to existing Company stock option plans and (vi) no officer or director of the Company has resigned from any position with the Company. The Company does not have pending before the Commission any request for confidential treatment of information. Except for the issuance of the Securities contemplated by this Agreement, no event, liability, fact, circumstance, occurrence or development has occurred or exists or is reasonably expected to occur or exist with respect to the Company or its Subsidiaries or their respective businesses, prospects, properties, operations, assets or financial condition that would be required to be disclosed by the Company under applicable securities laws at the time this representation is made or deemed made that has not been publicly disclosed at least 1 Trading Day prior to the date that this representation is made. Unless otherwise disclosed in an SEC Report filed prior to the date hereof, the Company has not: (i) issued any securities or incurred any liability or obligation, direct or contingent, for borrowed money; or (ii) declared or paid any dividend or made any other distribution on or in respect to its capital stock.

(k) Litigation. There is no action, suit, inquiry, notice of violation, proceeding or investigation pending or, to the knowledge of the Company, threatened against or affecting the Company, any Subsidiary or any of their respective properties before or by any court, arbitrator, governmental or administrative agency or regulatory authority (federal, state, county, local or foreign) (collectively, an “Action”) which (i) adversely affects or challenges the legality, validity or enforceability of any of the Transaction Documents or the Securities or (ii) could, if there were an unfavorable decision, have or reasonably be expected to result in a Material Adverse Effect. Neither the Company nor any Subsidiary, nor any director or officer thereof, is or has been the subject of any Action involving a claim of violation of or liability under federal or state securities laws or a claim of breach of fiduciary duty. There has not been, and to the knowledge of the Company, there is not pending or contemplated, any investigation by the Commission involving the Company or any current or former director or officer of the Company. The Commission has not issued any stop order or other order suspending the effectiveness of any registration statement filed by the Company or any Subsidiary under the Exchange Act or the Securities Act.

(l) Labor Relations. No labor dispute exists or, to the knowledge of the Company, is imminent with respect to any of the employees of the Company, which could reasonably be expected to result in a Material Adverse Effect. None of the Company’s or its Subsidiaries’ employees is a member of a union that relates to such employee’s relationship with the Company or such Subsidiary, and neither the Company nor any of its Subsidiaries is a party to a collective bargaining agreement, and the Company and its Subsidiaries believe that their relationships with their employees are good. To the knowledge of the Company, no executive officer of the Company or any Subsidiary, is, or is now expected to be, in violation of any material term of any employment contract, confidentiality, disclosure or proprietary information agreement or non-competition agreement, or any other contract or agreement or any restrictive covenant in favor of any third party, and the continued employment of each such executive officer does not subject the Company or any of its Subsidiaries to any liability with respect to any of the foregoing matters. The Company and its Subsidiaries are in compliance with all U.S. federal, state, local and foreign laws and regulations relating to employment and employment practices, terms and conditions of employment and wages and hours, except where the failure to be in compliance could not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.



(m) Compliance. Neither the Company nor any Subsidiary: (i) is in default under or in violation of (and no event has occurred that has not been waived that, with notice or lapse of time or both, would result in a default by the Company or any Subsidiary under), nor has the Company or any Subsidiary received notice of a claim that it is in default under or that it is in violation of, any indenture, loan or credit agreement or any other agreement or instrument to which it is a party or by which it or any of its properties is bound (whether or not such default or violation has been waived), (ii) is in violation of any judgment, decree or order of any court, arbitrator or other governmental authority or (iii) is or has been in violation of any statute, rule, ordinance or regulation of any governmental authority, including without limitation all foreign, federal, state and local laws relating to taxes, environmental protection, occupational health and safety, product quality and safety and employment and labor matters, except in each case as could not have or reasonably be expected to result in a Material Adverse Effect.

(n) Regulatory Permits. The Company and the Subsidiaries possess all certificates, authorizations and permits issued by the appropriate federal, state, local or foreign regulatory authorities necessary to conduct their respective businesses as described in the SEC Reports, except where the failure to possess such permits could not reasonably be expected to result in a Material Adverse Effect (each, a "Material Permit"), and neither the Company nor any Subsidiary has received any notice of proceedings relating to the revocation or modification of any Material Permit. The disclosures in the Registration Statement concerning the effects of Federal, State, local and all foreign regulation on the Company's business as currently contemplated are correct in all material respects.

(o) Title to Assets. The Company and the Subsidiaries have good and marketable title in fee simple to, or have valid and marketable rights to lease or otherwise use, all real property and all personal property that is material to the business of the Company and the Subsidiaries, in each case free and clear of all Liens, except for (i) Liens as do not materially affect the value of such property and do not materially interfere with the use made and proposed to be made of such property by the Company and the Subsidiaries and (ii) Liens for the payment of federal, state or other taxes, for which appropriate reserves have been made in accordance with GAAP, and the payment of which is neither delinquent nor subject to penalties. Any real property and facilities held under lease by the Company and the Subsidiaries are held by them under valid, subsisting and enforceable leases with which the Company and the Subsidiaries are in compliance.

(p) Intellectual Property. The Company and the Subsidiaries have, or have rights to use, all patents, patent applications, trademarks, trademark applications, service marks, trade names, trade secrets, inventions, copyrights, licenses and other intellectual property rights and similar rights necessary or required for use in connection with their respective businesses as described in the SEC Reports and which the failure to do so could have a Material Adverse Effect (collectively, the “Intellectual Property Rights”). None of, and neither the Company nor any Subsidiary has received a notice (written or otherwise) that any of, the Intellectual Property Rights has expired, terminated or been abandoned, or is expected to expire or terminate or be abandoned, within two (2) years from the date of this Agreement. Neither the Company nor any Subsidiary has received, since the date of the latest audited financial statements included within the SEC Reports, a written notice of a claim or otherwise has any knowledge that the Intellectual Property Rights violate or infringe upon the rights of any Person. To the knowledge of the Company, all such Intellectual Property Rights are enforceable and there is no existing infringement by another Person of any of the Intellectual Property Rights. The Company and its Subsidiaries have taken reasonable security measures to protect the secrecy, confidentiality and value of all of their intellectual properties, except where failure to do so could not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(q) Insurance. The Company and the Subsidiaries are insured by insurers of recognized financial responsibility against such losses and risks and in such amounts as are prudent and customary in the businesses in which the Company and the Subsidiaries are engaged, including, but not limited to, directors and officers insurance coverage. Neither the Company nor any Subsidiary has any reason to believe that it will not be able to renew its existing insurance coverage as and when such coverage expires or to obtain similar coverage from similar insurers as may be necessary to continue its business without a significant increase in cost.

(r) Transactions With Affiliates and Employees. Except as set forth in the SEC Reports, none of the officers or directors of the Company or any Subsidiary and, to the knowledge of the Company, none of the employees of the Company or any Subsidiary is presently a party to any transaction with the Company or any Subsidiary (other than for services as employees, officers and directors), including any contract, agreement or other arrangement providing for the furnishing of services to or by, providing for rental of real or personal property to or from, providing for the borrowing of money from or lending of money to or otherwise requiring payments to or from, any officer, director or such employee or, to the knowledge of the Company, any entity in which any officer, director, or any such employee has a substantial interest or is an officer, director, trustee, stockholder, member or partner, in each case in excess of \$120,000 other than for (i) payment of salary or consulting fees for services rendered, (ii) reimbursement for expenses incurred on behalf of the Company and (iii) other employee benefits, including stock option agreements under any stock option plan of the Company.

(s) Sarbanes-Oxley; Internal Accounting Controls. The Company and the Subsidiaries are in compliance in all material respects with any and all applicable requirements of the Sarbanes-Oxley Act of 2002 that are effective as of the date hereof, and any and all applicable rules and regulations promulgated by the Commission thereunder that are effective as of the date hereof and as of the Closing Date. The Company and the Subsidiaries maintain a system of internal accounting controls sufficient to provide reasonable assurance that: (i) transactions are executed in accordance with management's general or specific authorizations, (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity with GAAP and to maintain asset accountability, (iii) access to assets is permitted only in accordance with management's general or specific authorization, and (iv) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action is taken with respect to any differences. The Company and the Subsidiaries have established disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) for the Company and the Subsidiaries and designed such disclosure controls and procedures to ensure that information required to be disclosed by the Company in the reports it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the Commission's rules and forms. The Company's certifying officers have evaluated the effectiveness of the disclosure controls and procedures of the Company and the Subsidiaries as of the end of the period covered by the most recently filed periodic report under the Exchange Act (such date, the "Evaluation Date"). The Company presented in its most recently filed periodic report under the Exchange Act the conclusions of the certifying officers about the effectiveness of the disclosure controls and procedures based on their evaluations as of the Evaluation Date. Since the Evaluation Date, there have been no changes in the internal control over financial reporting (as such term is defined in the Exchange Act) of the Company and its Subsidiaries that have materially affected, or is reasonably likely to materially affect, the internal control over financial reporting of the Company and its Subsidiaries.

(t) Certain Fees. Except as set forth in the Prospectus, no brokerage or finder's fees or commissions are or will be payable by the Company, or any Subsidiary or Affiliate of the Company to any broker, financial advisor or consultant, finder, placement agent, investment banker, bank or other Person with respect to the transactions contemplated by the Transaction Documents. To the Company's knowledge, there are no other arrangements, agreements or understandings of the Company or, to the Company's knowledge, any of its stockholders that may affect the Underwriters' compensation, as determined by FINRA. Except for the payment of underwriting discounts and commissions to the Representative in March 2019 in connection with an underwritten public offering, the payment of commissions to the Representative in October 2019 in connection with a registered direct offering, and the payment of commissions to the Representative in November 2019 in connection with a registered direct offering, the Company has not made any direct or indirect payments (in cash, securities or otherwise) to: (i) any person, as a finder's fee, consulting fee or otherwise, in consideration of such person raising capital for the Company or introducing to the Company persons who raised or provided capital to the Company; (ii) any FINRA member; or (iii) any person or entity that has any direct or indirect affiliation or association with any FINRA member, within the twelve months prior to the Execution Date. None of the net proceeds of the Offering will be paid by the Company to any participating FINRA member or its affiliates, except as specifically authorized herein.

(u) Investment Company. The Company is not, and is not an Affiliate of, and immediately after receipt of payment for the Securities will not be or be an Affiliate of, an “investment company” within the meaning of the Investment Company Act of 1940, as amended. The Company shall conduct its business in a manner so that it will not become an “investment company” subject to registration under the Investment Company Act of 1940, as amended.

(v) Registration Rights. Except as set forth in the SEC Reports, the Registration Statement or the Prospectus, no Person has any right to cause the Company or any Subsidiary to effect the registration under the Securities Act of any securities of the Company or any Subsidiary.

(w) Listing and Maintenance Requirements. The Common Stock is registered pursuant to Section 12(b) of the Exchange Act, and the Company has taken no action designed to, or which to its knowledge is likely to have the effect of, terminating the registration of the Common Stock under the Exchange Act nor has the Company received any notification that the Commission is contemplating terminating such registration. Except as set forth in the SEC Reports, the Registration Statement or the Prospectus, the Company has not, in the 12 months preceding the date hereof, received notice from any Trading Market on which the Common Stock is or has been listed or quoted to the effect that the Company is not in compliance with the listing or maintenance requirements of such Trading Market. Except as set forth in the SEC Reports, the Registration Statement or the Prospectus, the Company is, and has no reason to believe that it will not in the foreseeable future continue to be, in compliance with all such listing and maintenance requirements. The Common Stock is currently eligible for electronic transfer through the Depository Trust Company or another established clearing corporation and the Company is current in payment of the fees of the Depository Trust Company (or such other established clearing corporation) in connection with such electronic transfer.

(x) Application of Takeover Protections. The Company and the Board of Directors have taken all necessary action, if any, in order to render inapplicable any control share acquisition, business combination, poison pill (including any distribution under a rights agreement) or other similar anti-takeover provision under the Company’s certificate of incorporation (or similar charter documents) or the laws of its state of incorporation that is or could become applicable as a result of the Underwriters and the Company fulfilling their obligations or exercising their rights under the Transaction Documents.

(y) Disclosure; 10b-5. The Registration Statement (and any further documents to be filed with the Commission) contains all exhibits and schedules as required by the Securities Act. Each of the Registration Statement and any post-effective amendment thereto, if any, at the time it became effective, including any information deemed to be a part thereof at the time of effectiveness pursuant to Rule 430A under the Securities Act, complied in all material respects with the Securities Act and the Exchange Act and the applicable rules and regulations under the Securities Act and did not and, as amended or supplemented, if applicable, will not, contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading. Each of the Preliminary Prospectus and the Prospectus, as of its respective date, complies in all material respects with the Securities Act and the Exchange Act and the applicable rules and regulations. The Prospectus, as amended or supplemented, did not and will not contain as of the date thereof any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in light of the circumstances under which they were made, not misleading. The SEC Reports incorporated by reference in the Prospectus, if any, when they were filed with the Commission, conformed in all material respects to the requirements of the Exchange Act and the applicable rules and regulations, and none of such documents, if any, when they were filed with the Commission, contained any untrue statement of a material fact or omitted to state a material fact necessary to make the statements therein, in light of the circumstances under which they were made, not misleading; and any further documents so filed and incorporated by reference in the Prospectus, if any, when such documents are filed with the Commission, will conform in all material respects to the requirements of the Exchange Act and the applicable rules and regulations, as applicable, and will not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements therein, in light of the circumstances under which they were made not misleading. No post-effective amendment to the Registration Statement reflecting any facts or events arising after the date thereof which represent, individually or in the aggregate, a fundamental change in the information set forth therein is required to be filed with the Commission. There are no documents required to be filed with the Commission in connection with the transaction contemplated hereby that (x) have not been filed as required pursuant to the Securities Act or (y) will not be filed within the requisite time period. There are no contracts or other documents required to be described in the Prospectus, or to be filed as exhibits or schedules to the Registration Statement, which have not been described or filed as required.

(z) No Integrated Offering. Neither the Company, nor any of its Affiliates, nor any Person acting on its or their behalf has, directly or indirectly, made any offers or sales of any security or solicited any offers to buy any security, under circumstances that would cause this offering of the Securities to be integrated with prior offerings by the Company for purposes of any applicable shareholder approval provisions of any Trading Market on which any of the securities of the Company are listed or designated.

(aa) Solvency. Based on the consolidated financial condition of the Company as of the Closing Date, after giving effect to the receipt by the Company of the proceeds from the sale of the Securities hereunder, (i) the fair saleable value of the Company's assets exceeds the amount that will be required to be paid on or in respect of the Company's existing debts and other liabilities (including known contingent liabilities) as they mature, (ii) the Company's assets do not constitute unreasonably small capital to carry on its business as now conducted and as proposed to be conducted including its capital needs taking into account the particular capital requirements of the business conducted by the Company, consolidated and projected capital requirements and capital availability thereof, and (iii) the current cash flow of the Company, together with the proceeds the Company would receive, were it to liquidate all of its assets, after taking into account all anticipated uses of the cash, would be sufficient to pay all amounts on or in respect of its liabilities when such amounts are required to be paid. The Company does not intend to incur debts beyond its ability to pay such debts as they mature (taking into account the timing and amounts of cash to be payable on or in respect of its debt). The Company has no knowledge of any facts or circumstances which lead it to believe that it will file for reorganization or liquidation under the bankruptcy or reorganization laws of any jurisdiction within one year from the Closing Date. The SEC Reports sets forth as of the date hereof all outstanding secured and unsecured Indebtedness of the Company or any Subsidiary, or for which the Company or any Subsidiary has commitments.

(bb) Tax Status. Except for matters that would not, individually or in the aggregate, have or reasonably be expected to result in a Material Adverse Effect, the Company and its Subsidiaries each (i) has made or filed all United States federal, state and local income and all foreign income and franchise tax returns, reports and declarations required by any jurisdiction to which it is subject, (ii) has paid all taxes and other governmental assessments and charges that are material in amount, shown or determined to be due on such returns, reports and declarations and (iii) has set aside on its books provision reasonably adequate for the payment of all material taxes for periods subsequent to the periods to which such returns, reports or declarations apply. There are no unpaid taxes in any material amount claimed to be due by the taxing authority of any jurisdiction, and the officers of the Company or of any Subsidiary know of no basis for any such claim. The provisions for taxes payable, if any, shown on the financial statements filed with or as part of the Registration Statement are sufficient for all accrued and unpaid taxes, whether or not disputed, and for all periods to and including the dates of such consolidated financial statements. The term "taxes" mean all federal, state, local, foreign, and other net income, gross income, gross receipts, sales, use, ad valorem, transfer, franchise, profits, license, lease, service, service use, withholding, payroll, employment, excise, severance, stamp, occupation, premium, property, windfall profits, customs, duties or other taxes, fees, assessments, or charges of any kind whatsoever, together with any interest and any penalties, additions to tax, or additional amounts with respect thereto. The term "returns" means all returns, declarations, reports, statements, and other documents required to be filed in respect to taxes.

(cc) Foreign Corrupt Practices. Neither the Company nor any Subsidiary, nor to the knowledge of the Company or any Subsidiary, any agent or other person acting on behalf of the Company or any Subsidiary, has (i) directly or indirectly, used any funds for unlawful contributions, gifts, entertainment or other unlawful expenses related to foreign or domestic political activity, (ii) made any unlawful payment to foreign or domestic government officials or employees or to any foreign or domestic political parties or campaigns from corporate funds, (iii) failed to disclose fully any contribution made by the Company or any Subsidiary (or made by any person acting on its behalf of which the Company is aware) which is in violation of law, or (iv) violated in any material respect any provision of FCPA. The Company has taken reasonable steps to ensure that its accounting controls and procedures are sufficient to cause the Company to comply in all material respects with the FCPA.

(dd) Accountants. To the knowledge and belief of the Company, the Company Auditor is an independent registered public accounting firm as required by the Exchange Act. The Company Auditor has not, during the periods covered by the financial statements included in the Prospectus, provided to the Company any non-audit services, as such term is used in Section 10A(g) of the Exchange Act.

(ee) FDA. As to each product subject to the jurisdiction of the U.S. Food and Drug Administration (“FDA”) under the Federal Food, Drug and Cosmetic Act, as amended, and the regulations thereunder (“FDCA”) that is manufactured, packaged, labeled, tested, distributed, sold, and/or marketed by the Company or any of its Subsidiaries (each such product, a “Product”), such Product is being manufactured, packaged, labeled, tested, distributed, sold and/or marketed by the Company in compliance with all applicable requirements under FDCA and similar laws, rules and regulations relating to registration, investigational use, premarket clearance, licensure, or application approval, good manufacturing practices, good laboratory practices, good clinical practices, product listing, quotas, labeling, advertising, record keeping and filing of reports, except where the failure to be in compliance would not have a Material Adverse Effect. There is no pending, completed or, to the Company's knowledge, threatened, action (including any lawsuit, arbitration, or legal or administrative or regulatory proceeding, charge, complaint, or investigation) against the Company or any of its Subsidiaries, and none of the Company or any of its Subsidiaries has received any notice, warning letter or other communication from the FDA or any other governmental entity, which (i) contests the premarket clearance, licensure, registration, or approval of, the uses of, the distribution of, the manufacturing or packaging of, the testing of, the sale of, or the labeling and promotion of any Product, (ii) withdraws its approval of, requests the recall, suspension, or seizure of, or withdraws or orders the withdrawal of advertising or sales promotional materials relating to, any Product, (iii) imposes a clinical hold on any clinical investigation by the Company or any of its Subsidiaries, (iv) enjoins production at any facility of the Company or any of its Subsidiaries, (v) enters or proposes to enter into a consent decree of permanent injunction with the Company or any of its Subsidiaries, or (vi) otherwise alleges any violation of any laws, rules or regulations by the Company or any of its Subsidiaries, and which, either individually or in the aggregate, would have a Material Adverse Effect. The properties, business and operations of the Company have been and are being conducted in all material respects in accordance with all applicable laws, rules and regulations of the FDA. The Company has not been informed by the FDA that the FDA will prohibit the marketing, sale, license or use in the United States of any product proposed to be developed, produced or marketed by the Company nor has the FDA expressed any concern as to approving or clearing for marketing any product being developed or proposed to be developed by the Company.

(ff) Office of Foreign Assets Control. Neither the Company nor any Subsidiary nor, to the Company's knowledge, any director, officer, agent, employee or affiliate of the Company or any Subsidiary is currently subject to any U.S. sanctions administered by the Office of Foreign Assets Control of the U.S. Treasury Department.

(gg) U.S. Real Property Holding Corporation. The Company is not and has never been a U.S. real property holding corporation within the meaning of Section 897 of the Internal Revenue Code of 1986, as amended, and the Company shall so certify upon the Representative's request.

(hh) Bank Holding Company Act. Neither the Company nor any of its Subsidiaries or Affiliates is subject to the Bank Holding Company Act of 1956, as amended (the "BHCA") and to regulation by the Board of Governors of the Federal Reserve System (the "Federal Reserve"). Neither the Company nor any of its Subsidiaries or Affiliates owns or controls, directly or indirectly, five percent (5%) or more of the outstanding shares of any class of voting securities or twenty-five percent (25%) or more of the total equity of a bank or any entity that is subject to the BHCA and to regulation by the Federal Reserve. Neither the Company nor any of its Subsidiaries or Affiliates exercises a controlling influence over the management or policies of a bank or any entity that is subject to the BHCA and to regulation by the Federal Reserve.

(ii) Money Laundering. The operations of the Company and its Subsidiaries are and have been conducted at all times in compliance with applicable financial record-keeping and reporting requirements of the Currency and Foreign Transactions Reporting Act of 1970, as amended, applicable money laundering statutes and applicable rules and regulations thereunder (collectively, the "Money Laundering Laws"), and no action, suit or proceeding by or before any court or governmental agency, authority or body or any arbitrator involving the Company or any Subsidiary with respect to the Money Laundering Laws is pending or, to the knowledge of the Company or any Subsidiary, threatened.

(jj) D&O Questionnaires. To the Company's knowledge, all information contained in the questionnaires completed by each of the Company's directors and officers prior to the Offering as well as in the Lock-Up Agreement provided to the Underwriters is true and correct in all material respects and the Company has not become aware of any information which would cause the information disclosed in such questionnaires become inaccurate and incorrect.

(kk) FINRA Affiliation. No officer, director or any beneficial owner of 5% or more of the Company's unregistered securities has any direct or indirect affiliation or association with any FINRA member (as determined in accordance with the rules and regulations of FINRA) that is participating in the Offering. The Company will advise the Representative and EGS if it learns that any officer, director or owner of 5% or more of the Company's outstanding shares of Common Stock or Common Stock Equivalents is or becomes an affiliate or associated person of a FINRA member firm.



(ll) Officers' Certificate. Any certificate signed by any duly authorized officer of the Company and delivered to the Representative or EGS shall be deemed a representation and warranty by the Company to the Underwriters as to the matters covered thereby.

(mm) Board of Directors. The Board of Directors is comprised of the persons set forth under the heading of the Prospectus captioned "Management." The qualifications of the persons serving as board members and the overall composition of the Board of Directors comply with the Sarbanes-Oxley Act of 2002 and the rules promulgated thereunder applicable to the Company and the rules of the Trading Market. At least one member of the Board of Directors qualifies as a "financial expert" as such term is defined under the Sarbanes-Oxley Act of 2002 and the rules promulgated thereunder and the rules of the Trading Market. In addition, at least a majority of the persons serving on the Board of Directors qualify as "independent" as defined under the rules of the Trading Market.

#### **ARTICLE IV. OTHER AGREEMENTS OF THE PARTIES**

4.1 Amendments to Registration Statement. The Company has delivered, or will as promptly as practicable deliver, to the Underwriters complete conformed copies of the Registration Statement and of each consent and certificate of experts, as applicable, filed as a part thereof, and conformed copies of the Registration Statement (without exhibits), the Prospectus and the Prospectus Supplement, if any, as amended or supplemented, in such quantities and at such places as an Underwriter reasonably requests. Neither the Company nor any of its directors and officers has distributed and none of them will distribute, prior to the Closing Date, any offering material in connection with the offering and sale of the Securities other than the Prospectus, the Prospectus Supplement, if any, the Registration Statement, any Permitted Free Writing Prospectus, and copies of the documents incorporated by reference therein. The Company shall not file any such amendment or supplement to which the Representative shall reasonably object in writing.

4.2 Federal Securities Laws.

(a) Compliance. During the time when a Prospectus is required to be delivered under the Securities Act, the Company will use its best efforts to comply with all requirements imposed upon it by the Securities Act and the rules and regulations thereunder and the Exchange Act and the rules and regulations thereunder, as from time to time in force, so far as necessary to permit the continuance of sales of or dealings in the Securities in accordance with the provisions hereof and the Prospectus. If at any time when a Prospectus relating to the Securities is required to be delivered under the Securities Act, any event shall have occurred as a result of which, in the opinion of counsel for the Company or counsel for the Underwriters, the Prospectus, as then amended or supplemented, includes an untrue statement of a material fact or omits to state any material fact required to be stated therein or necessary to make the statements therein, in light of the circumstances under which they were made, not misleading, or if it is necessary at any time to amend the Prospectus to comply with the Securities Act, the Company will notify the Underwriters promptly and prepare and file with the Commission, subject to Section 4.1 hereof, an appropriate amendment or supplement in accordance with Section 10 of the Securities Act.

(b) Filing of Final Prospectus. The Company will file the final Prospectus (in form and substance satisfactory to the Representative) with the Commission pursuant to the requirements of Rule 424.

(c) Exchange Act Registration. For a period of three years from the Execution Date, the Company will use its best efforts to maintain the registration of the Common Stock under the Exchange Act. The Company will not deregister the Common Stock under the Exchange Act without the prior written consent of the Representative.

(d) Free Writing Prospectuses. The Company represents and agrees that it has not made and will not make any offer relating to the Securities that would constitute an issuer free writing prospectus, as defined in Rule 433 of the rules and regulations under the Securities Act, without the prior written consent of the Representative. Any such free writing prospectus consented to by the Representative is herein referred to as a "Permitted Free Writing Prospectus." The Company represents that it will treat each Permitted Free Writing Prospectus as an "issuer free writing prospectus" as defined in rule and regulations under the Securities Act, and has complied and will comply with the applicable requirements of Rule 433 of the Securities Act, including timely Commission filing where required, legending and record keeping. The Representative has consented to the use and filing of the Company's free writing prospectus filed with the Commission on \_\_\_\_\_, 20\_\_\_, which therefore constitutes a Permitted Free Writing Prospectus.

4.3 Delivery to the Underwriters of Prospectuses. The Company will deliver to the Underwriters, without charge, from time to time during the period when the Prospectus is required to be delivered under the Securities Act or the Exchange Act such number of copies of each Prospectus as the Underwriters may reasonably request and, as soon as the Registration Statement or any amendment or supplement thereto becomes effective, deliver to you two original executed Registration Statements, including exhibits, and all post-effective amendments thereto and copies of all exhibits filed therewith or incorporated therein by reference and all original executed consents of certified experts.

4.4 Effectiveness and Events Requiring Notice to the Underwriters. The Company will use its best efforts to cause the Registration Statement to remain effective with a current prospectus until the later of nine (9) months from the Execution Date and the date on which the Warrants are no longer outstanding, and will notify the Underwriters and holders of the Warrants immediately and confirm the notice in writing: (i) of the effectiveness of the Registration Statement and any amendment thereto; (ii) of the issuance by the Commission of any stop order or of the initiation, or the threatening, of any proceeding for that purpose; (iii) of the issuance by any state securities commission of any proceedings for the suspension of the qualification of the Securities for offering or sale in any jurisdiction or of the initiation, or the threatening, of any proceeding for that purpose; (iv) of the mailing and delivery to the Commission for filing of any amendment or supplement to the Registration Statement or Prospectus; (v) of the receipt of any comments or request for any additional information from the Commission; and (vi) of the happening of any event during the period described in this Section 4.4 that, in the judgment of the Company, makes any statement of a material fact made in the Registration Statement or the Prospectus untrue or that requires the making of any changes in the Registration Statement or the Prospectus in order to make the statements therein, in light of the circumstances under which they were made, not misleading. If the Commission or any state securities commission shall enter a stop order or suspend such qualification at any time, the Company will make every reasonable effort to obtain promptly the lifting of such order.

4.5 Expenses of the Offering.

(a) General Expenses Related to the Offering. The Company hereby agrees to pay on each of the Closing Date and each Option Closing Date, if any, to the extent not paid at the Closing Date, all expenses incident to the performance of the obligations of the Company under this Agreement, including, but not limited to: (a) all filing fees and communication expenses relating to the registration of the Securities to be sold in the Offering (including the Option Securities) with the Commission; (b) all FINRA Public Offering Filing System fees associated with the review of the Offering by FINRA; all fees and expenses relating to the listing of the Closing Shares, Option Shares, and Underlying Shares on the Trading Market and such other stock exchanges as the Company and the Representative together determine; (c) all fees, expenses and disbursements relating to the registration or qualification of such Securities under the “blue sky” securities laws of such states and other foreign jurisdictions as the Representative may reasonably designate; (d) the costs of all mailing and printing of the underwriting documents (including, without limitation, the Underwriting Agreement, and, if appropriate, any Agreement Among Underwriters, Selected Dealers’ Agreement, Underwriters’ Questionnaire and Power of Attorney), Registration Statements, Prospectuses and all amendments, supplements and exhibits thereto and as many preliminary and final Prospectuses as the Representative may reasonably deem necessary; (e) the costs and expenses of the Company’s public relations firm; (f) the costs of preparing, printing and delivering the Securities; (g) fees and expenses of the Transfer Agent for the Securities (including, without limitation, any fees required for same-day processing of any instruction letter delivered by the Company), including, without limitation, fees and expenses pursuant to the Warrant Agency Agreement and the Preferred Stock Agency Agreement; (h) the fees and expenses of the Company’s accountants; and (i) the fees and expenses of the Company’s legal counsel and other agents and representatives.

(b) Expenses. The Company further agrees that, in addition to the expenses payable pursuant to Section 4.5(a), on the Closing Date it will reimburse the Representative for its out-of-pocket expenses related to the Offering in an amount up to \$85,000 in the aggregate, which shall be paid by deduction from the proceeds of the Offering contemplated herein.

4.6 Application of Net Proceeds. The Company will apply the net proceeds from the Offering received by it in a manner consistent with the application described under the caption “Use of Proceeds” in the Prospectus.

4.7 Delivery of Earnings Statements to Security Holders. The Company will make generally available to its security holders as soon as practicable, but not later than the first day of the fifteenth full calendar month following the Execution Date, an earnings statement (which need not be certified by independent public or independent certified public accountants unless required by the Securities Act or the Rules and Regulations under the Securities Act, but which shall satisfy the provisions of Rule 158(a) under Section 11(a) of the Securities Act) covering a period of at least twelve consecutive months beginning after the Execution Date.

4.8 Stabilization. Neither the Company, nor, to its knowledge, any of its employees, directors or shareholders (without the consent of the Representative) has taken or will take, directly or indirectly, any action designed to or that has constituted or that might reasonably be expected to cause or result in, under the Exchange Act, or otherwise, stabilization or manipulation of the price of any security of the Company to facilitate the sale or resale of the Securities.

4.9 Internal Controls. The Company will maintain a system of internal accounting controls sufficient to provide reasonable assurances that: (i) transactions are executed in accordance with management’s general or specific authorization; (ii) transactions are recorded as necessary in order to permit preparation of financial statements in accordance with GAAP and to maintain accountability for assets; (iii) access to assets is permitted only in accordance with management’s general or specific authorization; and (iv) the recorded accountability for assets is compared with existing assets at reasonable intervals and appropriate action is taken with respect to any differences.

4.10 Accountants. The Company shall continue to retain a nationally recognized independent certified public accounting firm for a period of at least three years after the Execution Date. The Underwriters acknowledge that the Company Auditor is acceptable to the Underwriters.

4.11 FINRA. The Company shall advise the Underwriters (who shall make an appropriate filing with FINRA) if it is aware that any 5% or greater shareholder of the Company becomes an affiliate or associated person of an Underwriter.

4.12 No Fiduciary Duties. The Company acknowledges and agrees that the Underwriters’ responsibility to the Company is solely contractual and commercial in nature, based on arms-length negotiations and that neither the Underwriters nor their affiliates or any selected dealer shall be deemed to be acting in a fiduciary capacity, or otherwise owes any fiduciary duty to the Company or any of its affiliates in connection with the Offering and the other transactions contemplated by this Agreement. Notwithstanding anything in this Agreement to the contrary, the Company acknowledges that the Underwriters may have financial interests in the success of the Offering that are not limited to the difference between the price to the public and the purchase price paid to the Company by the Underwriters for the shares and the Underwriters have no obligation to disclose, or account to the Company for, any of such additional financial interests. The Company hereby waives and releases, to the fullest extent permitted by law, any claims that the Company may have against the Underwriters with respect to any breach or alleged breach of fiduciary duty.

4.13 Underlying Shares. The shares of Common Stock underlying the Preferred Stock shall be issued free of legends. If all or any portion of a Warrant is exercised at a time when there is an effective registration statement to cover the issuance of the Warrant Shares or if the Warrant is exercised via cashless exercise at a time when such Warrant Shares would be eligible for resale under Rule 144 by a non-affiliate of the Company, the Warrant Shares issued pursuant to any such exercise shall be issued free of all restrictive legends. If at any time following the date hereof the Registration Statement (or any subsequent registration statement registering the sale or resale of the Warrant Shares) is not effective or is not otherwise available for the sale of the Warrant Shares, the Company shall immediately notify the holders of the Warrants in writing that such registration statement is not then effective and thereafter shall promptly notify such holders when the registration statement is effective again and available for the sale of the Warrant Shares (it being understood and agreed that the foregoing shall not limit the ability of the Company to issue, or any holder thereof to sell, any of the Warrant Shares in compliance with applicable federal and state securities laws).

4.14 Board Composition and Board Designations. The Company shall ensure that: (i) the qualifications of the persons serving as board members and the overall composition of the Board of Directors comply with the Sarbanes-Oxley Act of 2002 and the rules promulgated thereunder and with the listing requirements of the Trading Market and (ii) if applicable, at least one member of the Board of Directors qualifies as a “financial expert” as such term is defined under the Sarbanes-Oxley Act of 2002 and the rules promulgated thereunder.

4.15 Securities Laws Disclosure; Publicity. By 9:00 a.m. (New York City time) on the date hereof, the Company shall issue a press release disclosing the material terms of the Offering. The Company and the Representative shall consult with each other in issuing any other press releases with respect to the Offering, and neither the Company nor any Underwriter shall issue any such press release nor otherwise make any such public statement without the prior consent of the Company, with respect to any press release of such Underwriter, or without the prior consent of such Underwriter, with respect to any press release of the Company, which consent shall not unreasonably be withheld or delayed, except if such disclosure is required by law, in which case the disclosing party shall promptly provide the other party with prior notice of such public statement or communication. The Company will not issue press releases or engage in any other publicity, without the Representative’s prior written consent, for a period ending at 5:00 p.m. (New York City time) on the first business day following the 45th day following the Closing Date, other than normal and customary releases issued in the ordinary course of the Company’s business.

4.16 Shareholder Rights Plan. No claim will be made or enforced by the Company or, with the consent of the Company, any other Person, that any Underwriter of the Securities is an “Acquiring Person” under any control share acquisition, business combination, poison pill (including any distribution under a rights agreement) or similar anti-takeover plan or arrangement in effect or hereafter adopted by the Company, or that any Underwriter of Securities could be deemed to trigger the provisions of any such plan or arrangement, by virtue of receiving Securities.

4.17 Reservation of Common Stock. As of the date hereof, the Company has reserved and the Company shall continue to reserve and keep available at all times, free of preemptive rights, a sufficient number of shares of Common Stock for the purpose of enabling the Company to issue the Required Minimum.

4.18 Listing of Common Stock. The Company hereby agrees to use best efforts to maintain the listing or quotation of the Common Stock on the Trading Market on which it is currently listed, and concurrently with the Closing, the Company shall apply to list or quote all of the Closing Shares, Option Shares, Conversion Shares and Warrant Shares on such Trading Market and promptly secure the listing of all of the Closing Shares, Option Shares, Conversion Shares and Warrant Shares on such Trading Market. The Company further agrees, if the Company applies to have the Common Stock traded on any other Trading Market, it will then include in such application all of the Closing Shares, Option Shares, Conversion Shares and Warrant Shares, and will take such other action as is necessary to cause all of the Closing Shares, Option Shares, Conversion Shares and Warrant Shares to be listed or quoted on such other Trading Market as promptly as possible. The Company will then take all action reasonably necessary to continue the listing and trading of its Common Stock on a Trading Market and will comply in all respects with the Company’s reporting, filing and other obligations under the bylaws or rules of the Trading Market.

4.19 Subsequent Equity Sales.

(a) From the date hereof until ninety (90) days following the Closing Date, neither the Company nor any Subsidiary shall issue, enter into any agreement to issue or announce the issuance or proposed issuance of any shares of Common Stock or Common Stock Equivalents.

(b) From the date hereof until the one year anniversary of the Closing Date, the Company shall be prohibited from effecting or entering into an agreement to effect any issuance by the Company or any of its Subsidiaries of Common Stock or Common Stock Equivalents (or a combination of units thereof) involving a Variable Rate Transaction. “Variable Rate Transaction” means a transaction in which the Company (i) issues or sells any debt or equity securities that are convertible into, exchangeable or exercisable for, or include the right to receive, additional shares of Common Stock either (A) at a conversion price, exercise price or exchange rate or other price that is based upon, and/or varies with, the trading prices of or quotations for the shares of Common Stock at any time after the initial issuance of such debt or equity securities or (B) with a conversion, exercise or exchange price that is subject to being reset at some future date after the initial issuance of such debt or equity security or upon the occurrence of specified or contingent events directly or indirectly related to the business of the Company or the market for the Common Stock or (ii) enters into, or effects a transaction under, any agreement, including, but not limited to, an equity line of credit, whereby the Company may issue securities at a future determined price; provided, however, that, after the six (6) month anniversary of the Closing Date, the Company’s issuance of shares of Common Stock pursuant to an at-the-market offering facility with the Representative shall not be deemed a Variable Rate Transaction hereunder. Any Underwriter shall be entitled to obtain injunctive relief against the Company to preclude any such issuance, which remedy shall be in addition to any right to collect damages.

(c) Notwithstanding the foregoing, this Section 4.19 shall not apply in respect of an Exempt Issuance, except that no Variable Rate Transaction shall be an Exempt Issuance.

4.20 Research Independence. The Company acknowledges that each Underwriter's research analysts and research departments, if any, are required to be independent from their respective investment banking divisions and are subject to certain regulations and internal policies, and that such Underwriter's research analysts may hold and make statements or investment recommendations and/or publish research reports with respect to the Company and/or the offering that differ from the views of its investment bankers. The Company hereby waives and releases, to the fullest extent permitted by law, any claims that the Company may have against such Underwriter with respect to any conflict of interest that may arise from the fact that the views expressed by their independent research analysts and research departments may be different from or inconsistent with the views or advice communicated to the Company by such Underwriter's investment banking divisions. The Company acknowledges that the Representative is a full service securities firm and as such from time to time, subject to applicable securities laws, may effect transactions for its own account or the account of its customers and hold long or short position in debt or equity securities of the Company.

## **ARTICLE V. DEFAULT BY UNDERWRITERS**

If on the Closing Date or any Option Closing Date, if any, any Underwriter shall fail to purchase and pay for the portion of the Closing Securities or Option Securities, as the case may be, which such Underwriter has agreed to purchase and pay for on such date (otherwise than by reason of any default on the part of the Company), the Representative, or if the Representative is the defaulting Underwriter, the non-defaulting Underwriters, shall use their reasonable efforts to procure within 36 hours thereafter one or more of the other Underwriters, or any others, to purchase from the Company such amounts as may be agreed upon and upon the terms set forth herein, the Closing Securities or Option Securities, as the case may be, which the defaulting Underwriter or Underwriters failed to purchase. If during such 36 hours the Representative shall not have procured such other Underwriters, or any others, to purchase the Closing Securities or Option Securities, as the case may be, agreed to be purchased by the defaulting Underwriter or Underwriters, then (a) if the aggregate number of Closing Securities or Option Securities, as the case may be, with respect to which such default shall occur does not exceed 10% of the Closing Securities or Option Securities, as the case may be, covered hereby, the other Underwriters shall be obligated, severally, in proportion to the respective numbers of Closing Securities or Option Securities, as the case may be, which they are obligated to purchase hereunder, to purchase the Closing Securities or Option Securities, as the case may be, which such defaulting Underwriter or Underwriters failed to purchase, or (b) if the aggregate number of Closing Securities or Option Securities, as the case may be, with respect to which such default shall occur exceeds 10% of the Closing Securities or Option Securities, as the case may be, covered hereby, the Company or the Representative will have the right to terminate this Agreement without liability on the part of the non-defaulting Underwriters or of the Company except to the extent provided in Article VI hereof. In the event of a default by any Underwriter or Underwriters, as set forth in this Article V, the applicable Closing Date may be postponed for such period, not exceeding seven days, as the Representative, or if the Representative is the defaulting Underwriter, the non-defaulting Underwriters, may determine in order that the required changes in the Prospectus or in any other documents or arrangements may be effected. The term "Underwriter" includes any person substituted for a defaulting Underwriter. Any action taken under this Section shall not relieve any defaulting Underwriter from liability in respect of any default of such Underwriter under this Agreement.

**ARTICLE VI.  
INDEMNIFICATION**

6.1 Indemnification of the Underwriters. Subject to the conditions set forth below, the Company agrees to indemnify and hold harmless the Underwriters, and each dealer selected by each Underwriter that participates in the offer and sale of the Securities (each a “Selected Dealer”) and each of their respective directors, officers and employees and each Person, if any, who controls such Underwriter or any Selected Dealer (“Controlling Person”) within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act, against any and all loss, liability, claim, damage and expense whatsoever (including but not limited to any and all legal or other expenses reasonably incurred in investigating, preparing or defending against any litigation, commenced or threatened, or any claim whatsoever, whether arising out of any action between such Underwriter and the Company or between such Underwriter and any third party or otherwise) to which they or any of them may become subject under the Securities Act, the Exchange Act or any other statute or at common law or otherwise or under the laws of foreign countries, arising out of or based upon any untrue statement or alleged untrue statement of a material fact contained in (i) any Preliminary Prospectus, if any, the Registration Statement or the Prospectus (as from time to time each may be amended and supplemented); (ii) any materials or information provided to investors by, or with the approval of, the Company in connection with the marketing of the offering of the Securities, including any “road show” or investor presentations made to investors by the Company (whether in person or electronically); or (iii) any application or other document or written communication (in this Article VI, collectively called “application”) executed by the Company or based upon written information furnished by the Company in any jurisdiction in order to qualify the Securities under the securities laws thereof or filed with the Commission, any state securities commission or agency, Trading Market or any securities exchange; or the omission or alleged omission therefrom of a material fact required to be stated therein or necessary to make the statements therein, in light of the circumstances under which they were made, not misleading, unless such statement or omission was made in reliance upon and in conformity with written information furnished to the Company with respect to the applicable Underwriter by or on behalf of such Underwriter expressly for use in any Preliminary Prospectus, if any, the Registration Statement or Prospectus, or any amendment or supplement thereto, or in any application, as the case may be. With respect to any untrue statement or omission or alleged untrue statement or omission made in the Preliminary Prospectus, if any, the indemnity agreement contained in this Section 6.1 shall not inure to the benefit of an Underwriter to the extent that any loss, liability, claim, damage or expense of such Underwriter results from the fact that a copy of the Prospectus was not given or sent to the Person asserting any such loss, liability, claim or damage at or prior to the written confirmation of sale of the Securities to such Person as required by the Securities Act and the rules and regulations thereunder, and if the untrue statement or omission has been corrected in the Prospectus, unless such failure to deliver the Prospectus was a result of non-compliance by the Company with its obligations under this Agreement. The Company agrees promptly to notify each Underwriter of the commencement of any litigation or proceedings against the Company or any of its officers, directors or Controlling Persons in connection with the issue and sale of the Public Securities or in connection with the Registration Statement or Prospectus.



6.2 **Procedure.** If any action is brought against an Underwriter, a Selected Dealer or a Controlling Person in respect of which indemnity may be sought against the Company pursuant to Section 6.1, such Underwriter, such Selected Dealer or Controlling Person, as the case may be, shall promptly notify the Company in writing of the institution of such action and the Company shall assume the defense of such action, including the employment and fees of counsel (subject to the reasonable approval of such Underwriter or such Selected Dealer, as the case may be) and payment of actual expenses. Such Underwriter, such Selected Dealer or Controlling Person shall have the right to employ its or their own counsel in any such case, but the fees and expenses of such counsel shall be at the expense of such Underwriter, such Selected Dealer or Controlling Person unless (i) the employment of such counsel at the expense of the Company shall have been authorized in writing by the Company in connection with the defense of such action, or (ii) the Company shall not have employed counsel to have charge of the defense of such action, or (iii) such indemnified party or parties shall have reasonably concluded that there may be defenses available to it or them which are different from or additional to those available to the Company (in which case the Company shall not have the right to direct the defense of such action on behalf of the indemnified party or parties), in any of which events the reasonable fees and expenses of not more than one additional firm of attorneys selected by such Underwriter (in addition to local counsel), Selected Dealer and/or Controlling Person shall be borne by the Company. Notwithstanding anything to the contrary contained herein, if any Underwriter, Selected Dealer or Controlling Person shall assume the defense of such action as provided above, the Company shall have the right to approve the terms of any settlement of such action which approval shall not be unreasonably withheld.

6.3 Indemnification of the Company. Each Underwriter severally and not jointly agrees to indemnify and hold harmless the Company, each of its directors, each of its officers who signed the Registration Statement, and each person, if any, who controls the Company within the meaning of Section 15 of the Securities Act or Section 20 of the Exchange Act against any and all loss, liability, claim, damage and expense described in the foregoing indemnity from the Company to such Underwriter, as incurred, but only with respect to untrue statements or omissions, or alleged untrue statements or omissions made in any Preliminary Prospectus, if any, the Registration Statement or Prospectus or any amendment or supplement thereto or in any application, in reliance upon, and in strict conformity with, written information furnished to the Company with respect to such Underwriter by or on behalf of such Underwriter expressly for use in such Preliminary Prospectus, if any, the Registration Statement or Prospectus or any amendment or supplement thereto or in any such application. The parties acknowledge and agree such information consists solely of the following disclosure in the “Underwriting” section of the Prospectus; the last sentence of the third paragraph, the sentence constituting the sixth paragraph and the disclosure under “Stabilization, Short Positions and Penalty Bids”. In case any action shall be brought against the Company or any other Person so indemnified based on any Preliminary Prospectus, if any, the Registration Statement or Prospectus or any amendment or supplement thereto or any application, and in respect of which indemnity may be sought against such Underwriter, such Underwriter shall have the rights and duties given to the Company, and the Company and each other Person so indemnified shall have the rights and duties given to such Underwriter by the provisions of this Article VI. Notwithstanding the provisions of this Section 6.3, no Underwriter shall be required to indemnify the Company for any amount in excess of the underwriting discounts and commissions applicable to the Securities purchased by such Underwriter. The Underwriters' obligations in this Section 6.3 to indemnify the Company are several in proportion to their respective underwriting obligations and not joint.

6.4 Contribution.

(a) Contribution Rights. In order to provide for just and equitable contribution under the Securities Act in any case in which (i) any Person entitled to indemnification under this Article VI makes a claim for indemnification pursuant hereto but it is judicially determined (by the entry of a final judgment or decree by a court of competent jurisdiction and the expiration of time to appeal or the denial of the last right of appeal) that such indemnification may not be enforced in such case notwithstanding the fact that this Article VI provides for indemnification in such case, or (ii) contribution under the Securities Act, the Exchange Act or otherwise may be required on the part of any such Person in circumstances for which indemnification is provided under this Article VI, then, and in each such case, the Company and each Underwriter, severally and not jointly, shall contribute to the aggregate losses, liabilities, claims, damages and expenses of the nature contemplated by said indemnity agreement incurred by the Company and such Underwriter, as incurred, in such proportions that such Underwriter is responsible for that portion represented by the percentage that the underwriting discount appearing on the cover page of the Prospectus bears to the initial offering price appearing thereon and the Company is responsible for the balance; provided, that, no Person guilty of a fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) shall be entitled to contribution from any Person who was not guilty of such fraudulent misrepresentation. For purposes of this Section, each director, officer and employee of such Underwriter or the Company, as applicable, and each Person, if any, who controls such Underwriter or the Company, as applicable, within the meaning of Section 15 of the Securities Act shall have the same rights to contribution as such Underwriter or the Company, as applicable. Notwithstanding the provisions of this Section 6.4, no Underwriter shall be required to contribute any amount in excess of the underwriting discounts and commissions applicable to the Securities purchased by such Underwriter. The Underwriters' obligations in this Section 6.4 to contribute are several in proportion to their respective underwriting obligations and not joint.

(b) Contribution Procedure. Within fifteen days after receipt by any party to this Agreement (or its representative) of notice of the commencement of any action, suit or proceeding, such party will, if a claim for contribution in respect thereof is to be made against another party ("contributing party"), notify the contributing party of the commencement thereof, but the failure to so notify the contributing party will not relieve it from any liability which it may have to any other party other than for contribution hereunder. In case any such action, suit or proceeding is brought against any party, and such party notifies a contributing party or its representative of the commencement thereof within the aforesaid fifteen days, the contributing party will be entitled to participate therein with the notifying party and any other contributing party similarly notified. Any such contributing party shall not be liable to any party seeking contribution on account of any settlement of any claim, action or proceeding affected by such party seeking contribution without the written consent of such contributing party. The contribution provisions contained in this Section 6.4 are intended to supersede, to the extent permitted by law, any right to contribution under the Securities Act, the Exchange Act or otherwise available.

## **ARTICLE VII. MISCELLANEOUS**

### 7.1 Termination.

(a) Termination Right. The Representative shall have the right to terminate this Agreement at any time prior to any Closing Date, (i) if any domestic or international event or act or occurrence has materially disrupted, or in its opinion will in the immediate future materially disrupt, general securities markets in the United States; or (ii) if trading on any Trading Market shall have been suspended or materially limited, or minimum or maximum prices for trading shall have been fixed, or maximum ranges for prices for securities shall have been required by FINRA or by order of the Commission or any other government authority having jurisdiction, or (iii) if the United States shall have become involved in a new war or an increase in major hostilities, or (iv) if a banking moratorium has been declared by a New York State or federal authority, or (v) if a moratorium on foreign exchange trading has been declared which materially adversely impacts the United States securities markets, or (vi) if the Company shall have sustained a material loss by fire, flood, accident, hurricane, earthquake, theft, sabotage or other calamity or malicious act which, whether or not such loss shall have been insured, will, in the Representative's opinion, make it inadvisable to proceed with the delivery of the Securities, or (vii) if the Company is in material breach of any of its representations, warranties or covenants hereunder, or (viii) if the Representative shall have become aware after the date hereof of such a material adverse change in the conditions or prospects of the Company, or such adverse material change in general market conditions as in the Representative's judgment would make it impracticable to proceed with the offering, sale and/or delivery of the Securities or to enforce contracts made by the Underwriters for the sale of the Securities.

(b) Expenses. In the event this Agreement shall be terminated pursuant to Section 7.1(a), within the time specified herein or any extensions thereof pursuant to the terms herein, the Company shall be obligated to pay to the Representative its actual and accountable out of pocket expenses related to the transactions contemplated herein then due and payable, including the fees and disbursements of EGS; provided, however, that such expenses shall not exceed \$25,000 in the aggregate (provided, further, however, that such expense cap in no way limits or impairs the indemnification and contribution provisions of this Agreement).

(c) Indemnification. Notwithstanding any contrary provision contained in this Agreement, any election hereunder or any termination of this Agreement, and whether or not this Agreement is otherwise carried out, the provisions of Article VI shall not be in any way effected by such election or termination or failure to carry out the terms of this Agreement or any part hereof.

7.2 Entire Agreement. The Transaction Documents, together with the exhibits and schedules thereto, the Prospectus and the Prospectus Supplement, if any, contain the entire understanding of the parties with respect to the subject matter hereof and thereof and supersede all prior agreements and understandings, oral or written, with respect to such matters, which the parties acknowledge have been merged into such documents, exhibits and schedules. Notwithstanding anything herein to the contrary, the Investment Banking Agreement, dated October 7, 2019 ("Investment Banking Agreement"), between the Company and the Representative, shall continue to be effective during its term and the terms therein, including, without limitation, Section 4(d) and Section 5 therein with respect to any future offerings, shall continue to survive and be enforceable by the Representative in accordance with its terms, provided that, in the event of a conflict between the terms and conditions of this Agreement and the Investment Banking Agreement, the terms and conditions of this Agreement shall control.

7.3 Notices. Any and all notices or other communications or deliveries required or permitted to be provided hereunder shall be in writing and shall be deemed given and effective on the earliest of: (a) the time of transmission, if such notice or communication is delivered via facsimile at the facsimile number or e-mail attachment at the e-mail address set forth on the signature pages attached hereto at or prior to 5:30 p.m. (New York City time) on a Trading Day, (b) the next Trading Day after the time of transmission, if such notice or communication is delivered via facsimile at the facsimile number or e-mail attachment at the e-mail address as set forth on the signature pages attached hereto on a day that is not a Trading Day or later than 5:30 p.m. (New York City time) on any Trading Day, (c) the second (2<sup>nd</sup>) Trading Day following the date of mailing, if sent by U.S. nationally recognized overnight courier service or (d) upon actual receipt by the party to whom such notice is required to be given. The address for such notices and communications shall be as set forth on the signature pages attached hereto.

7.4 Amendments; Waivers. No provision of this Agreement may be waived, modified, supplemented or amended except in a written instrument signed, in the case of an amendment, by the Company and the Representative. No waiver of any default with respect to any provision, condition or requirement of this Agreement shall be deemed to be a continuing waiver in the future or a waiver of any subsequent default or a waiver of any other provision, condition or requirement hereof, nor shall any delay or omission of any party to exercise any right hereunder in any manner impair the exercise of any such right.

7.5 Headings. The headings herein are for convenience only, do not constitute a part of this Agreement and shall not be deemed to limit or affect any of the provisions hereof.

7.6 Successors and Assigns. This Agreement shall be binding upon and inure to the benefit of the parties and their successors and permitted assigns.

7.7 Governing Law. All questions concerning the construction, validity, enforcement and interpretation of the Transaction Documents shall be governed by and construed and enforced in accordance with the internal laws of the State of New York, without regard to the principles of conflicts of law thereof. Each party agrees that all legal proceedings concerning the interpretations, enforcement and defense of the transactions contemplated by this Agreement and any other Transaction Documents (whether brought against a party hereto or its respective affiliates, directors, officers, shareholders, partners, members, employees or agents) shall be commenced exclusively in the state and federal courts sitting in the City of New York. Each party hereby irrevocably submits to the exclusive jurisdiction of the state and federal courts sitting in the City of New York, Borough of Manhattan for the adjudication of any dispute hereunder or in connection herewith or with any transaction contemplated hereby or discussed herein (including with respect to the enforcement of any of the Transaction Documents), and hereby irrevocably waives, and agrees not to assert in any action, suit or proceeding, any claim that it is not personally subject to the jurisdiction of any such court, that such suit, action or proceeding is improper or is an inconvenient venue for such proceeding. Each party hereby irrevocably waives personal service of process and consents to process being served in any such suit, action or proceeding by mailing a copy thereof via registered or certified mail or overnight delivery (with evidence of delivery) to such party at the address in effect for notices to it under this Agreement and agrees that such service shall constitute good and sufficient service of process and notice thereof. Nothing contained herein shall be deemed to limit in any way any right to serve process in any other manner permitted by law. If either party shall commence an action or proceeding to enforce any provisions of the Transaction Documents, then, in addition to the obligations of the Company under Article VI, the prevailing party in such action, suit or proceeding shall be reimbursed by the other party for its reasonable attorneys' fees and other costs and expenses incurred with the investigation, preparation and prosecution of such action or proceeding.

7.8 Survival. The representations and warranties contained herein shall survive the Closing and the Option Closing, if any, and the delivery of the Securities.

7.9 **Execution.** This Agreement may be executed in two or more counterparts, all of which when taken together shall be considered one and the same agreement and shall become effective when counterparts have been signed by each party and delivered to each other party, it being understood that the parties need not sign the same counterpart. In the event that any signature is delivered by facsimile transmission or by e-mail delivery of a “.pdf” format data file, such signature shall create a valid and binding obligation of the party executing (or on whose behalf such signature is executed) with the same force and effect as if such facsimile or “.pdf” signature page were an original thereof.

7.10 **Severability.** If any term, provision, covenant or restriction of this Agreement is held by a court of competent jurisdiction to be invalid, illegal, void or unenforceable, the remainder of the terms, provisions, covenants and restrictions set forth herein shall remain in full force and effect and shall in no way be affected, impaired or invalidated, and the parties hereto shall use their commercially reasonable efforts to find and employ an alternative means to achieve the same or substantially the same result as that contemplated by such term, provision, covenant or restriction. It is hereby stipulated and declared to be the intention of the parties that they would have executed the remaining terms, provisions, covenants and restrictions without including any of such that may be hereafter declared invalid, illegal, void or unenforceable.

7.11 **Remedies.** In addition to being entitled to exercise all rights provided herein or granted by law, including recovery of damages, the Underwriters and the Company will be entitled to specific performance under the Transaction Documents. The parties agree that monetary damages may not be adequate compensation for any loss incurred by reason of any breach of obligations contained in the Transaction Documents and hereby agree to waive and not to assert in any action for specific performance of any such obligation the defense that a remedy at law would be adequate.

7.12 **Saturdays, Sundays, Holidays, etc.** If the last or appointed day for the taking of any action or the expiration of any right required or granted herein shall not be a Business Day, then such action may be taken or such right may be exercised on the next succeeding Business Day.

7.13 **Construction.** The parties agree that each of them and/or their respective counsel have reviewed and had an opportunity to revise the Transaction Documents and, therefore, the normal rule of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of the Transaction Documents or any amendments thereto. In addition, each and every reference to share prices and shares of Common Stock in any Transaction Document shall be subject to adjustment for reverse and forward stock splits, stock dividends, stock combinations and other similar transactions of the Common Stock that occur after the date of this Agreement.

7.14 **WAIVER OF JURY TRIAL.** **IN ANY ACTION, SUIT, OR PROCEEDING IN ANY JURISDICTION BROUGHT BY ANY PARTY AGAINST ANY OTHER PARTY ARISING OUT OF OR RELATING TO THIS AGREEMENT OR THE TRANSACTIONS CONTEMPLATED HEREBY, THE PARTIES EACH KNOWINGLY AND INTENTIONALLY, TO THE GREATEST EXTENT PERMITTED BY APPLICABLE LAW, HEREBY ABSOLUTELY, UNCONDITIONALLY, IRREVOCABLY AND EXPRESSLY WAIVE FOREVER ANY RIGHT TO TRIAL BY JURY.**

*(Signature Pages Follow)*

If the foregoing correctly sets forth the understanding between the Underwriters and the Company, please so indicate in the space provided below for that purpose, whereupon this letter shall constitute a binding agreement among the Company and the several Underwriters in accordance with its terms.

Very truly yours,

**CHF SOLUTIONS, INC.**

By: \_\_\_\_\_

Name:

Title:

Address for Notice:

CHF Solutions, Inc.

12988 Valley View Road

Eden Prairie, MN 55344

Attention: John L. Erb

Chairman and Chief Executive Officer

Telecopy: (952) 224-0181

Copy to:

Honigman LLP

650 Trade Centre Way, Suite 200

Kalamazoo, Michigan 49002-0402

E-mail: ptorrence@honigman.com

Attention: Phillip D. Torrence

Accepted on the date first above written.

**LADENBURG THALMANN & CO. INC.**

As the Representative of the several

Underwriters listed on Schedule I

By: Ladenburg Thalmann & Co. Inc.

By: \_\_\_\_\_

Name: Nicholas Stergis

Title: Managing Director

Address for Notice:

4400 Biscayne Boulevard, 14th Floor

Miami, Florida 33137

Attn: General Counsel

Copy to:

Ellenoff Grossman & Schole LLP

1345 Avenue of the Americas

New York, New York 10105

E-mail: mnertney@egslp.com

Attention: Michael Nertney

# SCHEDULE I

## SCHEDULE OF UNDERWRITERS

<u>Underwriters</u>	<u>Closing Shares</u>	<u>Closing Preferred Shares</u>	<u>Closing Warrants</u>	<u>Closing Purchase Price</u>
Ladenburg Thalmann & Co. Inc.				\$
<b>Total</b>				\$



## CHF SOLUTIONS, INC.

**CERTIFICATE OF DESIGNATION OF PREFERENCES,  
RIGHTS AND LIMITATIONS  
OF  
SERIES H CONVERTIBLE PREFERRED STOCK**

PURSUANT TO SECTION 151 OF THE  
DELAWARE GENERAL CORPORATION LAW

The undersigned, John L. Erb and Claudia Drayton, do hereby certify that:

1. They are the President and Secretary, respectively, of CHF Solutions, Inc., a Delaware corporation (the "Corporation").

2. The Corporation is authorized to issue 40,000,000 shares of preferred stock, 30,000 of which are designated as Series A junior participating preferred stock, none of which are outstanding, and 18,000 of which are designated as Series F Convertible Preferred Stock, 535 of which are outstanding.

3. The following resolutions were duly adopted by the board of directors of the Corporation (the "Board of Directors"):

WHEREAS, the certificate of incorporation of the Corporation provides for a class of its authorized stock known as preferred stock, consisting of 40,000,000 shares, \$0.0001 par value per share, issuable from time to time in one or more series;

WHEREAS, the Board of Directors is authorized to fix the dividend rights, dividend rate, voting rights, conversion rights, rights and terms of redemption and liquidation preferences of any wholly unissued series of preferred stock and the number of shares constituting any series and the designation thereof, of any of them; and

WHEREAS, it is the desire of the Board of Directors, pursuant to its authority as aforesaid, to fix the rights, preferences, restrictions and other matters relating to a series of the preferred stock, which shall consist of \_\_\_\_ shares of the preferred stock which the Corporation has the authority to issue, as follows:

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors does hereby provide for the issuance of a series of preferred stock for cash or exchange of other securities, rights or property and does hereby fix and determine the rights, preferences, restrictions and other matters relating to such series of preferred stock as follows:

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## TERMS OF PREFERRED STOCK

**Section 1. Definitions.** For the purposes hereof, the following terms shall have the following meanings:

“Affiliate” means any Person that, directly or indirectly through one or more intermediaries, controls or is controlled by or is under common control with a Person, as such terms are used in and construed under Rule 405 of the Securities Act.

“Alternate Consideration” shall have the meaning set forth in Section 7(d).

“Beneficial Ownership Limitation” shall have the meaning set forth in Section 6(d).

“Business Day” means any day except any Saturday, any Sunday, any day which is a federal legal holiday in the United States or any day on which banking institutions in the State of New York are authorized or required by law or other governmental action to close.

“Buy-In” shall have the meaning set forth in Section 6(c)(iv).

“Commission” means the United States Securities and Exchange Commission.

“Common Stock” means the Corporation’s common stock, par value \$0.0001 per share, and stock of any other class of securities into which such securities may hereafter be reclassified or changed.

“Common Stock Equivalents” means any securities of the Corporation or the Subsidiaries which would entitle the holder thereof to acquire at any time Common Stock, including, without limitation, any debt, preferred stock, rights, options, warrants or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock.

“Conversion Amount” means the sum of the Stated Value at issue.

“Conversion Date” shall have the meaning set forth in Section 6(a).

“Conversion Price” shall have the meaning set forth in Section 6(b).

“Conversion Shares” means, collectively, the shares of Common Stock issuable upon conversion of the shares of Preferred Stock in accordance with the terms hereof.

“Equity Conditions” means, during the period in question, (a) the Corporation shall have duly honored all conversions scheduled to occur or occurring by virtue of one or more Notices of Conversion of the applicable Holder on or prior to the dates so requested or required, if any, (b) the Corporation shall have paid all liquidated damages and other amounts owing to the applicable Holder in respect of the Preferred Stock, (c)(i) there is an effective registration statement pursuant to which the Corporation may issue Conversion Shares or (ii) all of the Conversion Shares may be issued to the Holder pursuant to Section 3(a)(9) of the Securities Act and immediately resold without restriction, (d) the Common Stock is trading on a Trading Market and all of the Conversion Shares are listed or quoted for trading on such Trading Market (and the Corporation believes, in good faith, that trading of the Common Stock on a Trading Market will continue uninterrupted for the foreseeable future), (e) there is a sufficient number of authorized, but unissued and otherwise unreserved, shares of Common Stock for the issuance of all of the shares then issuable pursuant to the Preferred Stock then outstanding, (f) the issuance of the shares in question to the applicable Holder would not violate the limitations set forth in Section 6(d) herein, (g) there has been no public announcement of a pending or proposed Fundamental Transaction that has not been consummated and (h) the applicable Holder is not in possession of any information provided by the Corporation, any of its Subsidiaries, or any of their officers, directors, employees, agents or Affiliates, that constitutes, or may constitute, material non-public information.

“Exchange Act” means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

“Forced Conversion Date” shall have the meaning set forth in Section 6(e).

“Forced Conversion Notice” shall have the meaning set forth in Section 6(e).

“Forced Conversion Notice Date” shall have the meaning set forth in Section 6(e).

“Fundamental Transaction” shall have the meaning set forth in Section 7(d).

“GAAP” means United States generally accepted accounting principles.

“Holder” shall have the meaning given such term in Section 2.

“Liquidation” shall have the meaning set forth in Section 5.

“New York Courts” shall have the meaning set forth in Section 8(d).

“Notice of Conversion” shall have the meaning set forth in Section 6(a).

“Original Issue Date” means the date of the first issuance of any shares of the Preferred Stock regardless of the number of transfers of any particular shares of Preferred Stock and regardless of the number of certificates which may be issued to evidence such Preferred Stock.

“Person” means an individual or corporation, partnership, trust, incorporated or unincorporated association, joint venture, limited liability company, joint stock company, government (or an agency or subdivision thereof) or other entity of any kind.

“Preferred Stock” shall have the meaning set forth in Section 2.

“Representative” means Ladenburg Thalmann & Co. Inc.

“Securities Act” means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

“Share Delivery Date” shall have the meaning set forth in Section 6(c).

“Stated Value” shall have the meaning set forth in Section 2, as the same may be increased pursuant to Section 3.

“Subsidiary” means any direct or indirect subsidiary of the Corporation as set and shall, where applicable, also include any direct or indirect subsidiary of the Corporation formed or acquired after the date Original Issue Date.

“Successor Entity” shall have the meaning set forth in Section 7(d).

“Threshold Period” shall have the meaning set forth in Section 6(e).

“Trading Day” means a day on which the principal Trading Market is open for business.

“Trading Market” means any of the following markets or exchanges on which the Common Stock is listed or quoted for trading on the date in question: the NYSE American, the Nasdaq Capital Market, the Nasdaq Global Market, the Nasdaq Global Select Market or the New York Stock Exchange (or any successors to any of the foregoing).

“Transfer Agent” means American Stock Transfer & Trust Company, the current transfer agent of the Corporation with a mailing address of 59 Maiden Lane, New York, New York and a facsimile number of 718-236-4588, and any successor transfer agent of the Corporation.

“Underwriting Agreement” means the underwriting agreement, dated as of \_\_\_\_\_, 2019, among the Corporation and the Representative, as representative of the underwriters named therein, as amended, modified or supplemented from time to time in accordance with its terms.

“VWAP” means, for any date, the price determined by the first of the following clauses that applies: (a) if the Common Stock is then listed or quoted on a Trading Market, the daily volume weighted average price of the Common Stock for such date (or the nearest preceding date) on the Trading Market on which the Common Stock is then listed or quoted as reported by Bloomberg L.P. (based on a Trading Day from 9:30 a.m. (New York City time) to 4:02 p.m. (New York City time)), (b) if OTCQB or OTCQX is not a Trading Market, the volume weighted average price of the Common Stock for such date (or the nearest preceding date) on OTCQB or OTCQX as applicable, (c) if the Common Stock is not then listed or quoted for trading on OTCQB or OTCQX and if prices for the Common Stock are then reported in the “Pink Sheets” published by OTC Markets, Inc. (or a similar organization or agency succeeding to its functions of reporting prices), the most recent bid price per share of the Common Stock so reported, or (d) in all other cases, the fair market value of a share of Common Stock as determined by an independent appraiser selected in good faith by the Holders of a majority in interest of the Preferred Stock then outstanding and reasonably acceptable to the Corporation, the fees and expenses of which shall be paid by the Corporation.

**Section 2. Designation, Amount and Par Value.** The series of preferred stock shall be designated as its Series H Convertible Preferred Stock (the “Preferred Stock”) and the number of shares so designated shall be \_\_\_\_\_ (which shall not be subject to increase without the written consent of all of the holders of the Preferred Stock (each, a “Holder” and collectively, the “Holders”). Each share of Preferred Stock shall have a par value of \$0.0001 per share and a stated value equal to \$\_\_\_\_<sup>1</sup> (the “Stated Value”). The Preferred Stock will initially be issued in book-entry form and shall initially be represented only by one or more global certificates deposited with the Depository Trust Company (“DTC”) and registered in the name of Cede & Co., a nominee of DTC, or as otherwise directed by DTC. As between the Corporation and a beneficial owner of Preferred Stock shall have all of the rights and remedies of a Holder hereunder. In addition, a beneficial owner of Preferred Stock has the right, upon written notice by such beneficial owner to the Corporation, to request the exchange of some or all of such beneficial owner’s interest in Preferred Stock represented by one or more global Preferred Stock certificates deposited with Cede & Co. (or its successor) for a physical Preferred Stock certificate (a “Preferred Stock Certificate Request Notice” and the date of delivery of such Preferred Stock Certificate Request Notice by a beneficial owner, the “Preferred Stock Certificate Request Notice Date” and the deemed surrender upon delivery by the beneficial owner of a number of global shares of Preferred Stock for the same number of shares of Preferred Stock represented by a physical stock certificate, a “Preferred Stock Exchange”, and such physical certificate(s), a “Preferred Stock Certificate”). Upon delivery of a Preferred Stock Certificate Request Notice, the Corporation shall promptly effect the Preferred Stock Exchange and shall promptly issue and deliver to the beneficial owner a physical Preferred Stock Certificate for such number of shares of Preferred Stock represented by its interest in such global certificates in the name of the beneficial owner. Such Preferred Stock Certificate shall be dated the Original Issue Date and shall be executed by an authorized signatory of the Corporation. In connection with a Preferred Stock Exchange, the Corporation agrees to deliver the Preferred Stock Certificate to the Holder within two (2) Business Days of the delivery of a properly completed and executed Preferred Stock Certificate Request Notice pursuant to the delivery instructions in the Preferred Stock Certificate Request Notice. The Corporation covenants and agrees that, upon the date of delivery of the properly completed and executed Preferred Stock Certificate Request Notice, the Holder shall be deemed to be the holder of the Preferred Stock Certificate and further, for purposes of Regulation SHO, a Holder whose interest in this Preferred Stock is a beneficial interest in certificate(s) representing this Preferred Stock held in book-entry form through DTC shall be deemed to have converted its interest in this Preferred Stock upon instructing its broker that is a DTC participant to convert its interest in this Preferred Stock, and, notwithstanding anything to the contrary set forth herein, the Preferred Stock Certificate shall be deemed for all purposes to represent all of the terms and conditions of the Preferred Stock evidenced by such global Preferred Stock certificates and the terms hereof.

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<sup>1</sup> The Class A Unit purchase price

Section 3.        Dividends. Except for stock dividends or distributions for which adjustments are to be made pursuant to Section 7, Holders shall be entitled to receive, and the Corporation shall pay, dividends on shares of Preferred Stock equal (on an as-if-converted-to-Common-Stock basis calculated using the then current Conversion Price for the Preferred Stock on the record date for such dividend, disregarding for such purpose any conversion limitations hereunder) to and in the same form as dividends actually paid on shares of the Common Stock when, as and if such dividends are paid on shares of the Common Stock. No other dividends shall be paid on shares of Preferred Stock. The Corporation shall not pay any dividends on the Common Stock unless the Corporation simultaneously complies with this provision.

Section 4.        Voting Rights. Except as otherwise provided herein or as otherwise required by law, the Preferred Stock shall have no voting rights. However, as long as any shares of Preferred Stock are outstanding, the Corporation shall not, without the affirmative vote of the Holders of a majority of the then outstanding shares of the Preferred Stock, (a) alter or change adversely the powers, preferences or rights given to the Preferred Stock or alter or amend this Certificate of Designation, (b) amend its certificate of incorporation or other charter documents in any manner that adversely affects any rights of the Holders, (c) increase the number of authorized shares of Preferred Stock, or (d) enter into any agreement with respect to any of the foregoing.

Section 5.        Liquidation. Upon any liquidation, dissolution or winding-up of the Corporation, whether voluntary or involuntary (a "Liquidation"), the Holders shall be entitled to receive out of the assets, whether capital or surplus, of the Corporation the same amount that a holder of Common Stock would receive if the Preferred Stock were fully converted (disregarding for such purposes any conversion limitations hereunder) to Common Stock which amounts shall be paid pari passu with all holders of Common Stock. The Corporation shall mail written notice of any such Liquidation, not less than 45 days prior to the payment date stated therein, to each Holder.

Section 6.      Conversion.

a)      Conversions at Option of Holder. Each share of Preferred Stock shall be convertible, at any time and from time to time on or after the Original Issue Date, at the option of the Holder thereof, into that number of shares of Common Stock (subject to the limitations set forth in Section 6(d)) determined by dividing the Stated Value of such share of Preferred Stock by the Conversion Price. Holders shall effect conversions by providing the Corporation with the form of conversion notice attached hereto as Annex A (a "Notice of Conversion"). Each Notice of Conversion shall specify the number of shares of Preferred Stock to be converted, the number of shares of Preferred Stock owned prior to the conversion at issue, the number of shares of Preferred Stock owned subsequent to the conversion at issue and the date on which such conversion is to be effected, which date may not be prior to the date the applicable Holder delivers by facsimile or email such Notice of Conversion to the Corporation (such date, the "Conversion Date"). If no Conversion Date is specified in a Notice of Conversion, the Conversion Date shall be the date that such Notice of Conversion to the Corporation is deemed delivered hereunder. No ink-original Notice of Conversion shall be required, nor shall any medallion guarantee (or other type of guarantee or notarization) of any Notice of Conversion form be required. The calculations and entries set forth in the Notice of Conversion shall control in the absence of manifest or mathematical error. To effect conversions of shares of Preferred Stock, a Holder shall not be required to surrender the certificate(s) representing the shares of Preferred Stock to the Corporation unless all of the shares of Preferred Stock represented thereby are so converted, in which case such Holder shall deliver the certificate representing such shares of Preferred Stock promptly following the Conversion Date at issue. Shares of Preferred Stock converted into Common Stock or redeemed in accordance with the terms hereof shall be canceled and shall not be reissued. Notwithstanding the foregoing in this Section 6(a), a holder whose interest in the Preferred Stock is a beneficial interest in certificate(s) representing the Preferred Stock held in book-entry form through DTC (or another established clearing corporation performing similar functions), shall effect conversions made pursuant to this Section 6(a) by delivering to DTC (or such other clearing corporation, as applicable) the appropriate instruction form for conversion, complying with the procedures to effect conversions that are required by DTC (or such other clearing corporation, as applicable), subject to a Holder's right to elect to receive Preferred Stock in certificated form pursuant to Section 2, in which case this sentence shall not apply.

b)      Conversion Price. The conversion price for the Preferred Stock shall equal \$\_\_\_\_\_<sup>2</sup> (the "Conversion Price"), subject to adjustment for reverse and forward stock splits, stock dividends, stock combinations and other similar transactions of the Common Stock that occur after the Original Issue Date as set forth in Section 7 hereof.

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<sup>2</sup> The Class A Unit Purchase Price

c) Mechanics of Conversion.

i. Delivery of Conversion Shares Upon Conversion. Not later than the earlier of (i) two (2) Trading Days and (ii) the number of Trading Days comprising the Standard Settlement Period (as defined below) after each Conversion Date (the “Share Delivery Date”), the Corporation shall deliver, or cause to be delivered, to the converting Holder (A) Conversion Shares which shall be free of restrictive legends and trading restrictions representing the number of Conversion Shares being acquired upon the conversion of the Preferred Stock, and (B) a bank check in the amount of accrued and unpaid dividends, if any. On any date of delivery of Conversion Shares, the Corporation shall use its best efforts to deliver the Conversion Shares required to be delivered by the Corporation under this Section 6 electronically through the Depository Trust Company or another established clearing corporation performing similar functions. As used herein, “Standard Settlement Period” means the standard settlement period, expressed in a number of Trading Days, on the Corporation’s primary Trading Market with respect to the Common Stock as in effect on the date of delivery of the Notice of Conversion. Notwithstanding the foregoing, with respect to any Notice(s) of Conversion delivered by 9:00 a.m. (New York City time) on the Original Issue Date, the Corporation agrees to deliver the Conversion Shares subject to such notice(s) by 4:00 p.m. (New York City time) on the Original Issue Date, and the Original Issue Date being deemed the “Share Delivery Date” with respect to any such Notice(s) of Conversion.

ii. Failure to Deliver Conversion Shares. If, in the case of any Notice of Conversion, such Conversion Shares are not delivered to or as directed by the applicable Holder by the Share Delivery Date, the Holder shall be entitled to elect by written notice to the Corporation at any time on or before its receipt of such Conversion Shares, to rescind such Conversion, in which event the Corporation shall promptly return to the Holder any original Preferred Stock certificate delivered to the Corporation and the Holder shall promptly return to the Corporation the Conversion Shares issued to such Holder pursuant to the rescinded Notice of Conversion.

iii. Obligation Absolute; Partial Liquidated Damages. The Corporation’s obligation to issue and deliver the Conversion Shares upon conversion of Preferred Stock in accordance with the terms hereof are absolute and unconditional, irrespective of any action or inaction by a Holder to enforce the same, any waiver or consent with respect to any provision hereof, the recovery of any judgment against any Person or any action to enforce the same, or any setoff, counterclaim, recoupment, limitation or termination, or any breach or alleged breach by such Holder or any other Person of any obligation to the Corporation or any violation or alleged violation of law by such Holder or any other person, and irrespective of any other circumstance which might otherwise limit such obligation of the Corporation to such Holder in connection with the issuance of such Conversion Shares; provided, however, that such delivery shall not operate as a waiver by the Corporation of any such action that the Corporation may have against such Holder. In the event a Holder shall elect to convert any or all of the Stated Value of its Preferred Stock, the Corporation may not refuse conversion based on any claim that such Holder or any one associated or affiliated with such Holder has been engaged in any violation of law, agreement or for any other reason, unless an injunction from a court, on notice to Holder, restraining and/or enjoining conversion of all or part of the Preferred Stock of such Holder shall have been sought and obtained, and the Corporation posts a surety bond for the benefit of such Holder in the amount of 150% of the Stated Value of Preferred Stock which is subject to the injunction, which bond shall remain in effect until the completion of arbitration/litigation of the underlying dispute and the proceeds of which shall be payable to such Holder to the extent it obtains judgment. In the absence of such injunction, the Corporation shall issue Conversion Shares and, if applicable, cash, upon a properly noticed conversion. If the Corporation fails to deliver to a Holder such Conversion Shares pursuant to Section 6(c)(i) by the Share Delivery Date applicable to such conversion, the Corporation shall pay to such Holder, in cash, as liquidated damages and not as a penalty, for each \$5,000 of Stated Value of Preferred Stock being converted, \$50 per Trading Day (increasing to



\$100 per Trading Day on the third Trading Day and increasing to \$200 per Trading Day on the sixth Trading Day after such damages begin to accrue) for each Trading Day after the Share Delivery Date until such Conversion Shares are delivered or Holder rescinds such conversion. Nothing herein shall limit a Holder's right to pursue actual damages for the Corporation's failure to deliver Conversion Shares within the period specified herein and such Holder shall have the right to pursue all remedies available to it hereunder, at law or in equity including, without limitation, a decree of specific performance and/or injunctive relief. The exercise of any such rights shall not prohibit a Holder from seeking to enforce damages pursuant to any other Section hereof or under applicable law.

iv. Compensation for Buy-In on Failure to Timely Deliver Conversion Shares Upon Conversion. In addition to any other rights available to the Holder, if the Corporation fails for any reason to deliver to a Holder the applicable Conversion Shares by the Share Delivery Date pursuant to Section 6(c)(i), and if after such Share Delivery Date such Holder is required by its brokerage firm to purchase (in an open market transaction or otherwise), or the Holder's brokerage firm otherwise purchases, shares of Common Stock to deliver in satisfaction of a sale by such Holder of the Conversion Shares which such Holder was entitled to receive upon the conversion relating to such Share Delivery Date (a "Buy-In"), then the Corporation shall (A) pay in cash to such Holder (in addition to any other remedies available to or elected by such Holder) the amount, if any, by which (x) such Holder's total purchase price (including any brokerage commissions) for the Common Stock so purchased exceeds (y) the product of (1) the aggregate number of shares of Common Stock that such Holder was entitled to receive from the conversion at issue multiplied by (2) the actual sale price at which the sell order giving rise to such purchase obligation was executed (including any brokerage commissions) and (B) at the option of such Holder, either reissue (if surrendered) the shares of Preferred Stock equal to the number of shares of Preferred Stock submitted for conversion (in which case, such conversion shall be deemed rescinded) or deliver to such Holder the number of shares of Common Stock that would have been issued if the Corporation had timely complied with its delivery requirements under Section 6(c)(i). For example, if a Holder purchases shares of Common Stock having a total purchase price of \$11,000 to cover a Buy-In with respect to an attempted conversion of shares of Preferred Stock with respect to which the actual sale price of the Conversion Shares (including any brokerage commissions) giving rise to such purchase obligation was a total of \$10,000 under clause (A) of the immediately preceding sentence, the Corporation shall be required to pay such Holder \$1,000. The Holder shall provide the Corporation written notice indicating the amounts payable to such Holder in respect of the Buy-In and, upon request of the Corporation, evidence of the amount of such loss. Nothing herein shall limit a Holder's right to pursue any other remedies available to it hereunder, at law or in equity including, without limitation, a decree of specific performance and/or injunctive relief with respect to the Corporation's failure to timely deliver Conversion Shares upon conversion of the shares of Preferred Stock as required pursuant to the terms hereof.

v. Reservation of Shares Issuable Upon Conversion. The Corporation covenants that it will at all times reserve and keep available out of its authorized and unissued shares of Common Stock for the sole purpose of issuance upon conversion of the Preferred Stock as herein provided, free from preemptive rights or any other actual contingent purchase rights of Persons other than the Holder (and the other holders of the Preferred Stock), not less than such aggregate number of shares of the Common Stock as shall be issuable (taking into account the adjustments and restrictions of Section 7) upon the conversion of the then outstanding shares of Preferred Stock. The Corporation covenants that all shares of Common Stock that shall be so issuable shall, upon issue, be duly authorized, validly issued, fully paid and nonassessable.

vi. Fractional Shares. No fractional shares or scrip representing fractional shares shall be issued upon the conversion of the Preferred Stock. As to any fraction of a share which the Holder would otherwise be entitled to purchase upon such conversion, the Corporation shall at its election, either pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the Conversion Price or round up to the next whole share. Notwithstanding anything to the contrary contained herein, but consistent with the provisions of this subsection with respect to fractional Conversion Shares, nothing shall prevent any Holder from converting fractional shares of Preferred Stock.

vii. Transfer Taxes and Expenses. The issuance of Conversion Shares on conversion of this Preferred Stock shall be made without charge to any Holder for any documentary stamp or similar taxes that may be payable in respect of the issue or delivery of such Conversion Shares, provided that the Corporation shall not be required to pay any tax that may be payable in respect of any transfer involved in the issuance and delivery of any such Conversion Shares upon conversion in a name other than that of the Holders of such shares of Preferred Stock and the Corporation shall not be required to issue or deliver such Conversion Shares unless or until the Person or Persons requesting the issuance thereof shall have paid to the Corporation the amount of such tax or shall have established to the satisfaction of the Corporation that such tax has been paid. The Corporation shall pay all Transfer Agent fees required for same-day processing of any Notice of Conversion and all fees to the Depository Trust Company (or another established clearing corporation performing similar functions) required for same-day electronic delivery of the Conversion Shares.

d) Beneficial Ownership Limitation. The Corporation shall not effect any conversion of the Preferred Stock, and a Holder shall not have the right to convert any portion of the Preferred Stock, to the extent that, after giving effect to the conversion set forth on the applicable Notice of Conversion, such Holder (together with such Holder's Affiliates, and any Persons acting as a group together with such Holder or any of such Holder's Affiliates (such Persons, "Attribution Parties")) would beneficially own in excess of the Beneficial Ownership Limitation (as defined below). For purposes of the foregoing sentence, the number of shares of Common Stock beneficially owned by such Holder and its Affiliates and Attribution Parties shall include the number of shares of Common Stock issuable upon conversion of the Preferred Stock with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which are issuable upon (i) conversion of the remaining, unconverted Stated Value of Preferred Stock beneficially owned by such Holder or any of its Affiliates or Attribution Parties and (ii) exercise or conversion of the unexercised or unconverted portion of any other securities of the Corporation subject to a limitation on conversion or exercise analogous to the limitation contained herein (including, without limitation, the Preferred Stock) beneficially owned by such Holder or any of its Affiliates or Attribution Parties. Except as set forth in the preceding sentence, for purposes of this Section 6(d), beneficial ownership shall be calculated in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder. To the extent that the limitation contained in this Section 6(d) applies, the determination of whether the Preferred Stock is convertible (in relation to other securities owned by such Holder together with any Affiliates and Attribution Parties) and of how many shares of Preferred Stock are convertible shall be in the sole discretion of such Holder, and the submission of a Notice of Conversion shall be deemed to be such Holder's determination of whether the shares of Preferred Stock may be converted (in relation to other securities owned by such Holder together with any Affiliates and Attribution Parties) and how many shares of the Preferred Stock are convertible, in each case subject to the Beneficial Ownership Limitation. To ensure compliance with this restriction, each Holder will be deemed to represent to the Corporation each time it delivers a Notice of Conversion that such Notice of Conversion has not violated the restrictions set forth in this paragraph and the Corporation shall have no obligation to verify or confirm the accuracy of such determination. In addition, a determination as to any group status as contemplated above shall be determined in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder. For purposes of this Section 6(d), in determining the number of outstanding shares of Common Stock, a Holder may rely on the number of outstanding shares of Common Stock as stated in the most recent of the following: (i) the Corporation's most recent periodic or annual report filed with the Commission, as the case may be, (ii) a more recent public announcement by the Corporation or (iii) a more recent written notice by the Corporation or the Transfer Agent setting forth the number of shares of Common Stock outstanding. Upon the written or oral request (which may be via email) of a Holder, the Corporation shall within two Trading Days confirm orally and in writing to such Holder the number of shares of Common Stock then outstanding. In any case, the number of outstanding shares of Common Stock shall be determined after giving effect to the conversion or exercise of securities of the Corporation, including the Preferred Stock, by such Holder or its Affiliates or Attribution Parties since the date as of which such number of outstanding shares of Common Stock was reported. The "Beneficial Ownership Limitation" shall be 4.99% (or, upon election by a Holder prior to the issuance of any shares of Preferred Stock, 9.99%) of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock issuable upon conversion of Preferred Stock held by the applicable Holder. A Holder, upon notice to the Corporation, may increase or decrease the Beneficial Ownership Limitation provisions of this Section 6(d) applicable to its Preferred Stock provided that the Beneficial Ownership Limitation in no event exceeds 9.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock upon conversion of this Preferred Stock held by the Holder and the provisions of this Section 6(d) shall continue to apply. Any such increase in the Beneficial Ownership Limitation will not be effective until the 61<sup>st</sup> day after such notice is delivered to the Corporation and shall only apply to such Holder and no other Holder. The provisions of this paragraph shall be construed and implemented in a manner otherwise than in strict conformity with the terms of this Section 6(d) to correct this paragraph (or any portion hereof) which may be defective or inconsistent with the intended Beneficial Ownership Limitation contained herein or to make changes or supplements necessary or desirable to properly give effect to such limitation. The limitations contained in this paragraph shall apply to a successor holder of Preferred Stock.

e) **Forced Conversion.** Notwithstanding anything herein to the contrary, if after the Original Issue Date, the VWAP during any twenty (20) of thirty (30) consecutive Trading Day period, which thirty (30) consecutive Trading Day period shall have commenced only after the Original Issue Date (the “**Threshold Period**”), exceeds \$\_\_\_\_\_<sup>3</sup> (subject to adjustment for forward and reverse stock splits, recapitalizations, stock dividends and the like after the Original Issue Date) and (ii) the average daily dollar trading volume for such Threshold Period exceeds \$200,000 per Trading Day, the Corporation may, within one (1) Trading Day after the end of any such Threshold Period, deliver a written notice to all Holders (a “**Forced Conversion Notice**” and the date such notice is delivered to all Holders, the “**Forced Conversion Notice Date**”) to cause each Holder to convert all or part of such Holder’s Preferred Stock (as specified in such Forced Conversion Notice) pursuant to Section 6, it being agreed that the “**Conversion Date**” for purposes of Section 6 shall be deemed to occur on the third Trading Day following the Forced Conversion Notice Date (such third Trading Day, the “**Forced Conversion Date**”). The Corporation may not deliver a Forced Conversion Notice, and any Forced Conversion Notice delivered by the Corporation shall not be effective, unless all of the Equity Conditions have been met on each Trading Day during the applicable Threshold Period through and including the later of the Forced Conversion Date and the Trading Day after the date that the Conversion Shares issuable pursuant to such conversion are actually delivered to the Holders pursuant to the Forced Conversion Notice. Any Forced Conversion Notices shall be applied ratably to all of the Holders based on the then outstanding shares of Preferred Stock. For purposes of clarification, a Forced Conversion shall be subject to all of the provisions of Section 6, including, without limitation, the provisions requiring payment of liquidated damages and limitations on conversions.

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<sup>3</sup> 300% of the Conversion Price

a)      Stock Dividends and Stock Splits. If the Corporation, at any time while this Preferred Stock is outstanding: (i) pays a stock dividend or otherwise makes a distribution or distributions payable in shares of Common Stock on shares of Common Stock or any other Common Stock Equivalents (which, for avoidance of doubt, shall not include any shares of Common Stock issued by the Corporation upon conversion of, or payment of a dividend on, this Preferred Stock), (ii) subdivides outstanding shares of Common Stock into a larger number of shares, (iii) combines (including by way of a reverse stock split) outstanding shares of Common Stock into a smaller number of shares, or (iv) issues, in the event of a reclassification of shares of the Common Stock, any shares of capital stock of the Corporation, then the Conversion Price shall be multiplied by a fraction of which the numerator shall be the number of shares of Common Stock (excluding any treasury shares of the Corporation) outstanding immediately before such event, and of which the denominator shall be the number of shares of Common Stock outstanding immediately after such event. Any adjustment made pursuant to this Section 7(a) shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution and shall become effective immediately after the effective date in the case of a subdivision, combination or re-classification.

b)      Subsequent Rights Offerings. In addition to any adjustments pursuant to Section 7(a) above, if at any time the Corporation grants, issues or sells any Common Stock Equivalents or rights to purchase stock, warrants, securities or other property pro rata to the record holders of any class of shares of Common Stock (the "Purchase Rights"), then the Holder will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which the Holder could have acquired if the Holder had held the number of shares of Common Stock acquirable upon complete conversion of such Holder's Preferred Stock (without regard to any limitations on exercise hereof, including without limitation, the Beneficial Ownership Limitation) immediately before the date on which a record is taken for the grant, issuance or sale of such Purchase Rights, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the grant, issue or sale of such Purchase Rights (provided, however, to the extent that the Holder's right to participate in any such Purchase Right would result in the Holder exceeding the Beneficial Ownership Limitation, then the Holder shall not be entitled to participate in such Purchase Right to such extent (or beneficial ownership of such shares of Common Stock as a result of such Purchase Right to such extent) and such Purchase Right to such extent shall be held in abeyance for the Holder until such time, if ever, as its right thereto would not result in the Holder exceeding the Beneficial Ownership Limitation).

c) Pro Rata Distributions. During such time as this Preferred Stock is outstanding, if the Corporation declares or makes any dividend or other distribution of its assets (or rights to acquire its assets) to holders of shares of Common Stock, by way of return of capital or otherwise (including, without limitation, any distribution of cash, stock or other securities, property or options by way of a dividend, spin off, reclassification, corporate rearrangement, scheme of arrangement or other similar transaction) (a “Distribution”), at any time after the issuance of this Preferred Stock, then, in each such case, the Holder shall be entitled to participate in such Distribution to the same extent that the Holder would have participated therein if the Holder had held the number of shares of Common Stock acquirable upon complete conversion of this Preferred Stock (without regard to any limitations on conversion hereof, including without limitation, the Beneficial Ownership Limitation) immediately before the date of which a record is taken for such Distribution, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the participation in such Distribution (provided, however, to the extent that the Holder's right to participate in any such Distribution would result in the Holder exceeding the Beneficial Ownership Limitation, then the Holder shall not be entitled to participate in such Distribution to such extent (or in the beneficial ownership of any shares of Common Stock as a result of such Distribution to such extent) and the portion of such Distribution shall be held in abeyance for the benefit of the Holder until such time, if ever, as its right thereto would not result in the Holder exceeding the Beneficial Ownership Limitation).

d) Fundamental Transaction. If, at any time while this Preferred Stock is outstanding, (i) the Corporation, directly or indirectly, in one or more related transactions effects any merger or consolidation of the Corporation with or into another Person, (ii) the Corporation, directly or indirectly, effects any sale, lease, license, assignment, transfer, conveyance or other disposition of all or substantially all of its assets in one or a series of related transactions, (iii) any, direct or indirect, purchase offer, tender offer or exchange offer (whether by the Corporation or another Person) is completed pursuant to which holders of Common Stock are permitted to sell, tender or exchange their shares for other securities, cash or property and has been accepted by the holders of 50% or more of the outstanding Common Stock, (iv) the Corporation, directly or indirectly, in one or more related transactions effects any reclassification, reorganization or recapitalization of the Common Stock or any compulsory share exchange pursuant to which the Common Stock is effectively converted into or exchanged for other securities, cash or property, or (v) the Corporation, directly or indirectly, in one or more related transactions consummates a stock or share purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spin-off or scheme of arrangement) with another Person whereby such other Person acquires more than 50% of the outstanding shares of Common Stock (not including any shares of Common Stock held by the other Person or other Persons making or party to, or associated or affiliated with the other Persons making or party to, such stock or share purchase agreement or other business combination) (each a “Fundamental Transaction”), then, upon any subsequent conversion of this Preferred Stock, the Holder shall have the right to receive, for each Conversion Share that would have been issuable upon such conversion immediately prior to the occurrence of such Fundamental Transaction (without regard to any limitation in Section 6(d) on the conversion of this Preferred Stock), the number of shares of Common Stock of the successor or acquiring corporation or of the Corporation, if it is the surviving corporation, and any additional consideration (the “Alternate Consideration”) receivable as a result of such Fundamental Transaction by a holder of the number of shares of Common Stock for which this Preferred Stock is convertible immediately prior to such Fundamental Transaction (without regard to any limitation in Section 6(d) on the conversion of this Preferred Stock). For purposes of any such conversion, the determination of the Conversion Price shall be appropriately adjusted to apply to such Alternate Consideration based on the amount of Alternate Consideration issuable in respect of one share of Common Stock in such Fundamental Transaction, and the Corporation shall apportion the Conversion Price among the Alternate Consideration in a reasonable manner reflecting the relative value of any different components of the Alternate Consideration. If holders of Common Stock are given any choice as to the securities, cash or property to be received in a Fundamental Transaction, then the Holder shall be given the same choice as to the Alternate Consideration it receives upon any conversion of this Preferred Stock following such Fundamental Transaction. To the extent necessary to effectuate the foregoing provisions, any successor to the Corporation or surviving entity in such Fundamental Transaction shall file a new Certificate of Designation with the same terms and conditions and issue to the Holders new preferred stock consistent with the

foregoing provisions and evidencing the Holders' right to convert such preferred stock into Alternate Consideration. The Corporation shall cause any successor entity in a Fundamental Transaction in which the Corporation is not the survivor (the "Successor Entity") to assume in writing all of the obligations of the Corporation under this Certificate of Designation in accordance with the provisions of this Section 7(d) pursuant to written agreements in form and substance reasonably satisfactory to the Holder and approved by the Holder (without unreasonable delay) prior to such Fundamental Transaction and shall, at the option of the holder of this Preferred Stock, deliver to the Holder in exchange for this Preferred Stock a security of the Successor Entity evidenced by a written instrument substantially similar in form and substance to this Preferred Stock which is convertible for a corresponding number of shares of capital stock of such Successor Entity (or its parent entity) equivalent to the shares of Common Stock acquirable and receivable upon conversion of this Preferred Stock (without regard to any limitations on the conversion of this Preferred Stock) prior to such Fundamental Transaction, and with a conversion price which applies the conversion price hereunder to such shares of capital stock (but taking into account the relative value of the shares of Common Stock pursuant to such Fundamental Transaction and the value of such shares of capital stock, such number of shares of capital stock and such conversion price being for the purpose of protecting the economic value of this Preferred Stock immediately prior to the consummation of such Fundamental Transaction), and which is reasonably satisfactory in form and substance to the Holder. Upon the occurrence of any such Fundamental Transaction, the Successor Entity shall succeed to, and be substituted for (so that from and after the date of such Fundamental Transaction, the provisions of this Certificate of Designation referring to the "Corporation" shall refer instead to the Successor Entity), and may exercise every right and power of the Corporation and shall assume all of the obligations of the Corporation under this Certificate of Designation with the same effect as if such Successor Entity had been named as the Corporation herein.

e) Calculations. All calculations under this Section 7 shall be made to the nearest cent or the nearest 1/100th of a share, as the case may be. For purposes of this Section 7, the number of shares of Common Stock deemed to be issued and outstanding as of a given date shall be the sum of the number of shares of Common Stock (excluding any treasury shares of the Corporation) issued and outstanding.

f) Notice to the Holders.

i. Adjustment to Conversion Price. Whenever the Conversion Price is adjusted pursuant to any provision of this Section 7, the Corporation shall promptly deliver to each record Holder by facsimile or email a notice setting forth the Conversion Price after such adjustment and setting forth a brief statement of the facts requiring such adjustment.

ii. Notice to Allow Conversion by Holder. If (A) the Corporation shall declare a dividend (or any other distribution in whatever form) on the Common Stock, (B) the Corporation shall declare a special nonrecurring cash dividend on or a redemption of the Common Stock, (C) the Corporation shall authorize the granting to all holders of the Common Stock of rights or warrants to subscribe for or purchase any shares of capital stock of any class or of any rights, (D) the approval of any stockholders of the Corporation shall be required in connection with any reclassification of the Common Stock, any consolidation or merger to which the Corporation is a party, any sale or transfer of all or substantially all of the assets of the Corporation, or any compulsory share exchange whereby the Common Stock is converted into other securities, cash or property or (E) the Corporation shall authorize the voluntary or involuntary dissolution, liquidation or winding up of the affairs of the Corporation, then, in each case, the Corporation shall cause to be filed at each office or agency maintained for the purpose of conversion of this Preferred Stock, and shall cause to be delivered by facsimile or email to each record Holder at its last facsimile number or email address as it shall appear upon the stock books of the Corporation, at least twenty (20) calendar days prior to the applicable record or effective date hereinafter specified, a notice stating (x) the date on which a record is to be taken for the purpose of such dividend, distribution, redemption, rights or warrants, or if a record is not to be taken, the date as of which the holders of the Common Stock of record to be entitled to such dividend, distributions, redemption, rights or warrants are to be determined or (y) the date on which such reclassification, consolidation, merger, sale, transfer or share exchange is expected to become effective or close, and the date as of which it is expected that holders of the Common Stock of record shall be entitled to exchange their shares of the Common Stock for securities, cash or other property deliverable upon such reclassification, consolidation, merger, sale, transfer or share exchange, provided that the failure to deliver such notice or any defect therein or in the delivery thereof shall not affect the validity of the corporate action required to be specified in such notice. To the extent that any notice provided hereunder constitutes, or contains, material, non-public information regarding the Corporation or any of the Subsidiaries, the Corporation shall simultaneously file such notice with the Commission pursuant to a Current Report on Form 8-K. The Holder shall remain entitled to convert the Conversion Amount of this Preferred Stock (or any part hereof) during the 20-day period commencing on the date of such notice through the effective date of the event triggering such notice except as may otherwise be expressly set forth herein.



a) Notices. Any and all notices or other communications or deliveries to be provided by the Holders hereunder including, without limitation, any Notice of Conversion, shall be in writing and delivered personally, by facsimile, or sent by a nationally recognized overnight courier service, addressed to the Corporation, at the address set forth above Attention: Claudia Drayton, facsimile number 952.224.0181, email address [Claudia.Drayton@chf-solutions.com](mailto:Claudia.Drayton@chf-solutions.com) or such other facsimile number, email address or address as the Corporation may specify for such purposes by notice to the Holders delivered in accordance with this Section 8. Any and all notices or other communications or deliveries to be provided by the Corporation hereunder shall be in writing and delivered personally, by facsimile, by email, or sent by a nationally recognized overnight courier service addressed to each record Holder at the facsimile number, email address or address of such Holder appearing on the books of the Corporation. Any notice or other communication or deliveries hereunder shall be deemed given and effective on the earliest of (i) the time of transmission, if such notice or communication is delivered via facsimile at the facsimile number or email at the email address set forth in this Section 8 prior to 5:30 p.m. (New York City time) on any date, (ii) the next Trading Day after the time of transmission, if such notice or communication is delivered via facsimile at the facsimile number or email at the email address set forth in this Section on a day that is not a Trading Day or later than 5:30 p.m. (New York City time) on any Trading Day, (iii) the second Trading Day following the date of mailing, if sent by U.S. nationally recognized overnight courier service, or (iv) upon actual receipt by the party to whom such notice is required to be given.

b) Absolute Obligation. Except as expressly provided herein, no provision of this Certificate of Designation shall alter or impair the obligation of the Corporation, which is absolute and unconditional, to pay liquidated damages and accrued dividends, as applicable, on the shares of Preferred Stock at the time, place, and rate, and in the coin or currency, herein prescribed.

c) Lost or Mutilated Preferred Stock Certificate. If a Holder's Preferred Stock certificate shall be mutilated, lost, stolen or destroyed, the Corporation shall execute and deliver, in exchange and substitution for and upon cancellation of a mutilated certificate, or in lieu of or in substitution for a lost, stolen or destroyed certificate, a new certificate for the shares of Preferred Stock so mutilated, lost, stolen or destroyed, but only upon receipt of evidence of such loss, theft or destruction of such certificate, and of the ownership hereof reasonably satisfactory to the Corporation.

d) Governing Law. All questions concerning the construction, validity, enforcement and interpretation of this Certificate of Designation shall be governed by and construed and enforced in accordance with the internal laws of the State of Delaware, without regard to the principles of conflict of laws thereof. All legal proceedings concerning the interpretation, enforcement and defense of the transactions contemplated by this Certificate of Designation (whether brought against a party hereto or its respective Affiliates, directors, officers, shareholders, employees or agents) shall be commenced in the state and federal courts sitting in the City of New York, Borough of Manhattan (the “New York Courts”). The Corporation and each Holder hereby irrevocably submits to the exclusive jurisdiction of the New York Courts for the adjudication of any dispute hereunder or in connection herewith or with any transaction contemplated hereby or discussed herein, and hereby irrevocably waives, and agrees not to assert in any suit, action or proceeding, any claim that it is not personally subject to the jurisdiction of such New York Courts, or such New York Courts are improper or inconvenient venue for such proceeding. The Corporation and each Holder hereby irrevocably waive personal service of process and consents to process being served in any such suit, action or proceeding by mailing a copy thereof via registered or certified mail or overnight delivery (with evidence of delivery) to such party at the address in effect for notices to it under this Certificate of Designation and agrees that such service shall constitute good and sufficient service of process and notice thereof. Nothing contained herein shall be deemed to limit in any way any right to serve process in any other manner permitted by applicable law. The Corporation and each Holder hereto hereby irrevocably waive, to the fullest extent permitted by applicable law, any and all right to trial by jury in any legal proceeding arising out of or relating to this Certificate of Designation or the transactions contemplated hereby. If any party shall commence an action or proceeding to enforce any provisions of this Certificate of Designation, then the prevailing party in such action or proceeding shall be reimbursed by the other party for its attorneys’ fees and other costs and expenses incurred in the investigation, preparation and prosecution of such action or proceeding.

e) Waiver. Any waiver by the Corporation or a Holder of a breach of any provision of this Certificate of Designation shall not operate as or be construed to be a waiver of any other breach of such provision or of any breach of any other provision of this Certificate of Designation or a waiver by any other Holders. The failure of the Corporation or a Holder to insist upon strict adherence to any term of this Certificate of Designation on one or more occasions shall not be considered a waiver or deprive that party (or any other Holder) of the right thereafter to insist upon strict adherence to that term or any other term of this Certificate of Designation on any other occasion. Any waiver by the Corporation or a Holder must be in writing.

f) Severability. If any provision of this Certificate of Designation is invalid, illegal or unenforceable, the balance of this Certificate of Designation shall remain in effect, and if any provision is inapplicable to any Person or circumstance, it shall nevertheless remain applicable to all other Persons and circumstances. If it shall be found that any interest or other amount deemed interest due hereunder violates the applicable law governing usury, the applicable rate of interest due hereunder shall automatically be lowered to equal the maximum rate of interest permitted under applicable law.

g) Next Business Day. Whenever any payment or other obligation hereunder shall be due on a day other than a Business Day, such payment shall be made on the next succeeding Business Day.

h) Headings. The headings contained herein are for convenience only, do not constitute a part of this Certificate of Designation and shall not be deemed to limit or affect any of the provisions hereof.

i) Status of Converted or Redeemed Preferred Stock. If any shares of Preferred Stock shall be converted, redeemed or reacquired by the Corporation, such shares shall resume the status of authorized but unissued shares of preferred stock and shall no longer be designated as Series H Convertible Preferred Stock.

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RESOLVED, FURTHER, that the Chairman, the president or any vice-president, and the secretary or any assistant secretary, of the Corporation be and they hereby are authorized and directed to prepare and file this Certificate of Designation of Preferences, Rights and Limitations in accordance with the foregoing resolution and the provisions of Delaware law.

IN WITNESS WHEREOF, the undersigned have executed this Certificate this \_\_\_\_ day of \_\_\_\_\_, 2019.

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Name:  
Title:

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Name:  
Title:

ANNEX A

NOTICE OF CONVERSION

(TO BE EXECUTED BY THE REGISTERED HOLDER IN ORDER TO CONVERT  
SHARES OF PREFERRED STOCK)

The undersigned hereby elects to convert the number of shares of Series H Convertible Preferred Stock indicated below into shares of common stock, par value \$0.0001 per share (the "Common Stock"), of CHF Solutions, Inc., a Delaware corporation (the "Corporation"), according to the conditions hereof, as of the date written below. If shares of Common Stock are to be issued in the name of a Person other than the undersigned, the undersigned will pay all transfer taxes payable with respect thereto. No fee will be charged to the Holders for any conversion, except for any such transfer taxes.

Conversion calculations:

Date to Effect Conversion: \_\_\_\_\_

Number of shares of Preferred Stock owned prior to Conversion: \_\_\_\_\_

Number of shares of Preferred Stock to be Converted: \_\_\_\_\_

Stated Value of shares of Preferred Stock to be Converted: \_\_\_\_\_

Number of shares of Common Stock to be Issued: \_\_\_\_\_

Applicable Conversion Price: \_\_\_\_\_

Number of shares of Preferred Stock subsequent to Conversion: \_\_\_\_\_

Address for Delivery: \_\_\_\_\_

or

DWAC Instructions:

Broker no: \_\_\_\_\_

Account no: \_\_\_\_\_

[HOLDER]

By: \_\_\_\_\_

Name:

Title:

## COMMON STOCK PURCHASE WARRANT

## CHF SOLUTIONS, INC.

Warrant Shares: \_\_\_\_\_

Initial Exercise Date: \_\_\_\_\_

CUSIP: \_\_\_\_\_

ISIN: \_\_\_\_\_

THIS COMMON STOCK PURCHASE WARRANT (the "Warrant") certifies that, for value received, CEDE & CO. or its assigns (the "Holder") is entitled, upon the terms and subject to the limitations on exercise and the conditions hereinafter set forth, at any time on or after the date hereof (the "Initial Exercise Date") and on or prior to 5:00 p.m. (New York City time) on \_\_\_\_\_, 20\_\_ (the "Termination Date") but not thereafter, to subscribe for and purchase from CHF Solutions, Inc., a Delaware corporation (the "Company"), up to \_\_\_\_\_ shares (as subject to adjustment hereunder, the "Warrant Shares") of the Company's common stock ("Common Stock"). The purchase price of one share of Common Stock under this Warrant shall be equal to the Exercise Price, as defined in Section 2(b). This Warrant shall initially be issued and maintained in the form of a security held in book-entry form and the Depository Trust Company or its nominee ("DTC") shall initially be the sole registered holder of this Warrant, subject to a Holder's right to elect to receive a Warrant in certificated form pursuant to the terms of the Warrant Agency Agreement, in which case this sentence shall not apply.

Section 1. Definitions. In addition to the terms defined elsewhere in this Warrant, the following terms have the meanings indicated in this Section 1:

"Affiliate" means any Person that, directly or indirectly through one or more intermediaries, controls or is controlled by or is under common control with a Person, as such terms are used in and construed under Rule 405 under the Securities Act.

"Bid Price" means, for any date, the price determined by the first of the following clauses that applies: (a) if the Common Stock is then listed or quoted on a Trading Market, the bid price of the Common Stock for the time in question (or the nearest preceding date) on the Trading Market on which the Common Stock is then listed or quoted as reported by Bloomberg L.P. (based on a Trading Day from 9:30 a.m. (New York City time) to 4:02 p.m. (New York City time)), (b) if OTCQB or OTCQX is not a Trading Market, the volume weighted average price of the Common Stock for such date (or the nearest preceding date) on OTCQB or OTCQX as applicable, (c) if the Common Stock is not then listed or quoted for trading on OTCQB or OTCQX and if prices for the Common Stock are then reported on the Pink Open Market (or a similar organization or agency succeeding to its functions of reporting prices), the most recent bid price per share of the Common Stock so reported, or (d) in all other cases, the fair market value of a share of Common Stock as determined by an independent appraiser selected in good faith by the Holders of a majority in interest of the Warrants then outstanding and reasonably acceptable to the Company, the fees and expenses of which shall be paid by the Company.

“Board of Directors” means the board of directors of the Company.

“Business Day” means any day except any Saturday, any Sunday, any day which is a federal legal holiday in the United States or any day on which banking institutions in the State of New York are authorized or required by law or other governmental action to close.

“Commission” means the United States Securities and Exchange Commission.

“Common Stock Equivalents” means any securities of the Company or the Subsidiaries which would entitle the holder thereof to acquire at any time Common Stock, including, without limitation, any debt, preferred stock, right, option, warrant or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock.

“Exchange Act” means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

“Person” means an individual or corporation, partnership, trust, incorporated or unincorporated association, joint venture, limited liability company, joint stock company, government (or an agency or subdivision thereof) or other entity of any kind.

“Registration Statement” means the Company’s registration statement on Form S-1 (File No. 333-235385).

“Securities Act” means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

“Trading Day” means a day on which the Common Stock is traded on a Trading Market.

“Trading Market” means any of the following markets or exchanges on which the Common Stock is listed or quoted for trading on the date in question: the NYSE American, the Nasdaq Capital Market, the Nasdaq Global Market, the Nasdaq Global Select Market or the New York Stock Exchange (or any successors to any of the foregoing).

“Transfer Agent” means American Stock Transfer & Trust Company, the current transfer agent of the Company, with a mailing address of 59 Maiden Lane, New York, New York and a facsimile number of 718-236-4588, and any successor transfer agent of the Company.

“VWAP” means, for any date, the price determined by the first of the following clauses that applies: (a) if the Common Stock is then listed or quoted on a Trading Market, the daily volume weighted average price of the Common Stock for such date (or the nearest preceding date) on the Trading Market on which the Common Stock is then listed or quoted as reported by Bloomberg L.P. (based on a Trading Day from 9:30 a.m. (New York City time) to 4:02 p.m. (New York City time)), (b) if OTCQB or OTCQX is not a Trading Market, the volume weighted average price of the Common Stock for such date (or the nearest preceding date) on OTCQB or OTCQX as applicable, (c) if the Common Stock is not then listed or quoted for trading on OTCQB or OTCQX and if prices for the Common Stock are then reported on the Pink Open Market (or a similar organization or agency succeeding to its functions of reporting prices), the most recent bid price per share of the Common Stock so reported, or (d) in all other cases, the fair market value of a share of Common Stock as determined by an independent appraiser selected in good faith by the holders of a majority in interest of the Warrants then outstanding and reasonably acceptable to the Company, the fees and expenses of which shall be paid by the Company.

“Warrant Agency Agreement” means that certain warrant agency agreement, dated on or about the Initial Exercise Date, between the Company and the Warrant Agent.

“Warrant Agent” means the Transfer Agent and any successor warrant agent of the Company.

“Warrants” means this Warrant and other Common Stock purchase warrants issued by the Company pursuant to the Registration Statement.

## Section 2. Exercise.

a) Exercise of Warrant. Exercise of the purchase rights represented by this Warrant may be made, in whole or in part, at any time or times on or after the Initial Exercise Date and on or before the Termination Date by delivery to the Company or Warrant Agent (or such other office or agency of the Company as it may designate by notice in writing to the registered Holder at the address of the Holder appearing on the books of the Company) of a duly executed facsimile copy (or e-mail attachment) of the Notice of Exercise in the form annexed hereto (the “Notice of Exercise”). Within the earlier of (i) two (2) Trading Days and (ii) the number of Trading Days comprising the Standard Settlement Period (as defined in Section 2(d)(i) herein) following the date of exercise as aforesaid, the Holder shall deliver the aggregate Exercise Price for the shares specified in the applicable Notice of Exercise by wire transfer or cashier’s check drawn on a United States bank unless the cashless exercise procedure specified in Section 2(c) below is specified in the applicable Notice of Exercise. No ink-original Notice of Exercise shall be required, nor shall any medallion guarantee (or other type of guarantee or notarization) of any Notice of Exercise form be required. Notwithstanding anything herein to the contrary, the Holder shall not be required to physically surrender this Warrant to the Company until the Holder has purchased all of the Warrant Shares available hereunder and the Warrant has been exercised in full, in which case, the Holder shall surrender this Warrant to the Company or Warrant Agent for cancellation within three (3) Trading Days of the date on which the final Notice of Exercise is delivered to the Company. Partial exercises of this Warrant resulting in purchases of a portion of the total number of Warrant Shares available hereunder shall have the effect of lowering the outstanding number of Warrant Shares purchasable hereunder in an amount equal to the applicable number of Warrant Shares purchased. The Holder and the Company shall maintain records showing the number of Warrant Shares purchased and the date of such purchases. The Company or Warrant Agent shall deliver any objection to any Notice of Exercise within one (1) Business Day of receipt of such notice. **The Holder and any assignee, by acceptance of this Warrant, acknowledge and agree that, by reason of the provisions of this paragraph, following the purchase of a portion of the Warrant Shares hereunder, the number of Warrant Shares available for purchase hereunder at any given time may be less than the amount stated on the face hereof.**



Notwithstanding the foregoing in this Section 2(a), a holder whose interest in this Warrant is a beneficial interest in certificate(s) representing this Warrant held in book-entry form through DTC (or another established clearing corporation performing similar functions), shall effect exercises made pursuant to this Section 2(a) by delivering to DTC (or such other clearing corporation, as applicable) the appropriate instruction form for exercise, complying with the procedures to effect exercise that are required by DTC (or such other clearing corporation, as applicable), subject to a Holder's right to elect to receive a Warrant in certificated form pursuant to the terms of the Warrant Agency Agreement, in which case this sentence shall not apply.

b) Exercise Price. The exercise price per share of the Common Stock under this Warrant shall be \$\_\_\_, subject to adjustment hereunder (the "Exercise Price").

c) Cashless Exercise. If at the time of exercise hereof there is no effective registration statement registering, or the prospectus contained therein is not available for the issuance of the Warrant Shares to the Holder, then this Warrant may also be exercised, in whole or in part, at such time by means of a "cashless exercise" in which the Holder shall be entitled to receive a number of Warrant Shares equal to the quotient obtained by dividing [(A-B) (X)] by (A), where:

(A) = as applicable: (i) the VWAP on the Trading Day immediately preceding the date of the applicable Notice of Exercise if such Notice of Exercise is (1) both executed and delivered pursuant to Section 2(a) hereof on a day that is not a Trading Day or (2) both executed and delivered pursuant to Section 2(a) hereof on a Trading Day prior to the opening of "regular trading hours" (as defined in Rule 600(b)(68) of Regulation NMS promulgated under the federal securities laws) on such Trading Day, (ii) at the option of the Holder, either (y) the VWAP on the Trading Day immediately preceding the date of the applicable Notice of Exercise or (z) the Bid Price of the Common Stock on the principal Trading Market as reported by Bloomberg L.P. as of the time of the Holder's execution of the applicable Notice of Exercise if such Notice of Exercise is executed during "regular trading hours" on a Trading Day and is delivered within two (2) hours thereafter (including until two (2) hours after the close of "regular trading hours" on a Trading Day) pursuant to Section 2(a) hereof or (iii) the VWAP on the date of the applicable Notice of Exercise if the date of such Notice of Exercise is a Trading Day and such Notice of Exercise is both executed and delivered pursuant to Section 2(a) hereof after the close of "regular trading hours" on such Trading Day;

(B) = the Exercise Price of this Warrant, as adjusted hereunder; and

(X) = the number of Warrant Shares that would be issuable upon exercise of this Warrant in accordance with the terms of this Warrant if such exercise were by means of a cash exercise rather than a cashless exercise.

In connection with clause (ii) in (A) above, upon written request of the Company, the Holder will provide evidence reasonably acceptable to the Company of the Bid Price of the Common Stock on the principal Trading Market that was reported by Bloomberg L.P. as of the time of the Holder's execution of the applicable Notice of Exercise.

If Warrant Shares are issued in such a cashless exercise, the parties acknowledge and agree that in accordance with Section 3(a)(9) of the Securities Act, the Warrant Shares shall take on the registered characteristics of the Warrants being exercised. The Company agrees not to take any position contrary to this Section 2(c).

Without limiting the rights of a Holder to receive Warrant Shares on a "cashless exercise" and without limiting the liquidated damages provision in Section 2(d)(i) and the buy-in provision in Section 2(d)(iv), in no event will the Company be required to net cash settle a Warrant exercise.

Notwithstanding anything herein to the contrary, on the Termination Date, this Warrant shall be automatically exercised via cashless exercise pursuant to this Section 2(c).

d) Mechanics of Exercise.

i. Delivery of Warrant Shares Upon Exercise. The Company shall cause the Warrant Shares purchased hereunder to be transmitted by the Transfer Agent to the Holder by crediting the account of the Holder's or its designee's balance account with The Depository Trust Company through its Deposit or Withdrawal at Custodian system ("DWAC") if the Company is then a participant in such system and either (A) there is an effective registration statement permitting the issuance of the Warrant Shares to or resale of the Warrant Shares by Holder or (B) this Warrant is being exercised via cashless exercise, and otherwise by physical delivery of a certificate, registered in the Company's share register in the name of the Holder or its designee, for the number of Warrant Shares to which the Holder is entitled pursuant to such exercise to the address specified by the Holder in the Notice of Exercise by the date that is the earliest of (i) two (2) Trading Days after the delivery to the Company or the Warrant Agent of the Notice of Exercise, (ii) one (1) Trading Day after delivery of the aggregate Exercise Price to the Company, and (iii) the number of Trading Days comprising the Standard Settlement Period after the delivery to the Company or the Warrant Agent of the Notice of Exercise (such date, the "Warrant Share Delivery Date"). Upon delivery of the Notice of Exercise, the Holder shall be deemed for all corporate purposes to have become the holder of record of the Warrant Shares with respect to which this Warrant has been exercised, irrespective of the date of delivery of the Warrant Shares, provided that payment of the aggregate Exercise Price (other than in the case of a cashless exercise) is received within the earlier of (i) two (2) Trading Days and (ii) the number of Trading Days comprising the Standard Settlement Period following delivery of the Notice of Exercise. If the Company fails for any reason to deliver to the Holder the Warrant Shares subject to a Notice of Exercise by the Warrant Share Delivery Date, the Company shall pay to the Holder, in cash, as liquidated damages and not as a penalty, for each \$1,000 of Warrant Shares subject to such exercise (based on the VWAP of the Common Stock on the date of the applicable Notice of Exercise), \$10 per Trading Day (increasing to \$20 per Trading Day on the fifth Trading Day after such liquidated damages begin to accrue) for each Trading Day after such Warrant Share Delivery Date until such Warrant Shares are delivered or Holder rescinds such exercise. The Company agrees to maintain a transfer agent that is a participant in the FAST program so long as this Warrant remains outstanding and exercisable. As used herein, "Standard Settlement Period" means the standard settlement period, expressed in a number of Trading Days, on the Company's primary Trading Market with respect to the Common Stock as in effect on the date of delivery of the Notice of Exercise.

ii. Delivery of New Warrants Upon Exercise. If this Warrant shall have been exercised in part, the Company shall, at the request of a Holder and upon surrender of this Warrant certificate, at the time of delivery of the Warrant Shares, deliver to the Holder a new Warrant evidencing the rights of the Holder to purchase the unpurchased Warrant Shares called for by this Warrant, which new Warrant shall in all other respects be identical with this Warrant.

iii. Rescission Rights. If the Company fails to cause the Transfer Agent to transmit to the Holder the Warrant Shares pursuant to Section 2(d)(i) by the Warrant Share Delivery Date, then the Holder will have the right to rescind such exercise.

iv. Compensation for Buy-In on Failure to Timely Deliver Warrant Shares Upon Exercise. In addition to any other rights available to the Holder, if the Company fails to cause the Transfer Agent to transmit to the Holder the Warrant Shares in accordance with the provisions of Section 2(d)(i) above pursuant to an exercise on or before the Warrant Share Delivery Date, and if after such date the Holder is required by its broker to purchase (in an open market transaction or otherwise) or the Holder's brokerage firm otherwise purchases, shares of Common Stock to deliver in satisfaction of a sale by the Holder of the Warrant Shares which the Holder anticipated receiving upon such exercise (a "Buy-In"), then the Company shall (A) pay in cash to the Holder the amount, if any, by which (x) the Holder's total purchase price (including brokerage commissions, if any) for the shares of Common Stock so purchased exceeds (y) the amount obtained by multiplying (1) the number of Warrant Shares that the Company was required to deliver to the Holder in connection with the exercise at issue times (2) the price at which the sell order giving rise to such purchase obligation was executed, and (B) at the option of the Holder, either reinstate the portion of the Warrant and equivalent number of Warrant Shares for which such exercise was not honored (in which case such exercise shall be deemed rescinded) or deliver to the Holder the number of shares of Common Stock that would have been issued had the Company timely complied with its exercise and delivery obligations hereunder. For example, if the Holder purchases Common Stock having a total purchase price of \$11,000 to cover a Buy-In with respect to an attempted exercise of shares of Common Stock with an aggregate sale price giving rise to such purchase obligation of \$10,000, under clause (A) of the immediately preceding sentence the Company shall be required to pay the Holder \$1,000. The Holder shall provide the Company written notice indicating the amounts payable to the Holder in respect of the Buy-In and, upon request of the Company, evidence of the amount of such loss. Nothing herein shall limit a Holder's right to pursue any other remedies available to it hereunder, at law or in equity including, without limitation, a decree of specific performance and/or injunctive relief with respect to the Company's failure to timely deliver shares of Common Stock upon exercise of the Warrant as required pursuant to the terms hereof.

v. No Fractional Shares or Scrip. No fractional shares or scrip representing fractional shares shall be issued upon the exercise of this Warrant. As to any fraction of a share which the Holder would otherwise be entitled to purchase upon such exercise, the Company shall, at its election, either pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the Exercise Price or round up to the next whole share.

vi. Charges, Taxes and Expenses. Issuance of Warrant Shares shall be made without charge to the Holder for any issue or transfer tax or other incidental expense in respect of the issuance of such Warrant Shares, all of which taxes and expenses shall be paid by the Company, and such Warrant Shares shall be issued in the name of the Holder or in such name or names as may be directed by the Holder; provided, however, that in the event that Warrant Shares are to be issued in a name other than the name of the Holder, this Warrant when surrendered for exercise shall be accompanied by the Assignment Form attached hereto duly executed by the Holder and the Company may require, as a condition thereto, the payment of a sum sufficient to reimburse it for any transfer tax incidental thereto. The Company shall pay all Transfer Agent fees required for same-day processing of any Notice of Exercise and all fees to the Depository Trust Company (or another established clearing corporation performing similar functions) required for same-day electronic delivery of the Warrant Shares.

vii. Closing of Books. The Company will not close its stockholder books or records in any manner which prevents the timely exercise of this Warrant, pursuant to the terms hereof.

e) Holder's Exercise Limitations. The Company shall not effect any exercise of this Warrant, and a Holder shall not have the right to exercise any portion of this Warrant, pursuant to Section 2 or otherwise, to the extent that after giving effect to such issuance after exercise as set forth on the applicable Notice of Exercise, the Holder (together with the Holder's Affiliates, and any other Persons acting as a group together with the Holder or any of the Holder's Affiliates (such Persons, "Attribution Parties")), would beneficially own in excess of the Beneficial Ownership Limitation (as defined below). For purposes of the foregoing sentence, the number of shares of Common Stock beneficially owned by the Holder and its Affiliates and Attribution Parties shall include the number of shares of Common Stock issuable upon exercise of this Warrant with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which would be issuable upon (i) exercise of the remaining, nonexercised portion of this Warrant beneficially owned by the Holder or any of its Affiliates or Attribution Parties and (ii) exercise or conversion of the unexercised or nonconverted portion of any other securities of the Company (including, without limitation, any other Common Stock Equivalents) subject to a limitation on conversion or exercise analogous to the limitation contained herein beneficially owned by the Holder or any of its Affiliates or Attribution Parties. Except as set forth in the preceding sentence, for purposes of this Section 2(e), beneficial ownership shall be calculated in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder, it being acknowledged by the Holder that the Company is not representing to the Holder that such calculation is in compliance with Section 13(d) of the Exchange Act and the Holder is solely responsible for any schedules required to be filed in accordance therewith. To the extent that the limitation contained in this Section 2(e) applies, the determination of whether this Warrant is exercisable (in relation to other securities owned by the Holder together with any Affiliates and Attribution Parties) and of which portion of this Warrant is exercisable shall be in the sole discretion of the Holder, and the submission of a Notice of Exercise shall be deemed to be the Holder's determination of whether this Warrant is exercisable (in relation to other securities owned by the Holder together with any Affiliates and Attribution Parties) and of which portion of this Warrant is exercisable, in each case subject to the Beneficial Ownership Limitation, and the Company shall have no obligation to verify or confirm the accuracy of such determination and shall have no liability for exercises of this Warrant that are not in compliance with the Beneficial Ownership Limitation, provided this limitation of liability shall not apply if the Holder has detrimentally relied on outstanding share information provided by the Company or the Transfer Agent. In addition, a determination as to any group status as contemplated above shall be determined in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder. For purposes of this Section 2(e), in determining the number of outstanding shares of Common Stock, a Holder may rely on the number of outstanding shares of Common Stock as reflected in (A) the Company's most recent periodic or annual report filed with the Commission, as the case may be, (B) a more recent public announcement by the Company or (C) a more recent written notice by the Company or the Transfer Agent setting forth the number of shares of Common Stock outstanding. Upon the written or oral request of a Holder, the Company shall within two Trading Days confirm orally and in writing to the Holder the number of shares of Common Stock then outstanding. In any case, the number of outstanding shares of Common Stock shall be determined after giving effect to the conversion or exercise of securities of the Company, including this Warrant, by the Holder or its Affiliates or Attribution Parties since the date as of which such number of outstanding shares of Common Stock was reported. The "Beneficial Ownership Limitation" shall be 4.99% (or, upon election by a Holder prior to the issuance of any Warrants, 9.99%) of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock issuable upon exercise of this Warrant. The Holder, upon notice to the Company, may increase or decrease the Beneficial Ownership Limitation provisions of this Section 2(e), provided that the Beneficial Ownership Limitation in no event exceeds 9.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock upon exercise of this Warrant held by the Holder and the provisions of this Section 2(e) shall continue to apply. Any increase in the Beneficial Ownership Limitation will not be effective until the 61<sup>st</sup> day after such notice is delivered to the Company. The provisions of this paragraph shall be construed and implemented in a manner otherwise than in strict conformity with the terms of this Section 2(e) to correct this paragraph (or any portion hereof) which may be defective or inconsistent with the intended Beneficial Ownership Limitation herein contained or to make changes or supplements necessary or desirable to properly give effect to such limitation. The limitations contained in this paragraph shall apply to a successor holder of this Warrant.

f) Call Provision. Subject to the provisions of Section 2(e) and this Section 2(f), if, after the date that is one hundred eighty (180) days following the Initial Exercise Date, (i) the VWAP for each of 30 consecutive Trading Days (the “Measurement Period,” which 30 consecutive Trading Day period shall not have commenced until after the date that is one hundred eighty (180) days following the Initial Exercise Date) exceeds \$\_\_\_\_\_<sup>1</sup> (subject to adjustment for forward and reverse stock splits, recapitalizations, stock dividends and the like after the Initial Exercise Date), (ii) the average dollar daily volume for such Measurement Period exceeds \$500,000 per Trading Day and (iii) the Holder is not in possession of any information that constitutes, or might constitute, material non-public information which was provided by the Company, any of its Subsidiaries, or any of their officers, directors, employees, agents or Affiliates, then the Company may, within one (1) Trading Day of the end of such Measurement Period, call for cancellation of all or any portion of this Warrant for which a Notice of Exercise has not yet been delivered (such right, a “Call”) for consideration equal to \$0.0001 per Warrant Share. To exercise this right, the Company must deliver to the Holder an irrevocable written notice (a “Call Notice”), indicating therein the portion of unexercised portion of this Warrant to which such notice applies. If the conditions set forth below for such Call are satisfied from the period from the date of the Call Notice through and including the Call Date (as defined below), then any portion of this Warrant subject to such Call Notice for which a Notice of Exercise shall not have been received by the Call Date will be cancelled at 6:30 p.m. (New York City time) on the tenth Trading Day after the date the Call Notice is received by the Holder (such date and time, the “Call Date”). Any unexercised portion of this Warrant to which the Call Notice does not pertain will be unaffected by such Call Notice. In furtherance thereof, the Company covenants and agrees that it will honor all Notices of Exercise with respect to Warrant Shares subject to a Call Notice that are tendered through 6:30 p.m. (New York City time) on the Call Date. The parties agree that any Notice of Exercise delivered following a Call Notice which calls less than all of the Warrant Shares remaining under the Warrants shall first reduce to zero the number of Warrant Shares subject to such Call Notice prior to reducing the remaining Warrant Shares available for purchase under this Warrant. For example, if (A) this Warrant then permits the Holder to acquire 100 Warrant Shares, (B) a Call Notice pertains to 75 Warrant Shares, and (C) prior to 6:30 p.m. (New York City time) on the Call Date the Holder tenders a Notice of Exercise in respect of 50 Warrant Shares, then (x) on the Call Date the right under this Warrant to acquire 25 Warrant Shares will be automatically cancelled, (y) the Company, in the time and manner required under this Warrant, will have issued and delivered to the Holder 50 Warrant Shares in respect of the exercises following receipt of the Call Notice, and (z) the Holder may, until the Termination Date, exercise this Warrant for 25 Warrant Shares (subject to adjustment as herein provided and subject to subsequent Call Notices). Subject again to the provisions of this Section 2(f), the Company may deliver subsequent Call Notices for any portion of this Warrant for which the Holder shall not have delivered a Notice of Exercise. Notwithstanding anything to the contrary set forth in this Warrant, the Company may not deliver a Call Notice or require the cancellation of this Warrant (and any such Call Notice shall be void), unless, from the beginning of the Measurement Period through the Call Date, (1) the Company shall have honored in accordance with the terms of this Warrant all Notices of Exercise delivered by 6:30 p.m. (New York City time) on the Call Date, and (2) the Registration Statement shall be effective as to all Warrant Shares and the prospectus thereunder available for use by the Company for the sale of all such Warrant Shares to the Holder, and (3) the Common Stock shall be listed or quoted for trading on the Trading Market, and (4) there is a sufficient number of authorized shares of Common Stock for issuance of all Warrant Shares and all shares of Common Stock issuable upon conversion of the Company’s preferred stock issued pursuant to the Registration Statement, and (5) the issuance of the shares shall not cause a breach of any provision of Section 2(e) herein. The Company’s right to call the Warrants under this Section 2(f) shall be exercised ratably among the Holders based on the then outstanding Warrants.

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<sup>1</sup> 300% of the Exercise Price

a) **Stock Dividends and Splits.** If the Company, at any time while this Warrant is outstanding: (i) pays a stock dividend or otherwise makes a distribution or distributions on shares of its Common Stock or any other equity or equity equivalent securities payable in shares of Common Stock (which, for avoidance of doubt, shall not include any shares of Common Stock issued by the Company upon exercise of this Warrant), (ii) subdivides outstanding shares of Common Stock into a larger number of shares, (iii) combines (including by way of reverse stock split) outstanding shares of Common Stock into a smaller number of shares, or (iv) issues by reclassification of shares of the Common Stock any shares of capital stock of the Company, then in each case the Exercise Price shall be multiplied by a fraction of which the numerator shall be the number of shares of Common Stock (excluding treasury shares, if any) outstanding immediately before such event and of which the denominator shall be the number of shares of Common Stock outstanding immediately after such event, and the number of shares issuable upon exercise of this Warrant shall be proportionately adjusted such that the aggregate Exercise Price of this Warrant shall remain unchanged. Any adjustment made pursuant to this Section 3(a) shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution and shall become effective immediately after the effective date in the case of a subdivision, combination or re-classification.

b) Subsequent Rights Offerings. In addition to any adjustments pursuant to Section 3(a) above, if at any time the Company grants, issues or sells any Common Stock Equivalents or rights to purchase stock, warrants, securities or other property pro rata to the record holders of any class of shares of Common Stock (the “Purchase Rights”), then the Holder will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which the Holder could have acquired if the Holder had held the number of shares of Common Stock acquirable upon complete exercise of this Warrant (without regard to any limitations on exercise hereof, including without limitation, the Beneficial Ownership Limitation) immediately before the date on which a record is taken for the grant, issuance or sale of such Purchase Rights, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the grant, issue or sale of such Purchase Rights (provided, however, that, to the extent that the Holder’s right to participate in any such Purchase Right would result in the Holder exceeding the Beneficial Ownership Limitation, then the Holder shall not be entitled to participate in such Purchase Right to such extent (or beneficial ownership of such shares of Common Stock as a result of such Purchase Right to such extent) and such Purchase Right to such extent shall be held in abeyance for the Holder until such time, if ever, as its right thereto would not result in the Holder exceeding the Beneficial Ownership Limitation).

c) Pro Rata Distributions. During such time as this Warrant is outstanding, if the Company shall declare or make any dividend or other distribution of its assets (or rights to acquire its assets) to holders of shares of Common Stock, by way of return of capital or otherwise (including, without limitation, any distribution of cash, stock or other securities, property or options by way of a dividend, spin off, reclassification, corporate rearrangement, scheme of arrangement or other similar transaction) (a “Distribution”), at any time after the issuance of this Warrant, then, in each such case, the Holder shall be entitled to participate in such Distribution to the same extent that the Holder would have participated therein if the Holder had held the number of shares of Common Stock acquirable upon complete exercise of this Warrant (without regard to any limitations on exercise hereof, including without limitation, the Beneficial Ownership Limitation) immediately before the date of which a record is taken for such Distribution, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the participation in such Distribution (provided, however, that, to the extent that the Holder’s right to participate in any such Distribution would result in the Holder exceeding the Beneficial Ownership Limitation, then the Holder shall not be entitled to participate in such Distribution to such extent (or in the beneficial ownership of any shares of Common Stock as a result of such Distribution to such extent) and the portion of such Distribution shall be held in abeyance for the benefit of the Holder until such time, if ever, as its right thereto would not result in the Holder exceeding the Beneficial Ownership Limitation). To the extent that this Warrant has not been partially or completely exercised at the time of such Distribution, such portion of the Distribution shall be held in abeyance for the benefit of the Holder until the Holder has exercised this Warrant.



d) Fundamental Transaction. If, at any time while this Warrant is outstanding, (i) the Company, directly or indirectly, in one or more related transactions effects any merger or consolidation of the Company with or into another Person, (ii) the Company, directly or indirectly, effects any sale, lease, license, assignment, transfer, conveyance or other disposition of all or substantially all of its assets in one or a series of related transactions, (iii) any, direct or indirect, purchase offer, tender offer or exchange offer (whether by the Company or another Person) is completed pursuant to which holders of Common Stock are permitted to sell, tender or exchange their shares for other securities, cash or property and has been accepted by the holders of 50% or more of the outstanding Common Stock, (iv) the Company, directly or indirectly, in one or more related transactions effects any reclassification, reorganization or recapitalization of the Common Stock or any compulsory share exchange pursuant to which the Common Stock is effectively converted into or exchanged for other securities, cash or property, or (v) the Company, directly or indirectly, in one or more related transactions consummates a stock or share purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spin-off or scheme of arrangement) with another Person or group of Persons whereby such other Person or group acquires more than 50% of the outstanding shares of Common Stock (not including any shares of Common Stock held by the other Person or other Persons making or party to, or associated or affiliated with the other Persons making or party to, such stock or share purchase agreement or other business combination) (each a “Fundamental Transaction”), then, upon any subsequent exercise of this Warrant, the Holder shall have the right to receive, for each Warrant Share that would have been issuable upon such exercise immediately prior to the occurrence of such Fundamental Transaction, at the option of the Holder (without regard to any limitation in Section 2(e) on the exercise of this Warrant), the number of shares of Common Stock of the successor or acquiring corporation or of the Company, if it is the surviving corporation, and any additional consideration (the “Alternate Consideration”) receivable as a result of such Fundamental Transaction by a holder of the number of shares of Common Stock for which this Warrant is exercisable immediately prior to such Fundamental Transaction (without regard to any limitation in Section 2(e) on the exercise of this Warrant). For purposes of any such exercise, the determination of the Exercise Price shall be appropriately adjusted to apply to such Alternate Consideration based on the amount of Alternate Consideration issuable in respect of one share of Common Stock in such Fundamental Transaction, and the Company shall apportion the Exercise Price among the Alternate Consideration in a reasonable manner reflecting the relative value of any different components of the Alternate Consideration. If holders of Common Stock are given any choice as to the securities, cash or property to be received in a Fundamental Transaction, then the Holder shall be given the same choice as to the Alternate Consideration it receives upon any exercise of this Warrant following such Fundamental Transaction. Notwithstanding anything to the contrary, in the event of a Fundamental Transaction other than one in which a Successor Entity (as defined below) that is a publicly traded corporation whose stock is quoted or listed on a Trading Market assumes this Warrant such that the Warrant shall be exercisable for the publicly traded common stock of such Successor Entity and only if such Fundamental Transaction is within the Company’s control, the Company or any Successor Entity (as defined below) shall, at the Holder’s option, exercisable at any time concurrently with, or within 30 days after, the consummation of the Fundamental Transaction, purchase this Warrant from the Holder by paying to the Holder an amount of cash equal to the Black Scholes Value of the remaining unexercised portion of this Warrant on the date of the consummation of such Fundamental Transaction; provided, however, if the Fundamental Transaction is not within the Company’s control, including not approved by the Company’s Board of Directors, Holder shall not have the option to require the Company to purchase its Warrant. Any cash payment will be made by wire transfer of immediately available funds within five Business Days of the Holder’s election (or, if later, on the effective date of the Fundamental Transaction). “Black Scholes Value” means the value of this Warrant based on the Black and Scholes Option Pricing Model obtained from the “OV” function on Bloomberg, L.P. (“Bloomberg”) determined as of the day of consummation of the applicable Fundamental Transaction for pricing purposes and reflecting (A) a risk-free interest rate corresponding to the U.S. Treasury rate for a period equal to the time between the date of the public announcement of the applicable Fundamental Transaction and the Termination Date, (B) an expected volatility equal to the greater of 100% and the 100 day volatility obtained from the HVT function on Bloomberg as of the Trading Day immediately following the public announcement of the applicable Fundamental Transaction, (C) the underlying price per share used in such calculation shall be the sum of the price per share being offered in cash, if any, plus the value of any non-cash consideration, if any, being offered in such Fundamental Transaction and (D) a remaining option time equal to the time between the date of the public announcement of the applicable Fundamental Transaction and the Termination Date. The Company shall cause any successor entity in a Fundamental Transaction in which the Company is not the survivor (the “Successor Entity”) to assume in writing all of the obligations of the Company under this Warrant in accordance with the provisions of this Section 3(d) pursuant to written agreements in form and substance reasonably satisfactory to the Holder and approved by the Holder (without unreasonable delay) prior to such Fundamental Transaction and shall, at the option of the Holder, deliver to the Holder in exchange for this Warrant a security of the Successor Entity evidenced by a written instrument substantially similar in form and substance to this Warrant which is exercisable for a corresponding number of shares of capital stock of such Successor Entity (or its parent entity) equivalent to the shares of Common Stock acquirable and receivable upon exercise of this Warrant (without regard to any limitations on the exercise of this Warrant) prior to such Fundamental Transaction, and with an exercise price which applies the exercise price hereunder to such shares of capital stock (but taking into account the relative value of the shares of Common Stock pursuant to such Fundamental Transaction and the value of such shares of capital stock, such number of shares of capital stock and such exercise price being for the purpose of protecting the economic value of this Warrant immediately prior to the consummation of such Fundamental Transaction), and which is reasonably satisfactory in form and substance to the Holder. Upon the occurrence of any such Fundamental Transaction, the Successor Entity shall succeed to, and be substituted for (so that from and after the date of such Fundamental Transaction, the provisions of this Warrant referring to the “Company” shall refer instead to the Successor Entity), and may exercise every right and power of the Company and shall assume all of the obligations of the Company under this Warrant with the same effect as if such Successor Entity had been named as the Company herein.

e) Calculations. All calculations under this Section 3 shall be made to the nearest cent or the nearest 1/100th of a share, as the case may be. For purposes of this Section 3, the number of shares of Common Stock deemed to be issued and outstanding as of a given date shall be the sum of the number of shares of Common Stock (excluding treasury shares, if any) issued and outstanding.

f) Notice to Holder.

i. Adjustment to Exercise Price. Whenever the Exercise Price is adjusted pursuant to any provision of this Section 3, the Company shall promptly deliver to the Holder by facsimile or email a notice setting forth the Exercise Price after such adjustment and any resulting adjustment to the number of Warrant Shares and setting forth a brief statement of the facts requiring such adjustment.

ii. Notice to Allow Exercise by Holder. If (A) the Company shall declare a dividend (or any other distribution in whatever form) on the Common Stock, (B) the Company shall declare a special nonrecurring cash dividend on or a redemption of the Common Stock, (C) the Company shall authorize the granting to all holders of the Common Stock rights or warrants to subscribe for or purchase any shares of capital stock of any class or of any rights, (D) the approval of any stockholders of the Company shall be required in connection with any reclassification of the Common Stock, any consolidation or merger to which the Company is a party, any sale or transfer of all or substantially all of the assets of the Company, or any compulsory share exchange whereby the Common Stock is converted into other securities, cash or property, or (E) the Company shall authorize the voluntary or involuntary dissolution, liquidation or winding up of the affairs of the Company, then, in each case, the Company shall cause to be delivered by facsimile or email to the Holder at its last facsimile number or email address as it shall appear upon the Warrant Register of the Company, at least 20 calendar days prior to the applicable record or effective date hereinafter specified, a notice stating (x) the date on which a record is to be taken for the purpose of such dividend, distribution, redemption, rights or warrants, or if a record is not to be taken, the date as of which the holders of the Common Stock of record to be entitled to such dividend, distributions, redemption, rights or warrants are to be determined or (y) the date on which such reclassification, consolidation, merger, sale, transfer or share exchange is expected to become effective or close, and the date as of which it is expected that holders of the Common Stock of record shall be entitled to exchange their shares of the Common Stock for securities, cash or other property deliverable upon such reclassification, consolidation, merger, sale, transfer or share exchange; provided that the failure to deliver such notice or any defect therein or in the delivery thereof shall not affect the validity of the corporate action required to be specified in such notice. To the extent that any notice provided in this Warrant constitutes, or contains, material, non-public information regarding the Company or any of the Subsidiaries, the Company shall simultaneously file such notice with the Commission pursuant to a Current Report on Form 8-K. The Holder shall remain entitled to exercise this Warrant during the period commencing on the date of such notice to the effective date of the event triggering such notice except as may otherwise be expressly set forth herein.

g) Voluntary Adjustment By Company. Subject to the rules and regulations of the Trading Market, the Company may at any time during the term of this Warrant, subject to the prior written consent of the Holder, reduce the then current Exercise Price to any amount and for any period of time deemed appropriate by the board of directors of the Company.

Section 4. Transfer of Warrant.

a) Transferability. This Warrant and all rights hereunder (including, without limitation, any registration rights) are transferable, in whole or in part, upon surrender of this Warrant at the principal office of the Company or its designated agent, together with a written assignment of this Warrant substantially in the form attached hereto duly executed by the Holder or its agent or attorney and funds sufficient to pay any transfer taxes payable upon the making of such transfer. Upon such surrender and, if required, such payment, the Company shall execute and deliver a new Warrant or Warrants in the name of the assignee or assignees, as applicable, and in the denomination or denominations specified in such instrument of assignment, and shall issue to the assignor a new Warrant evidencing the portion of this Warrant not so assigned, and this Warrant shall promptly be cancelled. Notwithstanding anything herein to the contrary, the Holder shall not be required to physically surrender this Warrant to the Company unless the Holder has assigned this Warrant in full, in which case, the Holder shall surrender this Warrant to the Company within three (3) Trading Days of the date on which the Holder delivers an assignment form to the Company assigning this Warrant in full. The Warrant, if properly assigned in accordance herewith, may be exercised by a new holder for the purchase of Warrant Shares without having a new Warrant issued.

b) New Warrants. If this Warrant is not held in global form through DTC (or any successor depositary), this Warrant may be divided or combined with other Warrants upon presentation hereof at the aforesaid office of the Company, together with a written notice specifying the names and denominations in which new Warrants are to be issued, signed by the Holder or its agent or attorney. Subject to compliance with Section 4(a), as to any transfer which may be involved in such division or combination, the Company shall execute and deliver a new Warrant or Warrants in exchange for the Warrant or Warrants to be divided or combined in accordance with such notice. All Warrants issued on transfers or exchanges shall be dated the initial issuance date of this Warrant and shall be identical with this Warrant except as to the number of Warrant Shares issuable pursuant thereto.

c) Warrant Register. The Company shall register this Warrant, upon records to be maintained by the Warrant Agent for that purpose (the "Warrant Register"), in the name of the record Holder hereof from time to time. The Company and the Warrant Agent may deem and treat the registered Holder of this Warrant as the absolute owner hereof for the purpose of any exercise hereof or any distribution to the Holder, and for all other purposes, absent actual notice to the contrary.

#### Section 5. Miscellaneous.

a) No Rights as Stockholder Until Exercise. This Warrant does not entitle the Holder to any voting rights, dividends or other rights as a stockholder of the Company prior to the exercise hereof as set forth in Section 2(d)(i), except as expressly set forth in Section 3.

b) Loss, Theft, Destruction or Mutilation of Warrant. The Company covenants that upon receipt by the Company of evidence reasonably satisfactory to it of the loss, theft, destruction or mutilation of this Warrant or any stock certificate relating to the Warrant Shares, and in case of loss, theft or destruction, of indemnity or security reasonably satisfactory to it (which, in the case of the Warrant, shall not include the posting of any bond), and upon surrender and cancellation of such Warrant or stock certificate, if mutilated, the Company will make and deliver a new Warrant or stock certificate of like tenor and dated as of such cancellation, in lieu of such Warrant or stock certificate.

c) Saturdays, Sundays, Holidays, etc. If the last or appointed day for the taking of any action or the expiration of any right required or granted herein shall not be a Business Day, then, such action may be taken or such right may be exercised on the next succeeding Business Day.

d) Authorized Shares.

The Company covenants that, during the period the Warrant is outstanding, it will reserve from its authorized and unissued Common Stock a sufficient number of shares to provide for the issuance of the Warrant Shares upon the exercise of any purchase rights under this Warrant. The Company further covenants that its issuance of this Warrant shall constitute full authority to its officers who are charged with the duty of issuing the necessary Warrant Shares upon the exercise of the purchase rights under this Warrant. The Company will take all such reasonable action as may be necessary to assure that such Warrant Shares may be issued as provided herein without violation of any applicable law or regulation, or of any requirements of the Trading Market upon which the Common Stock may be listed. The Company covenants that all Warrant Shares which may be issued upon the exercise of the purchase rights represented by this Warrant will, upon exercise of the purchase rights represented by this Warrant and payment for such Warrant Shares in accordance herewith, be duly authorized, validly issued, fully paid and nonassessable and free from all taxes, liens and charges created by the Company in respect of the issue thereof (other than taxes in respect of any transfer occurring contemporaneously with such issue).

Except and to the extent as waived or consented to by the Holder, the Company shall not by any action, including, without limitation, amending its certificate of incorporation or through any reorganization, transfer of assets, consolidation, merger, dissolution, issue or sale of securities or any other voluntary action, avoid or seek to avoid the observance or performance of any of the terms of this Warrant, but will at all times in good faith assist in the carrying out of all such terms and in the taking of all such actions as may be necessary or appropriate to protect the rights of Holder as set forth in this Warrant against impairment. Without limiting the generality of the foregoing, the Company will (i) not increase the par value of any Warrant Shares above the amount payable therefor upon such exercise immediately prior to such increase in par value, (ii) take all such action as may be necessary or appropriate in order that the Company may validly and legally issue fully paid and nonassessable Warrant Shares upon the exercise of this Warrant and (iii) use commercially reasonable efforts to obtain all such authorizations, exemptions or consents from any public regulatory body having jurisdiction thereof, as may be, necessary to enable the Company to perform its obligations under this Warrant.

Before taking any action which would result in an adjustment in the number of Warrant Shares for which this Warrant is exercisable or in the Exercise Price, the Company shall obtain all such authorizations or exemptions thereof, or consents thereto, as may be necessary from any public regulatory body or bodies having jurisdiction thereof.

e) Jurisdiction. All questions concerning the construction, validity, enforcement and interpretation of this Warrant shall be governed by and construed and enforced in accordance with the internal laws of the State of New York, without regard to the principles of conflicts of law thereof. Each party agrees that all legal proceedings concerning the interpretations, enforcement and defense of the transactions contemplated by this Warrant (whether brought against a party hereto or their respective affiliates, directors, officers, shareholders, partners, members, employees or agents) shall be commenced exclusively in the state and federal courts sitting in the City of New York. Each party hereby irrevocably submits to the exclusive jurisdiction of the state and federal courts sitting in the City of New York, Borough of Manhattan for the adjudication of any dispute hereunder or in connection herewith or with any transaction contemplated hereby or discussed herein, and hereby irrevocably waives, and agrees not to assert in any suit, action or proceeding, any claim that it is not personally subject to the jurisdiction of any such court, that such suit, action or proceeding is improper or is an inconvenient venue for such proceeding. Each party hereby irrevocably waives personal service of process and consents to process being served in any such suit, action or proceeding by mailing a copy thereof via registered or certified mail or overnight delivery (with evidence of delivery) to such party at the address in effect for notices to it under this Warrant and agrees that such service shall constitute good and sufficient service of process and notice thereof. Nothing contained herein shall be deemed to limit in any way any right to serve process in any other manner permitted by law. If either party shall commence an action, suit or proceeding to enforce any provisions of this Warrant, the prevailing party in such action, suit or proceeding shall be reimbursed by the other party for their reasonable attorneys' fees and other costs and expenses incurred with the investigation, preparation and prosecution of such action or proceeding.

f) Restrictions. The Holder acknowledges that the Warrant Shares acquired upon the exercise of this Warrant, if not registered, and the Holder does not utilize cashless exercise, will have restrictions upon resale imposed by state and federal securities laws.

g) Nonwaiver and Expenses. No course of dealing or any delay or failure to exercise any right hereunder on the part of Holder shall operate as a waiver of such right or otherwise prejudice the Holder's rights, powers or remedies. Without limiting any other provision of this Warrant, if the Company willfully and knowingly fails to comply with any provision of this Warrant, which results in any material damages to the Holder, the Company shall pay to the Holder such amounts as shall be sufficient to cover any costs and expenses including, but not limited to, reasonable attorneys' fees, including those of appellate proceedings, incurred by the Holder in collecting any amounts due pursuant hereto or in otherwise enforcing any of its rights, powers or remedies hereunder.

h) Notices. Any notices, consents, waivers or other document or communications required or permitted to be given or delivered under the terms of this Warrant must be in writing and will be deemed to have been delivered: (i) upon receipt, if delivered personally; (ii) when sent, if sent by facsimile (provided confirmation of transmission is mechanically or electronically generated and kept on file by the sending party); (iii) when sent, if sent by e-mail (provided that such sent e-mail is kept on file (whether electronically or otherwise) by the sending party and the sending party does not receive an automatically generated message from the recipient's e-mail server that such e-mail could not be delivered to such recipient) and (iv) if sent by overnight courier service, one (1) Trading Day after deposit with an overnight courier service with next day delivery specified, in each case, properly addressed to the party to receive the same. If notice is given by facsimile or email, a copy of such notice shall be dispatched no later than the next business day by first class mail, postage prepaid. The addresses, facsimile numbers and e-mail addresses for such communications shall be:

If to the Company:

CHF Solutions, Inc.  
12988 Valley View Road  
Eden Prairie, MN 55344  
Attention: John L. Erb  
Chairman and Chief Executive Officer  
Telecopy: (952) 224-0181

With a copy (for informational purposes only) to:

Honigman LLP  
650 Trade Centre Way, Suite 200  
Kalamazoo, Michigan 49002-0402  
E-mail: ptorrence@honigman.com  
Attention: Phillip D. Torrence

If to a Holder, to its address, facsimile number or e-mail address set forth herein or on the books and records of the Company.

Or, in each of the above instances, to such other address, facsimile number or e-mail address and/or to the attention of such other Person as the recipient party has specified by written notice given to each other party at least five (5) days prior to the effectiveness of such change. Written confirmation of receipt (A) given by the recipient of such notice, consent, waiver or other communication, (B) mechanically or electronically generated by the sender's facsimile machine containing the time, date and recipient facsimile number or (C) provided by an overnight courier service shall be rebuttable evidence of personal service, receipt by facsimile or receipt from an overnight courier service in accordance with clause (i), (ii) or (iv) above, respectively. A copy of the e-mail transmission containing the time, date and recipient e-mail address shall be rebuttable evidence of receipt by e-mail in accordance with clause (iii) above.

i) Limitation of Liability. No provision hereof, in the absence of any affirmative action by the Holder to exercise this Warrant to purchase Warrant Shares, and no enumeration herein of the rights or privileges of the Holder, shall give rise to any liability of the Holder for the purchase price of any Common Stock or as a stockholder of the Company, whether such liability is asserted by the Company or by creditors of the Company.

j) Remedies. The Holder, in addition to being entitled to exercise all rights granted by law, including recovery of damages, will be entitled to specific performance of its rights under this Warrant. The Company agrees that monetary damages would not be adequate compensation for any loss incurred by reason of a breach by it of the provisions of this Warrant and hereby agrees to waive and not to assert the defense in any action for specific performance that a remedy at law would be adequate.

k) Successors and Assigns. Subject to applicable securities laws, this Warrant and the rights and obligations evidenced hereby shall inure to the benefit of and be binding upon the successors and permitted assigns of the Company and the successors and permitted assigns of Holder. The provisions of this Warrant are intended to be for the benefit of any Holder from time to time of this Warrant and shall be enforceable by the Holder or holder of Warrant Shares.

l) Amendment. This Warrant may be modified or amended or the provisions hereof waived with the written consent of the Company, on the one hand, and the Holder or the beneficial owner of this Warrant, on the other hand.

m) Severability. Wherever possible, each provision of this Warrant shall be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this Warrant shall be prohibited by or invalid under applicable law, such provision shall be ineffective to the extent of such prohibition or invalidity, without invalidating the remainder of such provisions or the remaining provisions of this Warrant.

n) Headings. The headings used in this Warrant are for the convenience of reference only and shall not, for any purpose, be deemed a part of this Warrant.

o) Warrant Agency Agreement. If this Warrant is held in global form through DTC (or any successor depository), this Warrant is issued subject to the Warrant Agency Agreement. To the extent any provision of this Warrant conflicts with the express provisions of the Warrant Agency Agreement, the provisions of this Warrant shall govern and be controlling.

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*(Signature Page Follows)*



IN WITNESS WHEREOF, the Company has caused this Warrant to be executed by its officer thereunto duly authorized as of the date first above indicated.

**CHF SOLUTIONS, INC.**

By: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_

**NOTICE OF EXERCISE**

TO: CHF SOLUTIONS, INC.

(1) The undersigned hereby elects to purchase \_\_\_\_\_ Warrant Shares of the Company pursuant to the terms of the attached Warrant (only if exercised in full), and tenders herewith payment of the exercise price in full, together with all applicable transfer taxes, if any.

(2) Payment shall take the form of (check applicable box):

in lawful money of the United States; or

if permitted the cancellation of such number of Warrant Shares as is necessary, in accordance with the formula set forth in subsection 2(c), to exercise this Warrant with respect to the maximum number of Warrant Shares purchasable pursuant to the cashless exercise procedure set forth in subsection 2(c).

(3) Please issue said Warrant Shares in the name of the undersigned or in such other name as is specified below:

\_\_\_\_\_

The Warrant Shares shall be delivered to the following DWAC Account Number:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

[SIGNATURE OF HOLDER]

Name of Investing Entity: \_\_\_\_\_

Signature of Authorized Signatory of Investing Entity: \_\_\_\_\_

Name of Authorized Signatory: \_\_\_\_\_

Title of Authorized Signatory: \_\_\_\_\_

Date: \_\_\_\_\_



**ASSIGNMENT FORM**

*(To assign the foregoing Warrant, execute this form and supply required information. Do not use this form to purchase shares.)*

FOR VALUE RECEIVED, the foregoing Warrant and all rights evidenced thereby are hereby assigned to

Name: \_\_\_\_\_  
(Please Print)

Address: \_\_\_\_\_  
(Please Print)

Phone Number: \_\_\_\_\_

Email Address: \_\_\_\_\_

Dated: \_\_\_\_\_, \_\_\_\_\_

Holder's Signature: \_\_\_\_\_

Holder's Address: \_\_\_\_\_

\_\_\_\_\_

January 3, 2020

CHF Solutions, Inc.  
12988 Valley View Road  
Eden Prairie, Minnesota 55344

Re: *Registration Statement on Form S-1*

Ladies and Gentlemen:

We have acted as counsel to CHF Solutions, Inc., a Delaware corporation (the "**Company**"), in connection with the preparation and filing with the Securities and Exchange Commission (the "**Commission**") pursuant to the Securities Act of 1933, as amended (the "**Securities Act**"), of a Registration Statement on Form S-1 (such registration statement as amended or supplemented from time to time, the "**Registration Statement**"), relating to the offer and sale by the Company of up to \$5,000,000 in the aggregate of (i) units consisting of one share of the Company's common stock, par value \$0.0001 per share (the "**Common Stock**") and one warrant to purchase one share of Common Stock (the "**Class A Units**"), (ii) units consisting of one share of Series H Convertible Preferred Stock, par value \$0.0001 per share (the "**Preferred Stock**") and warrants to purchase Common Stock (the "**Class B Units**" and, together with the Class A Units, the "**Units**"), (iii) shares of Common Stock issuable upon conversion of the shares of Preferred Stock, and (iv) shares of Common Stock issuable upon exercise of the warrants issued under the Units. The Units are to be sold to the underwriters for resale to the public as described in the Registration Statement and pursuant to the underwriting agreement referred to in the Registration Statement (the "**Underwriting Agreement**"). Pursuant to the Certificate of Designation (the "**Certificate of Designation**") establishing the powers, designations, preferences and rights of the Preferred Stock to be filed in connection with the offering contemplated by the Registration Statement and the Company's Fourth Amended and Restated Certificate of Incorporation, as amended (the "**Certificate of Incorporation**"), the shares of the Preferred Stock will be convertible into shares of Common Stock. We have assumed that the sale of the Preferred Stock, Common Stock and warrants underlying the Units to the underwriter by the Company will be authorized and at a price established by the Board of Directors of the Company or a duly-formed Pricing Committee thereof in accordance with the Delaware General Corporation Law. We have also assumed that, at the time of exercise of the warrants underlying the Units or conversion of the Preferred Stock, a sufficient number of shares of Common Stock will be authorized and available for issuance and that the aggregate consideration for the issuance and sale of the Units and the Common Stock in connection with such exercise or conversion is an amount that is not less than the par value of the Common Stock.

For the purpose of rendering the opinions herein, we examined originals or copies of such documents as we deemed relevant. In conducting our examination, we assumed, without investigation, the genuineness of all signatures, the correctness of all certificates, the authenticity of all documents submitted to us as originals, the conformity to original documents of all documents submitted as certified or photostatic copies, the authenticity of the originals of such copies, the accuracy and completeness of all records made available to us by the Company and the due authorization, execution, delivery, and/or filing of all documents where due authorization, execution, delivery and/or filing are a prerequisite to the effectiveness thereof.

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January 3, 2020  
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Our opinions are limited solely to matters set forth herein. The law covered by the opinions expressed herein is limited to the federal law of the United States, New York law applicable to contracts and Delaware corporate law. We express no opinion as to whether the laws of any particular jurisdiction are applicable to the subject matter hereof. We are not rendering any opinion as to compliance with any federal or state law, rule or regulation relating to securities, or to the sale or issuance thereof.

Based on our examination of such documents and other matters as we deem relevant, we are of the opinion that:

1. When the Certificate of Designation has been properly filed with the Delaware Secretary of State, the Preferred Stock will have been duly authorized and, upon issuance, delivery, and payment therefor pursuant to the terms of the Underwriting Agreement, the Preferred Stock will be validly issued, fully paid and non-assessable.
2. The shares of Common Stock that are (a) offered by the Registration Statement, to be issued and sold by the Company as described in the Registration Statement and in the manner set forth in the Underwriting Agreement, against payment therefor, (b) issuable upon the valid exercise of the warrants underlying the Units in accordance with their terms, including without limitation, payment of the consideration therefor as described therein, and (c) issuable upon the valid conversion of the shares of Preferred Stock in accordance with the Certificate of Designation, in each case, have been duly authorized by the Company and when issued and delivered in accordance with the Underwriting Agreement, warrant, or Preferred Stock conversion right, as applicable (including, without limitation, the payment in full of all applicable consideration therefor) and in accordance with the Company's Certificate of Incorporation, as amended and supplemented to date by all amendments and certificates of designation thereto, will be validly issued, fully paid and non-assessable.
3. When the warrants underlying the Units have been duly executed and delivered by the Company against payment of the consideration for the Units specified in the Underwriting Agreement, such warrants underlying the Units will constitute binding obligations of the Company, enforceable against the Company in accordance with their terms.
4. The Units, when issued against payment therefor as set forth in the Registration Statement and the Underwriting Agreement, will be validly issued, fully paid and non-assessable.

Our opinions set forth in paragraph 3 above are subject to the effect of any applicable bankruptcy, insolvency, reorganization, moratorium or similar law relating to or affecting creditors' rights generally (including, without limitation, fraudulent conveyance and voidable transaction laws), general principles of equity, including, without limitation, concepts of materiality, reasonableness, good faith and fair dealing and the possible unavailability of specific performance or injunctive relief, regardless of whether considered in a proceeding in equity or at law and limitations regarding the availability of indemnification and contribution where such indemnification or contribution may be limited by applicable law or the application of principles of public policy.

We express no opinion as to the enforceability of (i) provisions that relate to choice of law, forum selection or submission to jurisdiction (including, without limitation, any express or implied waiver of any objection to venue in any court or of any objection that a court is an inconvenient forum) to the extent that the validity, binding effect or enforceability of any such provision is to be determined by any court other than a state court of the State of New York, (ii) waivers by the Company of any statutory or constitutional rights or remedies, (iii) terms which excuse any person or entity from liability for, or require the Company to indemnify such person or entity against, such person's or entity's negligence or willful misconduct, (iv) obligations to pay any prepayment premium, default interest rate, early termination fee or other form of liquidated damages, if the payment of such premium, interest rate, fee or damages may be construed as unreasonable in relation to actual damages or disproportionate to actual damages suffered as a result of such prepayment, default or termination, or (v) provisions providing that the terms of agreement may not be waived or modified except in writing.

CHF Solutions, Inc.  
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We hereby consent to the filing of this opinion as Exhibit 5.1 to the Registration Statement and to the reference to our firm under the caption “Legal Matters” in the Registration Statement. In giving such consent, we do not admit that we are within the category of persons whose consent is required by Section 7 of the Securities Act or the rules and regulations promulgated thereunder by the Commission. This opinion is expressed as of the date hereof, and we disclaim any undertaking to advise you of any subsequent changes in the facts stated or assumed herein or of any subsequent changes in applicable law.

Very truly yours,

/s/ HONIGMAN LLP

HONIGMAN LLP

PDT/JQW/REW

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the inclusion in this Amendment No. 2 to the Registration Statement on Form S-1/A (No. 333-235385) of CHF Solutions, Inc. and subsidiaries of our report dated February 21, 2019, relating to the consolidated financial statements of CHF Solutions, Inc. and subsidiaries (the "Company"), (which report expresses an unqualified opinion on the consolidated financial statements for the year ended December 31, 2018 and includes an explanatory paragraph relating to the substantial doubt about the Company's ability to continue as a going concern as described in Note 1 to the consolidated financial statements), appearing herein.

We also consent to the reference to us under the heading "Experts" in the Prospectus, which is part of this Registration Statement.

/s/ Baker Tilly Virchow Krause, LLP

Minneapolis, Minnesota  
January 3, 2020

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