chf solutions

Corporate Presentation (NASDAQ: CHFS) January 2020

Safe Harbor Statement

This presentation contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended and Section 21E of the Securities and Exchange Act, as amended regarding our plans, expectations, beliefs, estimates, goals and outlook for the future that are intended to be covered by the Private Securities Litigation Reform Act of 1995. Except for statements of historical fact, all forward-looking statements are management's present expectations and are not guarantees of future events and are subject to a number of known and unknown risks and uncertainties and other factors that may cause actual results to differ materially from those expressed in, or implied by, such forward-looking statements. In some cases, you can identify forward-looking statements by terminology such as "may," "will," "could," "would," "should," "plan," "predict," "potential," "project," "promising," "expect," "estimate," "anticipate," "intend," "goal," "strategy," "milestone," and similar expressions and variations thereof. Various factors could cause actual results to differ materially from these statements including our ability to execute on our commercial strategy and to grow our Aquadex FlexFlow® business, our post-market clinical data collection activities, benefits of our products to patients, our expectations with respect to product development and commercialization efforts, our ability to increase market and physician acceptance of our products, potentially competitive product offerings, intellectual property protection, our expectations regarding anticipated synergies with and benefits of the Aquadex FlexFlow business, our business strategy, market size, potential growth opportunities and the other risks set forth under the caption "Risk Factors" and elsewhere in our periodic and other reports filed with the U.S. Securities and Exchange Commission ("SEC"), including our Annual Report on Form 10-K for the fiscal year ended December 31, 2018. We are providing this information as of the date of this presentation we undertake no obligation to update any forward-looking statements contained in this presentation as a result of new information, future events or otherwise. Although the Company believes that the forward-looking statements are reasonable and based on information currently available, it can give no assurances that the Company's expectations are correct. All forward-looking statements are expressly qualified in their entirety by this cautionary statement.

This presentation also contains estimates and other statistical data made by independent parties and by us relating to market shares and other data about our industry. These data involves a number of assumptions and limitations, and you are cautioned not to give undue weight to such estimates.

The trademarks included herein are the property of the owners thereof and are used for reference purposes only. Such use should not be construed as an endorsement of such products.

Aquadex FlexFlow[®] is a registered trademark of CHF Solutions, Inc. Aquadex SmartFlow[™] is a trademark of CHF Solutions, Inc.



Risk Factors

Investing in our securities includes a high degree of risk. You should consider carefully the specific factors discussed below, together with all of the other information contained in our SEC filings. If any of the following risks actually occurs, our business, financial condition, results of operations and future prospects would likely be materially and adversely affected. This could cause the market price of our securities to decline and could cause you to lose all or part of your investment. Risks include but are not limited to:

- We are currently seeking 510(k) FDA approval of the Aquadex FlexFlow System for use in pediatrics, however, there is no guarantee that we will receive approval from the FDA.
- We have a 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.
- 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 revenues.
- We do not have commercial manufacturing experience and could experience difficulties in producing commercial volumes of the Aquadex FlexFlow system and related components or may need to depend on third parties for manufacturing.
- 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 depend upon third-party suppliers, including single source suppliers, making us vulnerable to supply problems and price fluctuations.
- 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.
- 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.
- The company may face significant risks associated with international operations, which could have a material adverse effect on business, financial conditions and results of operations.
- Nasdaq may delist our common stock from its exchange which could limit investors' ability to make transactions in our securities and subject
 us to additional trading restrictions.
- The company has a large number of authorized but unissued shares of stock, which could negatively impact a potential investor if they
 purchased the common stock.
- The company is a "smaller reporting company" under federal securities laws and the company cannot be certain whether the reduced
 reporting requirements applicable to such companies will make the common stock less attractive to investors.



Statement about Free Writing Prospectus

This presentation highlights basic information about us and the offering. Because it is a summary that has been prepared solely for informational purposes, it does not contain all of the information that you should consider before investing in our company. Except as otherwise indicated, this presentation speaks only as of the date hereof.

This presentation does not constitute an offer to sell, nor a solicitation of an offer to buy, any securities by any person in any jurisdiction in which it is unlawful for such person to make such an offering or solicitation.

Neither the Securities and Exchange Commission (the "SEC") nor any other regulatory body has approved or disapproved of our securities or passed upon the accuracy or adequacy of this presentation. Any representation to the contrary is a criminal offense.

This presentation includes industry and market data that we obtained from industry publications and journals, third-party studies and surveys, internal company studies and surveys, and other publicly available information. Industry publications and surveys generally state that the information contained therein has been obtained from sources believed to be reliable. Although we believe the industry and market data to be reliable as of the date of this presentation, this information could prove to be inaccurate. Industry and market data could be wrong because of the method by which sources obtained their data and because information cannot always be verified with complete certainty due to the limits on the availability and reliability of raw data, the voluntary nature of the data gathering process and other limitations and uncertainties. In addition, we do not know all of the assumptions that were used in preparing the forecasts from the sources relied upon or cited herein.

We have filed a Registration Statement on Form S-1 with the SEC, including a preliminary prospectus dated January 3, 2020 (the "Preliminary Prospectus"), with respect to the offering of our securities to which this communication relates. Before you invest, you should read the Preliminary Prospectus (including the risk factors described therein) and, when available, the final prospectus relating to the offering, and the other documents filed with the SEC and incorporated by reference into the Preliminary Prospectus, for more complete information about us and the offering. You may obtain these documents, including the Preliminary Prospectus, for free by visiting EDGAR on the SEC website at http://sec.gov.

Alternatively, we or any underwriter participating in the offering will arrange to send you the prospectus if you request it by contacting Ladenburg Thalmann & Co. Inc., Attn: Prospectus Department, 277 Park Avenue, 26th Floor, New York, NY 10172, by calling (212) 409-2000 or by email at prospectus@ladenburg.com.



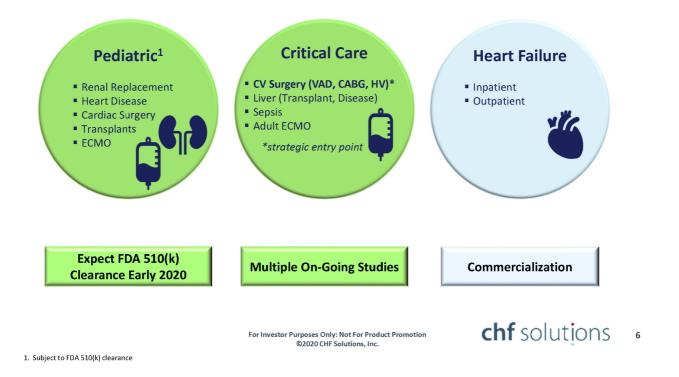


CHF Solutions is dedicated to changing the lives of patients suffering from fluid overload through science, collaboration, and innovation.



Addressable Target Segments

> We are transitioning from a primary focus on the chronic needs in heart failure to the acute needs in cardiac surgery and, we anticipate soon, to the life-saving therapy in pediatric care



Upcoming Key Milestones	Expected Timing
FDA 510(k) clearance of:	
\circ Expanded use in pediatric population (≥ 20kg)	Q1 2020
 Next generation Aquadex SmartFlow[™] console 	
 Receive CE mark for Aquadex SmartFlow 	Q1 2020
 U.S. pediatric market introduction of Aquadex SmartFlow 	Q2 2020
 Initiate Tampa VA clinical study on outpatient use of Aquadex SmartFlow 	Q2 2020
 Expanded clinical study results of aquapheresis in tandem with extracorporeal membrane oxygenation (ECMO) in pediatric patients 	Q2 2020
 Submit Category I CPT code application for aquapheresis using Aquadex SmartFlow 	Q2 2020
 Results of Mt Sinai 200 patient retrospective study in post cardiovascular surgery to be published at American College of Cardiology (ACC) meeting (submission October 2020) 	Q3 2020
 Abington-Jefferson retrospective single-center heart failure study to be published at Heart Failure Society of America (HFSA) 	Q3 2020
 Final publication of therapy into advanced liver disease (pre & post transplant) at Mt. Sinai Hospital. 	Q4 2020

For Investor Purposes Only: Not For Product Promotion ©2020 CHF Solutions, Inc.

Next Generation Aquadex

Expect FDA 510(k) Clearance Early 2020 Expect CE Mark Q1 2020





Simple	Easy set-up and monitoring allowing for a 4:1 nurse to patient ratio
Flexible	Deliver safe and precise therapy with the ability to adjust the fluid removal rate and volume to meet each patient's clinical need
Smart	Filter Alert prompts action to extend life and reduce therapy time
	Hct informs therapy triage and termination decisions
	Sv02 to help determine the amount of oxygen delivered to the body and guide therapy decisions
	Track fluid removed more easily than today's manual process

New ease of use and diagnostic features that provide therapeutic insights are expected to result in **greater account penetration** (more consoles per account) **and utilization** (more circuits per console)



The Aquadex SmartFlow offers a new and differentiated treatment in critical underserved markets:

	Ultrafiltration (Dedicated)	Pediatrics Ultrafiltration	Critical Care – Continuous Renal Replacement Therapy ("CRRT")
chf solutions	U.S. / Int'l Approval	Pending 510(k) (est. early 2020) & Int'l Approval	Potential for more effective treatment with Aquadex
Baxter	-	-	U.S. / Int'l Approval
F FRESENIUS	-	-	U.S. / Int'l Approval
B BRAUN SHARING EXPERTISE	-	-	Int'l Approval No US Approval
Medtronic	Int'l Approval No US Approval	Inť I Approval No US Approval	Int'l Approval No US Approval
NIKKISO	-	-	Int'l Approval No US Approval

For Investor Purposes Only: Not For Product Promotion ©2020 CHF Solutions, Inc.

chf solutions

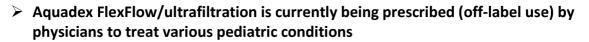
Pediatric Opportunity



"For our babies born with diseased or absent kidneys, Aquadex has given them a chance at life because in the past, there were no options to treat these patients."

Kara Short, MSN, CRNP, NICU nurse practitioner at Alabama Children's Hospital

Pediatrics: Providing a Solution in an Underserved Market



Acute

- Kidney replacement therapy (11,000 patients/yr)¹
- Cardiac surgery (10,000 procedures/yr)²
- Extracorporeal membrane oxygenation (ECMO) therapy (6,000 procedures/yr)³
- Solid organ transplantation (2,000 procedures/yr)⁴

Chronic

Heart Disease (12,000 patients/yr)⁵



Expect FDA 510(k) label expansion in pediatrics early 2020

1. https://www.ncbi.nlm.nih.gov/pubmed/23833312

- 2. https://www.cdc.gov/ncbddd/heartdefects/data.html
- 3. https://www.ncbi.nlm.nih.gov/pubmed/23246046. 4. https://www.organdonor.gov/about/donors/child-infant.html
- http://www.heartviews.org/article.asp?issn=1995-705X;year=2016;volume=17;issue=3;spage=92;epage=99;aulast=Jayaprasad



Aquadex is Providing Pediatric Patients at High Risk of Mortality an Opportunity at Life



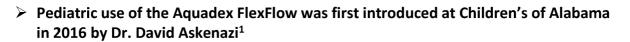
Patient's Weight	Survival	Rate with Aquadex	
< 10kg		60%]⊷
10kg – 20kg		100%	Í .
> 20kg		97%	
Attributes		Grp 1: <10 kg	Grp 2: 10-20kg
# of patients		N=72	N=13
Median age		19 days	26 months
Median weight at therap	y onset	4.1 kg	15.1 kg
Primary disease		43% kidney	54% kidney
•		29% cardiac	31% other
Predominant indication		46% Volume overload	54% Volume overload
Common modality		67% CVVH	62% CVVH
Median blood flow rate,	ml/min	40	40
Median # days on UF		9	7
Median # of circuits		4	3
Cardioresp. support at in w/ complications at initia	•	3%	7%
Survival at end of treatm	ent	43 (60%)	13 (100%)
Survival at hosp discharg	e	23 (32%)	11 (85%)
Survival at 1-yr		12 (52%)	8 (73%)
Most prevalent complica	tions	Transient hypotension (30), filter clot (37)	Transient hypotension (3), filter clot (9)

Clinical Data Overview: Patients who received therapy with Aquadex FlexFlow from January 2012 – March 2018 (n=119 admissions, 884 circuits); Three centers: Children's of Alabama, Cincinnati Children's Hospital and Seattle Children's Hospital (Menon S. et al. CJASN. August 28, 2019)

For Investor Purposes Only: Not For Product Promotion ©2020 CHF Solutions, Inc.

Subject to FDA 510(k) clearance for pediatric use

Children's of Alabama – Pioneer of Aquadex Use in **Pediatrics**



Today, 97% of therapy initiations occur without hemodynamic changes, meaning that the hospital gets pediatric patients on the machine safely²

Sample Pediatric Patient Case Study ³		
Age	2.5 years	
Average Weight for Age	30 lbs.	
Actual Weight with Fluid Overload	50 lbs.	
Prior to Aquadex Treatment	 Nephrotic syndrome No response to diuretics or other therapies Unable to walk Potential risk to heart and lung function 	
Aquadex Treatment	 Daily treatment for 2 weeks 	
Result	 Removal of 20 lbs. of fluid 	

Children critically ill with fluid overload from heart failure, liver failure and sepsis have also benefitted from the use of Aquadex FlexFlow¹

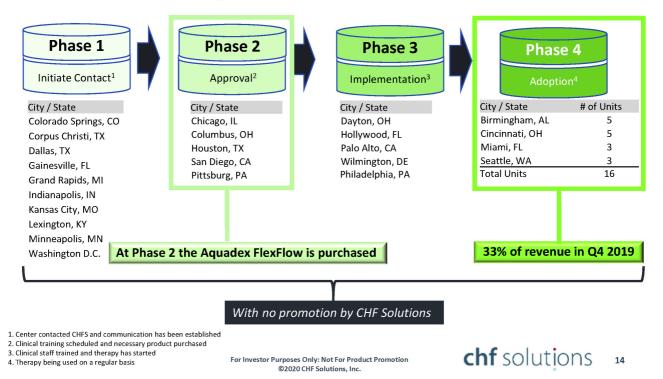
1. Aquadex FlexFlow® modified for pediatric use by staff at Children's of Alabama without promotion or training by CHF Solutions

Birmingham Medical News "Adapting Technology Saves Tiny Patients"; December 17, 2019
 Sample patient case study. Individual clinical results may vary

For Investor Purposes Only: Not For Product Promotion ©2020 CHF Solutions, Inc.

Subject to FDA 510(k) clearance for pediatric use

The Aquadex FlexFlow is being used in 24 metro areas in the U.S. for pediatric use without sales and marketing by CHF Solutions (pending 510(k) clearance for pediatric use)



Joe DiMaggio Children's Hospital Uses Aquadex FlexFlow In Tandem With ECMO In Pediatric Patients

- Extracorporeal Membrane Oxygenation (ECMO) is an advanced form of life support that does the work of the heart and lungs when those organs are failing
- Children with cardiopulmonary failure requiring ECMO are at risk for fluid overload; it has been shown that survival in the ICU is inversely proportional to fluid overload¹

Sample ECMO + Aquadex Pediatric Patient Case Study ^{1,2}		
Age	4 years	
Indication for ECMO	Septic Shock due to Streptococcus Pyogenes	
Indication for AQ	Fluid Removal because of AKI stage 3	
Outcome	 Initiated AQ on ECMO day 3 Remove ECMO and AQ on ECMO day 4 Transferred out of PICU on hospital day 13 	
Aquadex Treatment	 17 hours 	
Result	 Patient discharged home on hospital day 18 	

The use of Aquadex FlexFlow provides a simplified and safe form of fluid removal with minimal impact on ECMO therapy and renal function¹

1. Aquapheresis (AQ) in Tandem with Extracorporeal Membrane Oxygenation (ECMO) in Pediatric Patients; J Extra Corpor Technol. 2019;51:163-8

2. Sample patient case study. Individual clinical results may vary

For Investor Purposes Only: Not For Product Promotion ©2020 CHF Solutions, Inc.



Subject to FDA 510(k) clearance for pediatric use



chf solutions

Critical Care Opportunity

For Investor Purposes Only: Not For Product Promotion ©2020 CHF Solutions, Inc.

16

Critical Care: Ultrafiltration Critical to Success in Fluid Overloaded, Critically III Patients



- Many large-volume hospitals use Aquadex FlexFlow as a treatment for fluid overload in the ICU setting
- The clinical reason for fluid overload in critically ill patients is related to the requirement for fluid resuscitation (infusion of fluids to maintain hemodynamics)
- In a retrospective study of Aquadex FlexFlow utilization at Lenox Hill Hospital in NYC, 23 patients were treated safely in situations, other than heart failure, without effecting renal function¹

Hospital Location Where Aquadex FlexFlow is Used in Critically III ${\rm Patients}^1$

- Cardiothoracic Intensive Care Unit (ICU)
- Critical Care Unit
- Medical ICU
- Surgical ICU

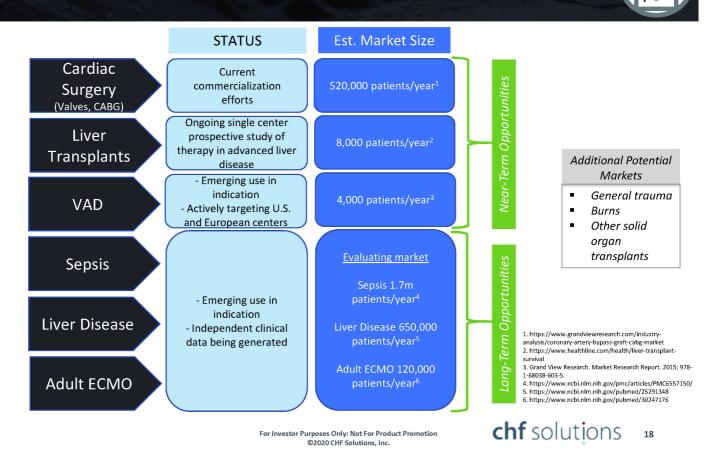
Indications for Prescribing Aquadex FlexFlow in Critically III Patients¹

- Cardiogenic shock, including post CTS
- Anasarca (general tissue fluid accumulation)
- Acute Tubular Necrosis (ATN) with volume overload
- End-stage renal disease between hemodialysis
- Post-operative volume overload

1. Aquapheresis: An Institutional Experience at Lenox Hill Hospital (Abstract presented a the 2019 ANS)



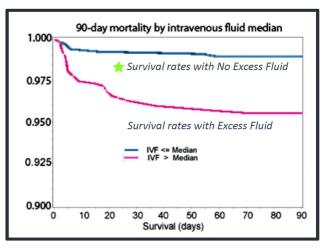
Critical Care Growth Opportunities



Acute Need in Cardiac Surgery: Fluid Overload is Associated with Greater Mortality

Fluid Overload is Associated with 300% Increase in 90 Day Mortality Rates Post CV Surgery

- Retrospective analysis on 1,358 patients who underwent cardiac surgery
- Greater amount of IV fluid during cardiac surgery associated with *three-fold increase* in mortality at 90 days



Source: Pradeep, A. et al. HSR Proc IC and Car An. 2010 Mar; 2(4): 287-296



Aquadex FlexFlow Provides Significant Clinical and Economic Benefits in CV Surgery

- Modified ultrafiltration reduces duration of assisted ventilation post cardiac surgery^{1,2,3}
- Ultrafiltration associated with decreases in certain post-operative complications^{4,5,6,7}
- Aquadex FlexFlow not considered renal replacement therapy from a quality reporting standpoint
- No Nephrology consultation required to prescribe Aquadex FlexFlow
- Featured sponsorship of CV usage discussion at Society of Thoracic Surgeons by Daniel Beckles, M.D., Ph.D.



1.Luciani GB, et al. Circulation. 2001 Sep 18;104(12 Suppl 1): 1253-1259. 2. Kiziltepe, U, et al. Ann Thorac Surg. 2001 Feb;71(2): 684-93. 3. Grunenfelder et al. Eur J of Cardio-Thoracic surgery.2000; 17:77-83. 4. Sahoo TK, et al. Indian J Thorac Cardiovas Surg. 2007 Jun;23(2):116-124. 5. Boodhwani M et al. Eur J Cardiothorac Surg. 6. Torina et al. J of Thorac Cardiovasc Surg. 2012;144:663-70. 7. Papadppoulos et al. Perfusion. 2013;28:306-14.



chf solutions

Heart Failure Opportunity

Heart Failure ("HF") – Opportunity in the 30 Days Readmission Patient Population

- Over 1 million heart failure ("HF") hospitalizations annually in the US and 90% of these are due to fluid overload¹
 - 68% show sub-optimal response, 40% exhibiting diuretic resistance ("failure")³. Nearly 50% of patients are discharged with residual excess fluid¹
 - Worsening heart failure with increased mortality after discharge¹
- Several publications support the use of Aquadex FlexFlow to lower rehospitalization rates in CHF patients¹
 - Per patient savings of \$3,975 over 90 days when Aquadex FlexFlow is used compared to diuretics²
- Expect to submit Category I CPT code application for aquapheresis using Aquadex SmartFlow in Q2 2020





1. Costanzo MR, et al., J Am Coll Cardiol., 2017; 69: 2428-45 2. Costanzo MR et al., Poster presented at ISPOR 23rd Annual International Meeting, May 19-23, Baltimore, MD, USA. 3. Testani, Circ Heart Failure, 2016;9:e002370



Outpatient Opportunity Update

Tampa VA Clinical Study on Outpatient Use of Aquadex

- Goal: Manage HF patients proactively to avoid 30-day readmissions
- \$6.5M blanket purchase agreement received for outpatient trial
- Aquadex FlexFlow vs. IV diuretics in outpatient setting
- Prospective, randomized 80 patient study
- Q2 2020 initiation IRB Approved. Awaiting first patient
- Primary outcomes: weight change and rehospitalizations
- Secondary endpoints: fluid removal, renal function, cost effectiveness, QOL, etc.

Active Aquadex FlexFlow Outpatient Programs

- MedStar Good Samaritan Hospital (Baltimore, MD)
- Advocate Good Samaritan Hospital (IL)
- Aquadex FlexFlow Outpatient Program Pipeline
 - Oklahoma Heart Institute (OK)
 - Christ Hospital (Cincinnati, OH)
 - Ohio State University (Columbus, OH)
- Expect to submit Category I CPT code application in Q2 2020



For Investor Purposes Only: Not For Product Promotion ©2020 CHF Solutions, Inc.

Expanding Commercial Distribution

In Q3/Q4 2019, we refocused our sales force towards the cardiac surgery and pediatrics markets



- US direct sales team of 13 sales territories and 14 clinical education specialists
- Distribution partners in UK, Italy, Germany, Spain, Greece, Singapore, Hong Kong, Thailand, India & Brazil

For Investor Purposes Only: Not For Product Promotion ©2020 CHF Solutions, Inc.

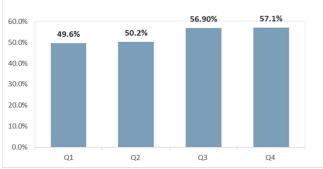
chf solutions

Financials & Capitalization

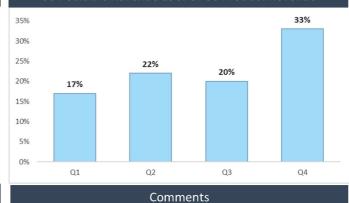
Financial Metrics



2019 Quarterly Gross Margin



US Pediatric Revenue as % of US Product Revenue

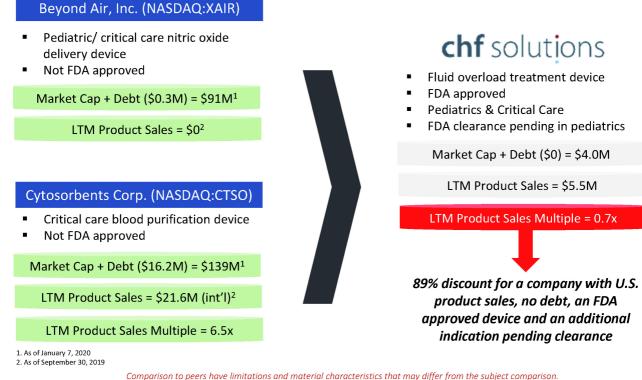


- Q3 2019: clinical pediatric publication
- Q3-Q4 2019: commenced salesforce refocus to cardiac surgery and pediatrics

Note: Q4 2019 numbers are preliminary



Comparable Pediatric and Critical Care Companies



n to peers have limitations and material characteristics that may differ from the s For informational purposes only

For Investor Purposes Only: Not For Product Promotion ©2020 CHF Solutions, Inc.

Cash as of December 31, 2019: \$1.3M

No debt

Capitalization as of December 31, 2019	Common Stock or Equivalents
Common Shares Outstanding (Nasdaq CHFS)	4,674,068
Series F Convertible Preferred ¹	538,210
Options (weighted average exercise price \$21.56)	405,730
Warrants ² (weighted average exercise price \$7.06)	6,948,466
Fully Diluted Shares	12,566,474

1. 535 shares convertible at \$0.9942 per share, anti-dilution rights

Consists of: a) 4.7 million Series 1 and Series 2 warrants exercisable at \$5.25, half expire within 30 days of announcement of a pediatric label modification by the FDA, half expire Mar 2024, b) 1,219,076 warrants exercisable at \$0.9942, expiring Nov 2024, c) 575,830 warrants exercisable at \$1.41 expiring Apr 2025, d) 277,161 warrants exercisable at \$29.7, expiring in Nov 2024; e) 9,494 warrants exercisable at \$63.0, expiring Nov 2024; and f) 135,477 warrants exercisable at a weighted average exercise price of \$98.7, expiring Feb 2022-Feb 2025. No anti-dilution provision on any warrants.



- Medical device company with near- and long- term growth opportunities:
 - Pediatrics: providing a solution to an underserved market; seeking 510(k) clearance
 - Cardiac Surgery & Critical Care: Leveraging acute need to reduce mortality and drive adoption with clinical/economic benefits
 - Heart Failure: Largest market opportunity. Increasing focus in outpatient hospital clinics and leveraging Tampa VA outpatient clinical study
- Sales force focus on new underserved market opportunities
- > Anticipated key milestones in 2020 including, but not limited to:
 - Pediatric 510(k) clearance: early 2020
 - Tampa VA first patient enrollment in outpatient study Q2 2020
 - Clinical publications for use in CV Surgery, HF and advanced Liver disease in Q3/Q4 2020
 - Therapy initiation in several hospital systems for Pediatrics, CV Surgery, and advanced Liver disease

For Investor Purposes Only: Not For Product Promotion ©2020 CHF Solutions, Inc.