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

FORM 10-Q

(Mark One)

QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the quarterly period ended March 31, 2015

or

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from _____ to _____

Commission File Number: 001-36201

Vital Therapies, Inc.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction of
incorporation or organization)

15010 Avenue of Science, Suite 200
San Diego, CA
(Address of principal executive offices)

56-2358443
(I.R.S. Employer
Identification No.)

92128
(Zip Code)

(858) 673-6840
(Registrant's telephone number, including area code)

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes No

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes No

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

Large accelerated filer Accelerated filer
Non-accelerated filer (Do not check if a smaller reporting company) Smaller reporting company

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes No

The number of shares of common stock outstanding as of the close of business on April 30, 2015:

Class
Common Stock, \$0.0001 par value

Number of Shares Outstanding
24,012,313

[Table of Contents](#)

Table of Contents

VITAL THERAPIES, INC.
INDEX

	<u>Page No.</u>
PART I - FINANCIAL INFORMATION	
Item 1. Financial Statements (Unaudited)	
Condensed Consolidated Balance Sheets	3
Condensed Consolidated Statements of Operations	4
Condensed Consolidated Statements of Comprehensive Loss	5
Condensed Consolidated Statements of Cash Flows	6
Notes to Condensed Consolidated Financial Statements	7
Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations	16
Item 3. Quantitative and Qualitative Disclosures About Market Risk	22
Item 4. Controls and Procedures	22
PART II - OTHER INFORMATION	
Item 1. Legal Proceedings	23
Item 1A. Risk Factors	23
Item 2. Unregistered Sales of Equity Securities and Use of Proceeds	47
Item 5. Other Information	48
Item 6. Exhibits	49

[Table of Contents](#)

VITAL THERAPIES, INC.
Condensed Consolidated Balance Sheets
(In thousands, except share and per share amounts)
(Unaudited)

	March 31, 2015	December 31, 2014
Assets		
Current assets:		
Cash and cash equivalents	\$ 88,257	\$ 102,238
Restricted cash	1,533	1,592
Other current assets and prepaid expenses	828	986
Total current assets	90,618	104,816
Property and equipment, net	4,108	3,068
Other assets	198	198
Total assets	<u>\$ 94,924</u>	<u>\$ 108,082</u>
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	\$ 1,128	\$ 1,153
Accrued expenses	9,591	8,875
Other current liabilities	227	250
Total current liabilities	10,946	10,278
Other long-term liabilities	200	241
Commitments and contingencies		
Stockholders' equity:		
Preferred stock, \$0.0001 par value; 20,000,000 authorized and no shares issued or outstanding at March 31, 2015 and December 31, 2014	—	—
Common stock, \$0.0001 par value; 130,000,000 shares authorized at March 31, 2015 and December 31, 2014; 24,010,351 and 23,982,786 shares issued and outstanding at March 31, 2015 and December 31, 2014, respectively	2	2
Additional paid-in capital	249,276	248,305
Accumulated other comprehensive income	90	89
Accumulated deficit	(165,590)	(150,833)
Total stockholders' equity	83,778	97,563
Total liabilities and stockholders' equity	<u>\$ 94,924</u>	<u>\$ 108,082</u>

The accompanying notes are an integral part of these unaudited condensed consolidated financial statements.

VITAL THERAPIES, INC.
Condensed Consolidated Statements of Operations
(In thousands, except share and per share amounts)
(Unaudited)

	Three Months Ended March 31,	
	2015	2014
Operating expenses:		
Research and development	\$ 11,753	\$ 9,219
General and administrative	3,064	2,657
Total operating expenses	14,817	11,876
Loss from operations	(14,817)	(11,876)
Other income (expense):		
Interest income	10	2
Other income (expense), net	49	(2)
Revaluation of future purchase rights liabilities	—	1,128
Total other income (expense)	59	1,128
Net loss	(14,758)	(10,748)
Amortization of deemed dividend	—	(22)
Accretion to redemption value of redeemable convertible preferred stock	—	(3,048)
Net loss attributable to common stockholders	\$ (14,758)	\$ (13,818)
Net loss per share attributable to common stockholders, basic and diluted	\$ (0.62)	\$ (24.49)
Weighted-average common shares outstanding, basic and diluted	23,972,599	564,186

The accompanying notes are an integral part of these unaudited condensed consolidated financial statements.

VITAL THERAPIES, INC.
Condensed Consolidated Statements of Comprehensive Loss
(In thousands)
(Unaudited)

	Three Months	
	Ended March 31,	
	2015	2014
Net loss	\$(14,758)	\$(10,748)
Other comprehensive income (loss):		
Foreign currency translation	1	(1)
Total comprehensive loss	<u>\$(14,757)</u>	<u>\$(10,749)</u>

The accompanying notes are an integral part of these unaudited condensed consolidated financial statements.

VITAL THERAPIES, INC.
Condensed Consolidated Statements of Cash Flows
(In thousands)
(Unaudited)

	Three Months	
	Ended March 31,	
	2015	2014
Cash flows from operating activities:		
Net loss	\$ (14,758)	\$(10,748)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation and amortization	294	297
Stock-based compensation	803	435
Revaluation of future purchase rights liabilities	—	(1,128)
Other	—	(45)
Changes in operating assets and liabilities:		
Other current assets and prepaid expenses	162	(81)
Accounts payable	111	(58)
Accrued expenses	(80)	1,964
Other liabilities	(38)	—
Net cash used in operating activities	<u>(13,506)</u>	<u>(9,364)</u>
Cash flows from investing activities:		
Purchases of property and equipment	(674)	(809)
Change in restricted cash	59	(44)
Net cash used in investing activities	<u>(615)</u>	<u>(853)</u>
Cash flows from financing activities:		
Proceeds from issuance of preferred stock, net of issuance costs	—	18,167
Proceeds from exercise of stock options	139	—
Deferred financing costs	—	(94)
Net cash provided by financing activities	<u>139</u>	<u>18,073</u>
Effect of exchange rate changes on cash and cash equivalents	<u>1</u>	<u>(1)</u>
Net change in cash and cash equivalents	(13,981)	7,855
Cash and cash equivalents, beginning of period	<u>102,238</u>	<u>38,186</u>
Cash and cash equivalents, end of period	<u>\$ 88,257</u>	<u>\$ 46,041</u>
Supplemental disclosure of noncash investing and financing activities:		
Deferred financing costs included in liabilities	<u>\$ —</u>	<u>\$ 336</u>
Accretion to redemption value of redeemable convertible preferred stock	<u>\$ —</u>	<u>\$ 3,048</u>
Amortization of deemed dividend	<u>\$ —</u>	<u>\$ 22</u>
Purchase of property and equipment through liabilities	<u>\$ 934</u>	<u>\$ 102</u>
Release of repurchase liability	<u>\$ 26</u>	<u>\$ 26</u>

The accompanying notes are an integral part of these unaudited condensed consolidated financial statements.

VITAL THERAPIES, INC.
Notes to Condensed Consolidated Financial Statements
(Unaudited)

1. Description of Business and Basis of Financial Statements

Description of Business

We are a biotherapeutic company focused on developing a cell-based therapy targeting the treatment of liver failure. Our product candidate, currently in Phase 3 clinical trials, the ELAD[®] System, or ELAD, is an extracorporeal human allogeneic cellular liver therapy designed to allow the patient's own liver to regenerate to a healthy state, or to stabilize the patient until transplant. Since inception, we have devoted essentially all of our efforts to product development, clinical testing and pilot manufacturing and have not realized revenues from our planned principal operations. Our business, operating results, financial condition, and growth prospects are subject to significant risks and uncertainties, including failing to obtain regulatory approval to commercialize and failing to secure additional funding to complete development of and to commercialize our product candidate.

Unaudited Interim Financial Information

The results for the three months ended March 31, 2015 are not necessarily indicative of results to be expected for the year ending December 31, 2015, any other interim or any future year or period. These unaudited condensed consolidated financial statements should be read in conjunction with the audited consolidated financial statements and notes thereto for the year ended December 31, 2014, included in our Annual Report on Form 10-K filed with the Securities and Exchange Commission on March 20, 2015.

Basis of Presentation and Consolidation

The accompanying unaudited interim condensed consolidated financial statements have been prepared in accordance with U.S. generally accepted accounting principles (GAAP) and the rules and regulations of the Securities and Exchange Commission, or the SEC, related to a quarterly report on Form 10-Q. Certain information and note disclosures normally included in annual financial statements prepared in accordance with GAAP have been condensed or omitted pursuant to those rules and regulations. The condensed consolidated balance sheet as of December 31, 2014 included in this report has been derived from the audited consolidated financial statements included in our Annual Report on Form 10-K. The unaudited interim condensed consolidated financial statements have been prepared on the same basis as the annual audited consolidated financial statements and, in the opinion of management, reflect all adjustments that are necessary for a fair statement of the financial position, results of operations and cash flows for the periods presented. All such adjustments are of a normal and recurring nature.

The unaudited interim condensed consolidated financial statements include the accounts of Vital Therapies, Inc. and its wholly-owned subsidiaries located in the United Kingdom (currently inactive) and China. All intercompany accounts and transactions have been eliminated in consolidation. We manage our operations as a single segment for the purposes of assessing performance and making operating decisions.

2. Summary of Significant Accounting Policies

Use of Estimates

The preparation of financial statements in conformity with GAAP requires us to make certain estimates and assumptions that affect the amounts reported in the consolidated financial statements and accompanying notes. Actual results could differ materially from those estimates and assumptions.

Cash and Cash Equivalents

Cash and cash equivalents consist of cash and highly-liquid investments with original maturities of three months or less when acquired and are stated at cost, which approximates market value.

Restricted Cash

Restricted cash relates to amounts reserved for various clinical trial obligations and lease arrangements.

[Table of Contents](#)

Fair Value of Financial Instruments

Fair value is defined as the price that would be received to sell an asset or be paid to transfer a liability in an orderly transaction between market participants on the measurement date. Accounting guidance establishes a fair value hierarchy that requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. The standard describes three levels of inputs that may be used to measure fair value:

Level 1—Quoted prices in active markets for identical assets or liabilities. Our Level 1 assets consisted of money market funds for the periods presented. We had no Level 1 liabilities for any period presented.

Level 2—Observable inputs other than Level 1 prices, such as quoted prices for similar assets or liabilities, quoted prices in markets with insufficient volume or infrequent transactions (less active markets), or model-derived valuations in which all significant inputs are observable or can be derived principally from or corroborated with observable market data for substantially the full term of the assets or liabilities. We had no Level 2 assets or liabilities for any period presented.

Level 3—Unobservable inputs to the valuation methodology that are significant to the measurement of the fair value of assets or liabilities. Historically, our Level 3 liabilities consisted of future purchase rights liabilities. We had no Level 3 assets or liabilities as of March 31, 2015 or December 31, 2014. We estimated the fair value of the future purchase rights using a binomial lattice model depending on the underlying attributes of the future purchase rights, as applicable. See “Future Purchase Rights Liabilities” below.

The Company recognizes transfers into and out of levels within the fair value hierarchy at the end of the reporting period in which the actual event or change in circumstances that caused the the transfer occurs.

The carrying value of cash and cash equivalents, restricted cash, other current assets and prepaid expenses, accounts payable, and accrued expenses approximate fair value due to the short period of time to maturity.

Property and Equipment, Depreciation and Amortization

Property and equipment are recorded at cost and depreciated using the straight-line method over the estimated useful lives of the assets (generally three to five years). Leasehold improvements are stated at cost and amortized on a straight-line basis over the lesser of the remaining term of the related lease or the estimated useful lives of the assets. Construction in progress is not depreciated until the underlying asset is available to be placed in service. Repairs and maintenance costs are charged to expense as incurred.

Impairment of Long-lived Assets

Long-lived assets consist primarily of property and equipment. An impairment loss is recorded if and when events and circumstances indicate that assets might be impaired and the undiscounted cash flows estimated to be generated by those assets are less than the carrying amount of those assets. While our current and historical operating losses and negative cash flows are indicators of impairment, we believe that our expected future cash flows to be received support the carrying value of our long-lived assets and, accordingly, have not recognized any impairment losses through March 31, 2015.

Future Purchase Rights Liabilities

In September 2012, we entered into a senior preferred stock purchase agreement pursuant to which we granted the investors the right to purchase additional shares of senior preferred stock. These future purchase rights liabilities were initially recorded at their estimated fair value on the date of issuance as a discount on the underlying preferred stock and were re-measured to reflect changes in the estimated fair value at each reporting date, with any decrease or increase in the estimated fair value being recorded as other income or expense, respectively. The fair value of these liabilities was estimated using a binomial lattice model that was based on the characteristics of the common and preferred stock on the valuation date, probabilities related to our operations and clinical development, as well as assumptions for volatility, remaining expected life, risk-free interest rate and, in some cases, credit spread. Changes in the fair value of the future purchase rights fluctuated in conjunction with increases or decreases in the implied fair value of our common stock, and the number of preferred and common shares and future purchase rights outstanding relative to our enterprise value at each reporting date. In April 2014, the remaining future purchase rights terminated upon the conversion of all senior preferred stock to common stock in conjunction with our initial public offering, or IPO, with the remaining balance of the future purchase rights liabilities recorded as other income in our statement of operations for the applicable period.

Research and Development

Research and development costs consist primarily of employee-related expenses, contractors, clinical trial sites and contract research organizations engaged in the development of the ELAD System, investigation of the mechanism of action of the ELAD System, expenses associated with obtaining regulatory approvals, and the cost of acquiring and manufacturing clinical trial materials. All research and development costs are expensed as incurred.

Stock-based Compensation

We measure and recognize compensation expense for all stock-based payments made to employees and directors based on estimated fair value, net of an estimated forfeiture rate, and to consultants based on estimated fair value. Currently, our stock-based awards consist only of stock options; however, future grants under our equity compensation plans may consist of shares of restricted stock and restricted stock units. We estimate the fair value of stock options granted using the Black-Scholes-Merton, or BSM, option pricing model, which requires the use of estimates to value employee stock-based compensation at the date of grant.

We recognize stock-based compensation cost for employees and directors on a straight-line basis over the requisite service period of the award. Stock-based compensation expense is recognized only for those awards that are ultimately expected to vest. We estimate forfeitures based on an analysis of our historical employee turnover and will continue to evaluate the appropriateness of the forfeiture rate based on actual forfeiture experience, analysis of employee turnover and other factors. We will revise the forfeiture estimate, if necessary, in subsequent periods if actual forfeitures differ from those estimates. Changes in forfeiture estimates, which have not been material to date, impact compensation cost in the period in which the change in estimate occurs.

The fair value of options granted to consultants is estimated using the BSM option pricing model and is remeasured at each reporting date with changes in fair value recognized as expense in the consolidated statements of operations.

The BSM option pricing model requires the input of highly subjective assumptions, including the risk-free interest rate, the expected dividend yield of our common stock, the expected volatility of the price of our common stock, and the expected term of the option. These estimates involve inherent uncertainties and the application of management's judgment. If factors change and different assumptions are used, our stock-based compensation expense could be materially different in the future. These assumptions are estimated as follows:

Risk-free Interest Rate

We base the risk-free interest rate assumption on zero-coupon U.S. treasury instruments appropriate for the expected term of the stock option grants.

Expected Dividend Yield

We base the expected dividend yield assumption on the fact that we have never paid cash dividends and have no present intention to pay cash dividends. Consequently, we used an expected dividend yield of zero.

Expected Volatility

The expected stock price volatility for our common stock is estimated based on volatilities of a peer group of similar publicly-traded, biotechnology companies by taking the average historic price volatility for the peers for a period equivalent to the expected term of the stock option grants. We do not use our average historic price volatility as we have only been a publicly-traded company since April 2014.

Expected Term

The expected term represents the period of time that options are expected to be outstanding. As we do not have sufficient historical experience for determining the expected term of the stock option awards granted we have determined the expected life assumption using either the simplified method, which is an average of the contractual term of the option and its ordinary vesting period, or the comparable average expected term utilizing those companies in the peer group as noted above.

Common Stock Valuation

Due to the absence of a public market trading our common stock prior to the completion of our IPO in April 2014, it was necessary to estimate the fair value of the common stock underlying our stock-based awards when performing fair value calculations using the BSM option pricing model. The fair value of the common stock underlying our stock-based awards was assessed by our board of directors. All options to purchase shares of our common stock have been granted with an exercise price per share no less than the fair value per share of our common stock underlying those options on the date of grant.

In the absence of a public trading market for our common stock, we determined the estimated fair value of our common stock using methodologies, approaches, and assumptions consistent with the American Institute of Certified Public Accountants Audit and Accounting Practice Aid Series: *Valuation of Privately Held Company Equity Securities Issued as Compensation*.

Leases

We lease all of our office space and enter into various other operating lease agreements in conducting our business. At the inception of each lease, we evaluate the lease agreement to determine whether the lease is an operating or capital lease. Some of our lease agreements may contain renewal options, tenant improvement allowances, rent holidays or rent escalation clauses. When such items are included in a lease agreement, we record a deferred rent asset or liability equal to the difference between the rent expense and future minimum lease payments due. The rent expense related to operating leases is recognized on a straight-line basis in the statements of operations over the terms of the leases. In cases where our lessor grants to us leasehold improvement allowances that reduce our rent expense, we capitalize the improvements as incurred and recognize deferred rent, which is amortized over the shorter of the lease term or the expected useful life of the improvements.

[Table of Contents](#)

Comprehensive Loss

Comprehensive loss is defined as the change in equity during a period from transactions and other events and circumstances from non-owner sources and has been reflected as a separate component of stockholders' equity in the accompanying condensed consolidated balance sheets.

Foreign Currency Translation and Transactions

The functional currencies of each our subsidiaries in the United Kingdom (currently inactive) and China is the local currency. Assets and liabilities of the subsidiaries are translated at the rate of exchange at the balance sheet date. Expenses are translated at the average rate of exchange rates in effect during the reporting period. Gains and losses resulting from foreign currency translation are included in accumulated other comprehensive income in the accompanying condensed consolidated balance sheets. Gains and losses resulting from foreign currency transactions are included in the results of operations, which to date, have not been significant.

Income Taxes

We account for income taxes under the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the consolidated financial statements. Under this method, deferred tax assets and liabilities are determined on the basis of the differences between the financial statements and tax basis of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. The effect of a change in tax rates on deferred tax assets and liabilities is recognized in income in the period that includes the enactment date.

We recognize net deferred tax assets to the extent we believe these assets are more likely than not to be realized. In making such a determination, management considers all available positive and negative evidence, including future reversals of existing taxable temporary differences, projected future taxable income, tax-planning strategies, and results of recent operations. If management determines that we would be able to realize our deferred tax assets in the future in excess of their net recorded amount, management would make an adjustment to the deferred tax asset valuation allowance, which would reduce the provision for income taxes. As of March 31, 2015 and December 31, 2014, we maintained a full valuation allowance against our entire balance of deferred tax assets.

We record uncertain tax positions in accordance with Accounting Standards Codification, or ASC, 740 on the basis of a two-step process whereby (1) management determines whether it is more likely than not that the tax positions will be sustained on the basis of the technical merits of the position and (2) for those tax positions that meet the more-likely-than-not recognition threshold, management recognizes the largest amount of tax benefit that is more than 50 percent likely to be realized upon ultimate settlement with the related tax authority. We recognize interest and penalties related to unrecognized tax benefits, if any, within income tax expense and any accrued interest and penalties are included within the related tax liability line.

Net Loss Per Share

Basic net loss per share attributable to common stockholders is calculated by dividing the net loss attributable to common stockholders by the weighted-average number of common shares outstanding for the period, without consideration for common stock equivalents. Excluded from the weighted-average number of shares outstanding are shares that have been issued upon the early exercise of stock options and are subject to future vesting, which was a total of 19,265 and 39,979 shares as of March 31, 2015 and 2014, respectively. Diluted net loss per share attributable to common stockholders is computed by dividing the net loss attributable to common stockholders by the weighted-average number of common share equivalents outstanding for the period determined using the treasury-stock method. Common stock equivalents are comprised of redeemable convertible preferred stock, warrants for the purchase of common stock, and options outstanding under our stock option plan. For all periods presented, there is no difference in the number of shares used to calculate basic and diluted shares outstanding due to our net loss position.

Potentially dilutive securities not included in the calculation of diluted net loss per share attributable to common stockholders because to do so would be anti-dilutive are as follows:

	As of March 31,	
	2015	2014
Redeemable convertible preferred stock	—	16,009,423
Options to purchase common stock	3,233,013	3,143,565
Warrants to purchase common stock	250,646	250,646

Recently Issued Accounting Standards

In August 2014, the FASB issued Accounting Standards Update, or ASU, No. 2014-15, "Presentation of Financial Statements—Going Concern (Subtopic 205-40): Disclosure of Uncertainties about an Entity's Ability to Continue as a Going Concern," or ASU 2014-15. ASU 2014-15 will require management to assess, at each annual and interim reporting period, the entity's ability to continue as a going concern. The amendments in ASU 2014-15 do not have any application to an entity's financial statements, but only to disclosure in the related notes. ASU 2014-15 is effective for annual periods ending after December 15, 2016 and early application is permitted. We intend to apply ASU 2014-15 beginning with the first quarter of fiscal year 2016.

[Table of Contents](#)

3. Other Financial Information

Property and Equipment

Property and equipment, leasehold improvements, and related accumulated depreciation and amortization were as follows (in thousands):

	March 31, 2015	December 31, 2014
Manufacturing and laboratory equipment	\$ 3,179	\$ 3,177
Office furniture and equipment	113	113
Clinical equipment	2,407	2,115
Computer equipment and software	177	152
Leasehold improvements	3,378	3,367
Construction in progress	1,926	922
	11,180	9,846
Less: accumulated depreciation and amortization	(7,072)	(6,778)
Total	\$ 4,108	\$ 3,068

Depreciation and amortization expense for the three months ended March 31, 2015 and 2014 was \$294,000 and \$297,000, respectively.

Accrued Expenses

Accrued expenses consist of (in thousands):

	March 31, 2015	December 31, 2014
Accrued clinical and related costs	\$ 6,655	\$ 6,072
Accrued compensation and related taxes	1,551	2,554
Accrued capital costs	845	52
Accrued other	540	197
Total	\$ 9,591	\$ 8,875

4. Commitments and Contingencies

Operating Leases

We lease office, manufacturing and research and development facilities, and equipment under various non-cancellable operating lease agreements through 2017. Facility leases generally provide for periodic rent increases and many contain escalation clauses and renewal options. Certain leases require us to pay property taxes and routine maintenance. Total rent expense under our operating leases was \$225,000 and \$183,000 for the three months ended March 31, 2015 and 2014, respectively.

We recognize rent expense for our facility operating leases on a straight-line basis. We account for the difference between the minimum lease payments and the straight-line amount as deferred rent. Current and long-term deferred rent totaled \$130,000 and \$200,000 at March 31, 2015, and \$126,000 and \$241,000 at December 31, 2014, respectively.

Legal Proceedings

We are not currently a party to any litigation, nor are we aware of any pending or threatened litigation against us that we believe would materially affect our business, operating results, financial condition or cash flows. Our industry is characterized by frequent claims and litigation, including claims regarding patent and other intellectual property rights, as well as for product liability. As a result, in the future, we may be involved in various legal proceedings from time to time.

5. Fair Value

The following fair value hierarchy table presents information about each major category of our financial assets and liabilities measured at fair value on a recurring basis (in thousands):

	Fair Value Measurement at March 31, 2015			
	Fair Value	Level 1	Level 2	Level 3
Assets				
Money market funds	\$ 87,601	\$ 87,601	\$ —	\$ —

[Table of Contents](#)

	Fair Value Measurement at December 31, 2014			
	Fair Value	Level 1	Level 2	Level 3
Assets				
Money market funds	<u>\$ 101,592</u>	<u>\$ 101,592</u>	<u>\$ —</u>	<u>\$ —</u>

There were no liabilities measured at fair value on a recurring basis as of March 31, 2015 or as of December 31, 2014.

We report the change in fair value during each period as a non-operating gain or loss. There were no transfers between Level 1, Level 2 or Level 3 for our assets during the three months ended March 31, 2015.

6. Convertible Preferred Stock and Warrants

Redeemable Convertible Preferred Stock

As a result of our IPO in April 2014, all our outstanding junior and senior preferred stock was converted into common stock on a one-to-one basis. In conjunction with certain sales of our senior preferred stock, we had recorded beneficial conversion amounts associated with the rights of the holders of such preferred stock to convert their preferred stock to common stock. These beneficial conversion amounts were recorded as an offset to additional paid-in capital and were being amortized as a deemed dividend over the redemption period using an effective interest rate method. For the three months ended March 31, 2014, \$22,000 was recognized as a deemed dividend and \$3.0 million was recognized as an accretion to the redemption value of the redeemable convertible preferred stock.

Warrants

Warrants outstanding and exercisable for 250,646 shares of common stock as of March 31, 2015 have a weighted-average exercise price of \$95.21 and expire between February 2016 and September 2019.

7. Common Stock

Stock Reserved for Future Issuance

Shares reserved for future issuance at March 31, 2015 are as follows:

	Number of Shares
Common stock options outstanding	3,233,013
Common stock options available for future grant	323,919
Common stock warrants	250,646
Total common shares reserved for future issuance	<u>3,807,578</u>

8. Stock Compensation Plans

Equity Incentive Plans

Our 2014 Equity Incentive Plan, or the 2014 Plan, became effective in April 2014 and replaced our 2012 Stock Option Plan, or the 2012 Plan, with respect to future awards. The 2014 Plan provides for the grant of stock options, restricted stock, restricted stock units, stock appreciation rights, performance awards and performance units to employees, directors, and consultants. Option grants under the 2014 Plan generally have a ten-year term and vest over four years. Shares available for grant under the 2014 Plan include any shares remaining available or becoming available in the future under the 2012 Plan due to cancellation or forfeiture. In addition, the 2014 Plan provides for annual increases in the number of shares available for issuance thereunder beginning upon its effective date in April 2014, and on each annual anniversary, equal to the lower of:

- 1,200,000 shares of our common stock;
- 3% of the outstanding shares of our common stock on the second-to-the-last day prior to each anniversary date of the effectiveness date of our IPO; or
- an amount as our board of directors may determine.

Our 2012 Plan provided for the grant of stock options, restricted stock, restricted stock units, stock purchase rights, and performance awards to employees, directors, and consultants. Option grants under the 2012 Plan generally have a ten-year term, vest over four years and are exercisable immediately, subject to a repurchase right that lapses as the option vests. As of March 31, 2015, options for the purchase of 55,516 shares of our common stock had been exercised prior to vesting, of which 19,265 were unvested and subject to repurchase. During the three months ended March 31, 2015, 5,180 shares vested resulting in a release of the repurchase liability of \$26,000. We have not repurchased any shares related to these early exercises for which our repurchase liability was \$97,000 as of March 31, 2015.

Table of Contents

The following table summarizes stock option activity:

	Options	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value
Outstanding as of January 1, 2015	3,210,693	\$ 7.54		
Granted	63,683	\$ 23.68		
Exercised	(27,564)	\$ 5.16		
Forfeited	(13,799)	\$ 8.00		
Outstanding as of March 31, 2015	<u>3,233,013</u>	\$ 7.87	7.8	\$55,448,771
Options vested and expected to vest as of March 31, 2015	<u>3,164,500</u>	\$ 7.78	7.8	\$54,555,223
Options exercisable as of March 31, 2015	<u>2,958,072</u>	\$ 6.72	7.7	\$54,091,498

Stock-based Compensation Expense

The weighted-average grant date fair value of stock options granted during the three months ended March 31, 2015 and 2014 was \$17.87 and \$5.17, respectively. The following are the ranges of underlying assumptions used in the BSM option pricing model to determine the fair value of stock options granted to employees and nonemployees:

	Three Months Ended March 31,	
	2015	2014
Employee:		
Risk-free interest rate	1.84-1.85%	1.60%
Expected dividend yield	0%	0%
Expected volatility	92.2%	81.0%
Expected term of options (years)	5.9	6.0
Fair value of common stock	\$19.75 - \$26.13	\$7.55
Non-Employees:		
Risk-free interest rate	0.15% - 0.36%	0.13% - 0.95%
Expected dividend yield	0%	0%
Expected volatility	60.8% - 70.6%	81.0%
Expected term of options (years)	0.3-1.8	1.0-4.0
Fair value of common stock	\$25.01	\$11.30

Valuation Analyses

Due to our management's and board of directors' decision to pursue an IPO, coupled with our belief that we could reasonably estimate the form and timing of potential liquidity events, we utilized a Probability Weighted Expected Return Method, or PWERM, to determine the fair value of our common stock in the first quarter of 2014, prior to our IPO. Under this method, the implied fair value of our common stock is estimated based upon an analysis of future values assuming various outcomes. The value is based on the probability-weighted present value of expected future investment returns considering each of the possible outcomes available to us as well as the rights of each share class. The possible outcomes considered are based upon an analysis of future scenarios as described below:

- closing of an IPO;
- sale to a strategic acquirer;
- continuation as a private company with subsequent liquidation event; and
- dissolution.

Critical assumptions required to perform the PWERM include the following:

- Scenarios: Expected future events were identified.
- Scenario probabilities: Estimates of the probability of occurrence of each event were identified.
- Valuation: Expected future values under each scenario were estimated.
- Timing: Expected timing to the event under each scenario was estimated.

Table of Contents

- Risk adjusted discount rates: Risk-adjusted discount rates were selected for each equity class based on the rights and preferences of each equity class and market data.
- Discounts: Appropriate minority or marketability discounts, if any, required to estimate the per share value of the various equity classes were determined.

In determining the implied fair value of our common stock in the IPO scenario, we assumed that the preferred stock then outstanding would be converted into common stock. In allocating value to our common stock in the merger or sale scenario, we first allocated to our outstanding shares of preferred stock the greater of the liquidation preference of the preferred stock and the amount that would have been payable had all such shares of preferred stock been converted to common stock.

There is inherent uncertainty in these estimates and, if we had made different assumptions, the fair value of the underlying common stock and amount of our stock-based compensation expense, net loss and net loss per share amounts would have differed.

February 12, 2014 Valuation Analysis

Our analysis considered the following probability-weighted scenarios:

Scenario	Weight
IPO by May 15, 2014	25%
Sale by September 30, 2015	10%
Private company	50%
Dissolution	15%

A discount for lack of marketability was applied for common stockholders of 8%, 20% and 28% for the IPO, sale and private company scenarios, respectively, which resulted in an implied fair value of \$7.55 per share. The increase in fair value of our common stock from December 31, 2013 of \$5.93 per share was primarily related to the increase in likelihood of an IPO scenario based on progress toward a public offering, coupled with a slight decrease in discount for lack of marketability for the IPO and sale scenarios. These were partially offset by dilution from the issuance of additional shares of our senior redeemable convertible preferred stock in January 2014.

March 31, 2014 Valuation Analysis

Our analysis considered the following probability-weighted scenarios:

Scenario	Weight
IPO by April 15, 2014	65%
Sale by September 30, 2015	10%
Private company	15%
Dissolution	10%

A discount for lack of marketability was applied for common stockholders of 2%, 17% and 27% for the IPO, sale and private company scenarios, respectively, which resulted in an implied fair value of \$11.30 per share. The increase in fair value of our common stock from December 31, 2013 and February 12, 2014, was related to the increase in likelihood of an IPO scenario as significant progress had been completed toward a public offering and the decrease in discount for lack of marketability for the IPO scenario that reflected the proximity to the projected time to liquidity. These were slightly offset by dilution from the issuance of additional shares of our senior redeemable convertible preferred stock in January and February 2014, as applicable.

Total stock-based compensation expense for all stock awards recognized in our condensed consolidated statements of operations is as follows (in thousands):

	Three Months Ended	
	March 31,	
	2015	2014
Employees		
Research and development	\$ 251	\$ 149
General and administrative	327	196
Total	<u>\$ 578</u>	<u>\$ 345</u>

[Table of Contents](#)

	Three Months Ended	
	March 31,	
	2015	2014
Non-employees		
Research and development	\$ 217	\$ 85
General and administrative	8	5
Total	<u>\$ 225</u>	<u>\$ 90</u>

As of March 31, 2015, there was \$6.3 million and \$1.7 million of total compensation cost related to unvested employee and non-employee, stock option awards, respectively, not yet recognized, which is expected to be recognized over a remaining weighted-average vesting period of 2.0 years and 2.2 years, respectively.

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations

The following Management's Discussion and Analysis of Financial Condition and Results of Operations should be read in conjunction with our condensed consolidated financial statements and notes thereto included in Item 1 "Financial Statements" in this Quarterly Report on Form 10-Q and our Annual Report on Form 10-K filed with the Securities and Exchange Commission (SEC) for the year ended December 31, 2014. As used in this report, unless the context suggests otherwise, "we," "us," "our," "the Company" or "Vital Therapies" refer to Vital Therapies, Inc. and its subsidiaries.

Forward-Looking Statements

In addition to historical information, this Quarterly Report on Form 10-Q, or Quarterly Report, includes forward-looking statements within the meaning of federal securities laws. Forward-looking statements, many of which are beyond our control, are subject to certain risks and uncertainties, particularly those inherent in the process of discovering, developing and commercializing biologics and devices that are safe and effective for use as human therapeutics products. Such statements include, but are not limited to, statements preceded by, followed by or that otherwise include the words, "believe," "may," "might," "can," "could," "will," "would," "should," "estimate," "continue," "anticipate," "intend," "seek," "plan," "project," "expect," or similar expressions.

Forward-looking statements discuss matters that are not historical facts. Our forward-looking statements involve assumptions that, if they never materialize or prove correct, could cause our results to differ materially from those expressed or implied by such forward-looking statements. In this Quarterly Report, for example, we make forward-looking statements regarding: markets for the ELAD® System; strategy and timing of clinic trials, regulatory requirements, financial estimates and projections; and the sufficiency of our capital resources to fund our operations.

The inclusion of any forward-looking statements in this Quarterly Report should not be regarded as a representation that any of our plans will be achieved. Our actual results may differ from those anticipated in our forward looking statements as a result of various factors, including those set forth below under the caption "Part II, Item 1A—Risk Factors" and the differences may be material. These risk factors include, but are not limited to: the initiation, cost and timing of our clinical programs for the ELAD System; the timing of, and our ability to obtain and maintain regulatory approvals for the ELAD System; the performance of third parties in connection with the development of the ELAD System including, but not limited to, third parties involved in our clinical trials and third-party suppliers; our ability to reliably manufacture ELAD cartridges and ELAD bedside units in sufficient quantities and in compliance with regulatory requirements for clinical trials and commercialization; regulatory developments in the U.S. and foreign countries; our ability to obtain funding for our operations; and our ability to achieve and maintain effective internal control over financial reporting.

Although our forward-looking statements reflect the good faith judgment of our management, these statements are based only on facts and factors currently known by us. As a result, you are cautioned not to rely on these forward-looking statements, which speak only as of the date hereof. All forward-looking statements are qualified in their entirety by this cautionary statement and we undertake no obligation to revise or update such statements to reflect events or circumstances after the date hereof.

Overview

We are a biotherapeutic company focused on developing a cell-based therapy targeting the treatment of liver failure. Our product candidate, the ELAD® System, is an extracorporeal human allogeneic cellular liver therapy designed to allow the patient's own liver to regenerate to a healthy state, or to stabilize the patient until transplant. The ELAD System is the only bio-artificial liver support system containing immortal human liver-derived cells, or C3A cells, to enter Phase 3 clinical trials. We designed the ELAD System to supplement key aspects of normal liver function to improve patient survival. We estimate that at least 40,000 patients annually in the United States, or U.S., experience the forms of liver failure that may be addressed by ELAD, such as acute-on-chronic, surgery-induced and fulminant liver failures, for which the ELAD System may be a life-saving therapy. Outside of liver transplant, which is severely limited by the availability of organs and not available to many patients, the current standard of care for these forms of liver failure is primarily focused on the management of complications, which does not restore lost liver function and is associated with a high rate of mortality. The ELAD System has received orphan designation in the U.S. and Europe for the treatment of patients with acute liver failure. This designation provides tax credits for qualified clinical testing, seven years of market exclusivity in the U.S., and ten years of market exclusivity in Europe for the first orphan drug approved for a given indication. However, orphan designation does not alter the standard regulatory requirements or the process for obtaining marketing approval.

Vital Therapies, Inc. was formed in May 2003 to acquire the assets of VitaGen (formerly Hepatix) in a bankruptcy proceeding. Our predecessor companies developed the ELAD System, completing two pilot trials in liver failure resulting from acute hepatocellular insult and two randomized, controlled Phase 1 and Phase 2 trials in fulminant hepatic failure, or FHF, but failed to attract funds sufficient to continue development of the ELAD System. Beginning in June 2003, we refocused the company to pursue regulatory approval and commercialization of the ELAD System in China. In 2007, we completed a pivotal trial in subjects suffering from several forms of liver failure, principally viral hepatitis, in China, and we submitted an application for marketing in China. Our application is still under review in China; however, we do not expect approval in China until we have approval in the U.S.

[Table of Contents](#)

We restarted our clinical program in the U.S. and Europe in 2008. Since then, we have run two Phase 2 trials and selected alcohol-induced liver decompensation, or AILD, and severe acute alcoholic hepatitis, or SAAH, as indications for our Phase 3 pivotal trial program in the U.S. and Europe. We have also made significant improvements in the ELAD System bedside unit and our proprietary cartridge cell growth production process, including (i) the incorporation of an updated version of the cardiovascular base unit that has improved features, functionalities and reliability; (ii) new and improved cartridges for ultrafiltrate, cell filters and the ELAD cartridges; (iii) tubing sets that have been optimized to recirculate smaller volumes of ultrafiltrate and blood through the system to reduce the risk of clotting and other potential adverse side effects; and (iv) improvements to our cell culture and growth processes to reduce cost and increase manufacturing efficiency and yield.

In January 2015, we completed enrollment in our leading Phase 3 clinical trial, VTI-208, of 203 subjects with AILD. During 2014, we initiated enrollment in a second Phase 3 trial, VTI-210, for subjects with SAAH and in a Phase 2 clinical trial, VTI-212, for subjects with FHF and surgery-induced acute liver failure, referred to as SILF.

VTI-210 is Phase 3 randomized, controlled, open-label clinical trial in subjects with SAAH, who we believe are at a substantially increased risk of mortality. VTI-210 has regulatory allowance in the U.S., United Kingdom, or U.K., Germany and Spain. The statistical plan for VTI-210 provides for an event-driven clinical design (a statistical plan that allows the study sample size to be adjusted according to aggregate mortality) with a minimum of 150 subjects. The primary endpoint of VTI-210 is overall survival up to at least study day ninety-one. As of May 11, 2015, we had enrolled nine subjects in VTI-210 and had 24 clinical sites open for enrollment.

We have also enrolled six subjects in VTI-212, an open-label Phase 2 clinical trial that is part of a Phase 2/3 clinical program in subjects with either fulminant hepatic failure or surgery-induced acute liver failure. We are beginning this program with a Phase 2 single-arm component enrolling 40 subjects, which may later be followed by a randomized, controlled Phase 3 component. Results from the single-arm component will be compared with historical or case-matched controls, and we currently anticipate Phase 2 data in 2016. In the event that randomized or other Phase 3 data are necessary for approval in FHF and SILF, we expect to perform the randomized Phase 3 portion of the program or evaluate other Phase 3 trials, the design of which would be finalized upon analysis of the Phase 2 component.

We incurred net losses since inception of \$165.6 million through March 31, 2015. We anticipate that we will continue to incur increasing losses for at least the next several years. Due to the uncertainties involved with biological product development and the clinical trial process, we cannot predict the timing or accuracy of future expenses, when product approval for the ELAD System might occur, or when profitability may be achieved or sustained.

Results of Operations

Research and Development Expenses

Research and development expenses relate to the development of the ELAD System and are expensed as incurred. Our research and development expenses consist primarily of:

- expenses incurred under agreements with clinical sites, clinical research organizations, or CROs, and statistical and regulatory consultants that assist us with our clinical trials;
- employee-related expenses, which include salaries, benefits, travel and stock-based compensation;
- the cost of acquiring and manufacturing clinical trial materials;
- facilities, depreciation, and other allocated expenses, which include direct and allocated expenses for rent and maintenance of facilities and equipment, and depreciation of fixed assets; and
- costs associated with other research and regulatory activities.

We anticipate that our research and development expenses will increase substantially as we continue to conduct our Phase 3 and Phase 2 clinical trials of the ELAD System, expand our research and development activities and pursue regulatory approval.

Table of Contents

We do not track our employee and facility-related research and development costs by clinical trial, as we typically use our employee and infrastructure resources across multiple clinical trials and the allocation of such costs would be arbitrary and would not provide a meaningful assessment.

The costs of clinical trials may vary significantly over the life of a project owing to, but not limited to, the following:

- per subject trial costs;
- the number of sites included in the trials;
- the countries in which the trial is conducted;
- the number of subjects that participate in the trials;
- continuing quality assurance activities and standards consistent with the U.S. Food and Drug Administration, or FDA, and other regulatory requirements;
- potential additional safety monitoring or other studies requested by regulatory agencies; and
- the frequency and duration of subject follow-up visits.

A change in the outcome of any of these variables could result in a significant change in the costs and timing associated with the development of the ELAD System. For example, if the FDA or other regulatory authorities were to require us to conduct clinical trials beyond those which we currently anticipate will be required for the completion of clinical development of the ELAD System or if we experience significant delays in enrollment in any clinical trial, we could be required to expend significant additional financial resources and time on the completion of the clinical development of the ELAD System.

General and Administrative Expenses

General and administrative expenses consist primarily of salaries and related costs for personnel in executive, finance, information technology, marketing, and legal functions. Other general and administrative expenses include related facility costs, stock-based compensation, and professional fees for legal, consulting, accounting and tax services.

We anticipate that our general and administrative expenses will increase for primarily the following reasons:

- increased payroll, expanded infrastructure and higher consulting, legal, accounting and investor relations costs, and director and officer insurance premiums associated with being a public company;
- expansion of our facilities to support our growth;
- to support our business activities, which we expect to expand as we continue the development of the ELAD System; and
- to build a marketing, reimbursement, training and support team before we receive regulatory approval of the ELAD System in anticipation of commercial launch.

Comparison of three months ended March 31, 2015 and 2014

The following table summarizes our operating expenses for the three months ended March 31, 2015 and 2014.

(dollars in thousands)	Three Months Ended March 31,		Change	
	2015	2014	\$	%
Operating expenses:				
Research and development	\$11,753	\$ 9,219	\$2,534	27%
General and administrative	3,064	2,657	407	15%
Total operating expenses	<u>\$14,817</u>	<u>\$11,876</u>	<u>\$2,941</u>	<u>25%</u>

The \$2.5 million increase in research and development expense during the three months ended March 31, 2015 as compared to the three months ended March 31, 2014 was primarily associated with an increase in our Phase 3 clinical trial activities. The increase was principally attributable to \$1.2 million in third-party consulting, \$899,000 in salaries and wages, stock-based compensation and other compensation related costs due to increased headcount, \$572,000 in manufacturing supplies and related costs, \$519,000 of facilities-related costs, and \$67,000 in travel expenses. These increases were partially offset by a \$740,000 reduction in clinical trial costs related to CRO activity and fewer clinical trial enrollees as compared to the same period in 2014.

[Table of Contents](#)

The \$407,000 increase in general and administrative expense during the three months ended March 31, 2015 as compared to the three months ended March 31, 2014 was primarily attributable to a \$611,000 increase in salaries and wages, stock-based compensation, and other compensation related expenses due to increased headcount to support our operations, an increase of \$148,000 in insurance due to higher costs as a result of becoming a public company in April 2014, an increase of \$53,000 for travel and conference-related activities, offset by a \$295,000 decrease in legal and audit related expenses and a \$118,000 decrease in facilities-related costs.

Other income reflects \$1.1 million recognized for the revaluation of future purchase rights liabilities for the three months ended March 31, 2014 as a result of a decrease in the estimated fair value of future purchase rights liabilities associated with our senior preferred stock. All remaining purchase rights liabilities outstanding were exercised or terminated in conjunction with the completion of our initial public offering in April 2014.

Liquidity and Capital Resources

To date, we have not generated significant revenues attributable to the ELAD System. We have a history of incurring losses and negative cash flows from operations and have an accumulated deficit of \$165.6 million as of March 31, 2015. We expect that our research and development and general and administrative expenses will continue to increase through the completion of our Phase 3 clinical trials and, as a result, we will need additional capital to fund our operations, which we may seek to obtain through a combination of equity offerings, debt financings, government or other third-party financing, marketing and distribution arrangements and other collaborations, strategic alliances and licensing arrangements.

As of March 31, 2015, we had cash and cash equivalents of approximately \$88.3 million. Cash in excess of immediate requirements is invested in accordance with our investment policy, primarily with an intent to maximize liquidity and preserve capital. As of March 31, 2015, such funds were held in cash and money market funds.

[Table of Contents](#)

The following table shows a summary of our cash flows for the three months ended March 31, 2015 and 2014.

	Three Months Ended March 31,	
	2015	2014
	(In thousands) (unaudited)	
Cash (used in) provided by:		
Operating activities	\$(13,506)	\$ (9,364)
Investing activities	(615)	(853)
Financing activities	139	18,073

Operating Activities

During the three months ended March 31, 2015, operating activities used \$13.5 million of cash. The use of cash primarily related to our net loss of \$14.8 million adjusted for non-cash charges of \$803,000 related to stock-based compensation, and \$294,000 related to depreciation and amortization.

During the three months ended March 31, 2014, operating activities used \$9.4 million of cash. The use of cash primarily related to our net loss of \$10.7 million adjusted for several non-cash charges including \$1.1 million related to the revaluation of future purchase rights liabilities, non-cash charges of \$732,000 related to depreciation and amortization and stock-based compensation, and a \$1.8 million net change in our operating assets and liabilities. Net cash provided by changes in our operating assets and liabilities during the three months ended March 31, 2014 consisted primarily of an increase of \$2.0 million in accrued liabilities, reflecting an increase in clinical activities, partially offset by an increase of \$81,000 from other current assets and prepaid expenses and of \$58,000 from accounts payable. The net increase in other current assets and prepaid expenses was attributable to a reduction in prepaid clinical costs of \$297,000 related to the utilization of prepayments to our CROs, offset by an increase in deposits of \$67,000 related to a third-party provider of clinical trial personnel in Europe and an increase of \$311,000 related to prepaid expenses primarily attributable to the purchase of new corporate insurance policies.

Investing Activities

During the three months ended March 31, 2015, investing activities used \$615,000 of cash, primarily related to \$674,000 in purchases of capital equipment for manufacturing and clinical areas and a decrease of \$59,000 in restricted cash requirements. The net decrease in our restricted cash is related to payments made related to our clinical trial obligations in excess of new clinical trial costs.

During the three months ended March 31, 2014, investing activities used \$853,000 of cash, primarily related to \$809,000 in purchases of capital equipment for manufacturing and clinical areas and an increase of \$44,000 in restricted cash requirements. The increase in our restricted cash is related to an increase in our clinical trial obligations of \$332,000, which was offset by \$288,000 related to the elimination of certain provisions associated with our junior preferred stock purchase agreement.

Financing Activities

During the three months ended March 31, 2015, financing activities provided \$139,000 of cash from the exercise of stock options.

In the three months ended March 31, 2014, financing activities provided \$18.1 million of cash, which was primarily related to the sale of senior redeemable convertible preferred stock for net proceeds of \$18.2 million, offset by an increase in deferred financing costs of \$94,000. In January 2014, we issued 555,000 shares of senior redeemable convertible preferred stock at \$8.00 per share for net proceeds of \$4.3 million under our senior preferred stock purchase agreement, and completed a private placement to new investors of 1.5 million shares of our senior redeemable convertible preferred stock at a price of \$8.00 per share for net proceeds of \$12.0 million. Additionally, in February 2014, we completed a pre-emptive rights offering, triggered by the private placement in January 2014, for 241,016 shares of our senior redeemable convertible preferred stock at a price of \$8.00 per share for net proceeds of \$1.9 million.

Based on our current business plan, we believe that our existing cash and cash equivalents as of March 31, 2015 will be sufficient to fund our operations into the third quarter of 2016, assuming we do not begin building any significant commercial infrastructure during the period. Under this plan, our existing cash and cash equivalents will be sufficient to fund development through the receipt of topline results from our VTI-208 Phase 3 clinical trial; however, we believe we will need additional funds to complete enrollment in both our VTI-210 Phase 3 clinical trial and our VTI-212 Phase 2 clinical trial. However, if the VTI-208 clinical trial is successful and we proceed to file a biologics license application, or BLA and to prepare for market launch, we anticipate increasing our cash burn and raising additional funds. A decision to build commercial infrastructure will be based on a variety of factors, most importantly the outcome of our clinical trials. If the VTI-208 clinical trial results do not support the filing of a BLA, we expect to focus on conserving cash in order to enable completion of the VTI-210 clinical trial. The amount and timing of our actual expenditures also depend on numerous factors, including the rate of subject enrollment in our clinical trials, filing requirements with various regulatory agencies, and any unforeseen cash needs.

[Table of Contents](#)

Our forecast of the period of time through which our financial resources will be adequate to support our operations is a forward-looking statement that involves risks and uncertainties, and actual results could vary materially. Our future capital requirements are difficult to forecast and will depend on many factors, including, but not limited to:

- the scope, progress, results and costs of research and development and clinical trials related to the ELAD System or any future product candidates;
- the cost and timing of scaling up and validating the manufacturing process for the ELAD System or any other product candidates for commercialization;
- the cost and timing of commercialization activities, including reimbursement, marketing, sales and distribution costs, both before and after product approval (if any);
- our ability to establish new collaborations, licensing or other arrangements and the financial terms of such agreements;
- the number and characteristics of any future product candidates we pursue;
- the costs involved with being a public company;
- the costs involved in preparing, filing, prosecuting, maintaining, defending and enforcing patents, including litigation costs and the outcome of such litigation; and
- the timing, receipt and amount of sales of, or royalties on the ELAD System and any future product candidates.

Until such time, if ever, as we can generate substantial product revenues, we expect to finance our cash needs through a combination of stock offerings, debt financings, collaborations and licensing arrangements. In any event, we do not expect to achieve revenue from product sales prior to the use of the net proceeds from our recently completed initial public offering and follow-on public offering. We do not have any committed external source of funds. Additional funds may not be available on acceptable terms, if at all. To the extent that we raise additional capital through the sale of equity securities, the ownership interest of our stockholders will be diluted and may be on terms that are not favorable to us or our stockholders. Debt financing, if available, may involve covenants restricting our operations or our ability to incur additional debt or other terms that are not favorable to us or our stockholders. If we raise additional funds through collaborations and licensing arrangements with third parties, which we have no prior experience in, we may have to relinquish some rights to our technologies or our products, or grant licenses on terms that are not favorable to us. If we are unable to raise adequate funds, we may have to liquidate some or all of our assets, or delay, reduce the scope or eliminate some or all of our development programs. We may have also have to delay development or commercialization of our products or license to third parties the rights to commercialize products or technology that we would otherwise seek to commercialize. Any of these factors could harm our operating results.

Off-Balance Sheet Arrangements

Through March 31, 2015, we have not entered into and did not have any relationships with unconsolidated entities or financial collaborations, such as entities often referred to as structured finance or special purpose entities, which would have been established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purpose.

Critical Accounting Policies and Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States requires us to make estimates and assumptions that affect amounts reported in the accompanying condensed consolidated financial statements and related notes. In preparing our financial statements, we make assumptions and estimates about future events and apply judgments that affect the reported amounts of assets, liabilities, revenue, expenses and the related disclosures. We base our assumptions, estimates and judgments on historical experience, current trends and other factors that management considers relevant. Because future events and their effects cannot be determined with certainty, actual results could differ materially from our assumptions and estimates. We have reviewed these critical accounting policies and related disclosures with the Audit Committee of our Board of Directors.

During the first quarter of 2015, there were no significant changes in our critical accounting policies or in the methodology used for estimates. Please refer to Management's Discussion and Analysis of Financial Condition and Results of Operations contained in our Annual Report on Form 10-K filed with the Securities and Exchange Commission (SEC) on March 20, 2015 for a more complete discussion of our critical accounting policies and estimates.

Recently Issued Accounting Standards

In August 2014, the FASB issued Accounting Standards Update, or ASU, No. 2014-15, "*Presentation of Financial Statements—Going Concern (Subtopic 205-40): Disclosure of Uncertainties about an Entity's Ability to Continue as a Going Concern*," or ASU 2014-15. ASU 2014-15 will require management to assess, at each annual and interim reporting period, the entity's ability to continue as a going concern. The amendments in ASU 2014-15 do not have any application to an entity's financial statements, but only to disclosure in the related notes. ASU 2014-15 is effective for annual periods ending after December 15, 2016 and early application is permitted. We intend to apply ASU 2014-15 beginning with the first quarter of fiscal year 2016.

Item 3. Quantitative and Qualitative Disclosures About Market Risk

There has been no material change in the Company's assessment of its sensitivity to market risk since our presentation set forth in "Quantitative and Qualitative Disclosures About Market Risk" in our Annual Report on Form 10-K filed with the SEC on March 20, 2015.

Item 4. Controls and Procedures

Internal Controls and Procedures

Prior to our initial public offering and in connection with past audits of our financial statements, our independent registered public accounting firm identified and reported adjustments to management. Certain of the identified adjustments in the prior periods were deemed to be the result of internal control deficiencies that constitute material weaknesses in our internal control over financial reporting.

We have not maintained an effective control environment in that the design and execution of our internal controls over financial reporting was limited due to the lack of proper segregation of duties resulting from inadequate staffing levels, the ineffective review over financial transactions, and the maintenance of our books and records. The lack of adequate staffing levels resulted in insufficient time spent on review and approval of certain information used to prepare our financial statements and the maintenance of effective controls to adequately monitor and review significant transactions for financial statement completeness and accuracy. Such examples include correct financial statement classification, the valuation of financing transactions entered into during the period, and maintenance of documentation in support of such transactions. These control deficiencies, although varying in severity, contributed to the material weaknesses in the control environment noted by our independent registered public accounting firm.

Although efforts to remediate the existing material weakness are still in progress, management is taking steps to address the causes of our audit adjustments and to improve our internal control over financial reporting, including the implementation of new accounting processes and control procedures and the identification of gaps in our skills base and expertise of the staff required to meet the financial reporting requirements of a public company. We have hired additional accounting personnel who are degreed and experienced accountants, which has enabled us to expedite our month-end close process, thereby facilitating the timely preparation of financial reports. Additionally, the increase in qualified resources has strengthened our segregation of duties. The additional staff has provided additional resources for the review and approval of transactions and the information used to prepare our financial statements, for the preparation and maintenance of documentation, for a better segregation of duties, and for designing and maintaining an effective control environment.

In the first quarter of 2015, we completed the process of compiling and modifying our system of internal controls, preparing or revising documentation, and evaluating the design of our system of internal controls with respect to our operations, reporting, and compliance as determined necessary to comply with Section 404 of the Sarbanes-Oxley Act and consistent with the structure for designing and evaluating the effectiveness of internal controls guidance provided in The Committee of Sponsoring Organizations of the Treadway Commission's updated framework, *Internal Control – Integrated Framework (2013)*. In addition to adding qualified personnel as discussed above, the principal actions resulting from evaluation have been to formally document and improve our internal controls and to improve the segregation of duties. This includes the documentation of procedures and reviews that were performed but not documented or performed on a timely basis. Over the next several quarters, we plan to test the implementation and operation of, and compliance with, our system of internal controls. Based upon the outcome of our testing, we will take remedial action should issues be identified.

Our independent registered public accounting firm will not be required to report on the effectiveness of our internal control over financial reporting pursuant to Section 404 of the Sarbanes-Oxley Act until the date we are no longer an "emerging growth company" based on the exemptions contained in the Jumpstart Our Business Startups Act, or JOBS Act. At such time, our independent registered public accounting firm may issue a report that is adverse in the event it is not satisfied that our internal controls over financial reporting are designed and operating effectively to prevent or detect a material misstatement to the financial statements.

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of March 31, 2015. The term “disclosure controls and procedures,” as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended, or the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC’s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company’s management, including its principal executive and principal financial officers, as appropriate, to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of our disclosure controls and procedures as of March 31, 2015, our Chief Executive Officer and Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were not effective at the reasonable assurance level because of the material weaknesses in our internal controls over financial reporting as described above. Notwithstanding the existence of the material weaknesses described above, management believes that the consolidated financial statements in this Quarterly Report Form 10-Q fairly present, in all material respects, our financial position, results of operations and cash flows for the periods presented in accordance with generally accepted accounting principles.

Changes in Internal Control over Financial Reporting

There were changes in our internal control over financial reporting (as defined in Rules 13a-15(d) and 15d-15(d) under the Exchange Act), as discussed above, during the three months ended March 31, 2015 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Part II - OTHER INFORMATION

Item 1. Legal Proceedings

We are not currently party to any litigation and we are not aware of any pending or threatened litigation against us that we believe would adversely affect our business, operating results, financial condition or cash flows.

Item 1A. Risk Factors.

Investing in our common stock involves a high degree of risk. Before deciding to invest in our company or deciding to maintain or increase your investment, you should consider carefully the risks and uncertainties described below. The risks and uncertainties described below and in our other filings with the Securities Exchange Commission are not the only ones we face. If one or more of the following risks are realized, our business, financial condition and results of operations and prospects could be materially and adversely affected. In that event, the market price for our common stock could decline and you may lose your investment.

Risks Related to Our Business

We are a clinical-stage company with no approved products, which makes assessment of our future viability difficult.

We are a clinical-stage company and we have no approved products or revenues from the sale of products. Our operations to date have been limited to organizing, staffing and financing our company, applying for patent rights, manufacturing on a clinical scale, undertaking clinical trials of our product candidate, and engaging in research and development. We have not yet demonstrated an ability to obtain regulatory approval, manufacture products on a commercial-scale, or conduct the sales and marketing activities necessary for successful product commercialization. As a result, there is limited information about us for investors to use when assessing our future viability and our potential to successfully develop product candidates, conduct clinical trials, manufacture our products on a commercial scale, obtain regulatory approval and profitably commercialize any approved products.

We are totally dependent upon the success of the ELAD System, our sole product candidate.

The ELAD® System is designed to improve survival rates of patients with certain forms of liver failure resulting from hepatocellular insult. The ELAD System is a novel product candidate whose safety, efficacy and other attributes have not been demonstrated in well-designed, large scale, clinical trials and are not fully understood. As a cell-based therapy, the ELAD System’s mechanism-of-action is complex and we cannot be certain that our currently-targeted indications of alcohol-induced liver decompensation, or AILD, severe acute alcoholic hepatitis, or SAAH, fulminant hepatic failure, referred to as FHF, and surgery-induced acute liver failure, referred to as SILF, in the U.S. and Europe, and viral hepatitis (predominantly hepatitis B) in China represent suitable applications for the ELAD System, or even ones where the ELAD System therapy can or will ultimately be shown to be safe and effective in well-designed clinical trials necessary to support regulatory approval in any jurisdiction. For example, the U.S. Food and Drug Administration, or FDA, has expressed concern about the open-label design of study VTI-208, our pivotal study in AILD, and the need to apply a consistent standard of care and to standardize post-discharge care, both being issues that could significantly confound the study results, impact morbidity and mortality and cause the FDA or other regulatory authorities to require that we repeat clinical trials with different trial designs. Finally, even if the ELAD System is proven to be safe and effective and ultimately receives regulatory approval, there is no guarantee that its commercialization will be successful. If the ELAD System should fail at any stage in our clinical trials or at the marketing stage, our business and operating results and financial condition will be materially and adversely affected.

[Table of Contents](#)

We cannot give any assurance that we will successfully complete the ELAD System's clinical development, or that the ELAD System will receive regulatory approval in a timely fashion or at all.

We must be evaluated in light of the uncertainties and complexities affecting a clinical-stage, combination product, biologic and medical device company. We have not completed clinical development for any of the ELAD System's potential indications in the U.S. or Europe where the ELAD System is regulated as a combination biologic and medical device, and a combined somatic cell Advanced Therapy Medicinal Product, respectively. We are conducting two Phase 3 clinical trials and a Phase 2/3 clinical program designed to establish the safety and efficacy of the ELAD System and to support approval in the U.S. and Europe. These clinical trials are expected to be performed in subjects with alcohol-induced liver decompensation, severe acute alcoholic hepatitis, fulminant hepatic failure and surgery-induced acute liver failure. Any additional indications we elect to pursue will require the initiation and completion of additional Phase 3 clinical trials demonstrating safety and efficacy for each such indication. For example, the FDA has noted its view that preliminary clinical evidence, at this time, does not indicate that the ELAD System may demonstrate a substantial improvement over standard of care. There is no guarantee that our clinical trials will be completed in a timely fashion or succeed. Our ability ultimately to reach profitability is critically dependent on our future success in obtaining regulatory approval for the ELAD System. However, there is no guarantee that our clinical trials will be successful, or that regulators will approve the ELAD System in a timely manner, or at all.

If we fail to obtain regulatory approval as anticipated in the U.S. and Europe, our business would be harmed.

We require regulatory approval for each indication we are seeking before we can market and sell the ELAD System in a particular jurisdiction for such indication. Our ability to obtain regulatory approval of the ELAD System depends on, among other things, successful completion of clinical trials, and demonstrating efficacy with statistical significance and acceptable safety in humans. The results of our current and future clinical trials may not meet the FDA, the European Medicines Agency, or EMA, or other regulatory agencies' requirements to approve the ELAD System for marketing under any specific indication, and these regulatory agencies may otherwise determine that our manufacturing processes or facilities are insufficient to support approval. For example, the FDA has noted its view that preliminary clinical evidence, at this time, does not indicate that the ELAD System may demonstrate a substantial improvement over standard of care. As such, we may need to conduct more clinical trials than we currently anticipate and upgrade our manufacturing processes and facilities, which may require significant additional time and expense and which could delay or prevent approval. If we fail to obtain regulatory approval in a timely manner, our commercialization of the ELAD System would be delayed and our business would be harmed.

If we are able to secure marketing approval, our commercial success will be determined by our ability to obtain acceptable pricing and reimbursement for the ELAD System therapy.

Therapies such as the ELAD System are paid for primarily by private and government insurance, although in some markets payment may be made by private individuals and their families. Reimbursement policies and decisions for medical products is a highly bureaucratic, politicized and regulated process and includes consideration of factors such as cost effectiveness and patient benefit. There is great pressure from government and third-party payors to reduce costs. Furthermore, there are no therapies approved to restore liver function and the lack of an established reimbursement structure introduces additional uncertainty with regard to reimbursement for the ELAD System. Although we have commissioned a report from pricing study and reimbursement specialists that concluded we should target a commercial price between \$150,000 and \$275,000 for ELAD therapy in the U.S., we do not know whether this price is achievable or sustainable. We have not yet determined a target commercial price for ELAD therapy either within or outside of the U.S., but believe it may be difficult to sustain a commercial price outside of the U.S. at or above the commercial price in the U.S. We will have no control over the pricing that is set by the government or private insurers, assuming we are able to secure marketing approval for the ELAD System. In markets where payment will be made by private individuals and their families, we cannot predict if such private payors will be prepared to pay an acceptable price.

If we are unable to implement our sales, marketing, distribution, training and support strategies or enter into agreements with third parties to perform these functions in markets outside of the U.S. and Europe, we will not be able to effectively commercialize the ELAD System and may not reach profitability.

[Table of Contents](#)

Our technology is new and complex, and potential customers will have limited knowledge of, or experience with, the ELAD System. In addition, we have no ELAD System-related sales and marketing experience either domestically or abroad. We have not commercialized the ELAD System anywhere and do not plan to introduce the ELAD System, if approved, into the U.S. or other foreign jurisdictions until 2017 at the earliest. Our commercial success will depend on our ability to market and receive adequate reimbursement of the ELAD System. This success will also depend on our ability to obtain and maintain adequate pricing for the ELAD System.

We do not have a sales or marketing infrastructure and have no experience in the sale, marketing or distribution of biologic products and medical devices. To achieve commercial success for the ELAD System, if and when we obtain marketing approval, we will need to establish a sales and marketing organization. In the future, we expect to build a targeted sales, marketing, training and support infrastructure to market the ELAD System in the U.S. and Europe and to establish collaborations opportunistically to market, distribute and support the ELAD System outside of the U.S. and Europe. There are risks involved with establishing our own sales, marketing, distribution, training and support capabilities. For example, recruiting and training sales and marketing personnel and personnel necessary to initially provide on-site device support and later device training to end-users is expensive and time consuming and could delay any product launch. If the commercial launch of the ELAD System is delayed or does not occur for any reason, we would have prematurely or unnecessarily incurred these commercialization expenses. This may be costly, and our investment would be lost if we cannot retain or reposition our sales, marketing, training and support personnel.

Factors that may inhibit our efforts to commercialize the ELAD System on our own include:

- our inability to recruit, train and retain adequate numbers of effective sales, marketing, training and support personnel;
- the inability of sales personnel to obtain access to physicians, including key opinion leaders, or to persuade adequate numbers of physicians to use the ELAD System;
- our inability to properly support the ELAD System therapy with our own qualified personnel at each customer site or our inability to properly train and support our customers to use the ELAD System effectively on their own;
- the lack of complementary products to be offered by sales personnel, which may put us at a competitive disadvantage relative to companies with more extensive or integrated product offerings; and
- unforeseen costs and expenses associated with creating an independent sales, marketing, training and support organization.

If we are unable to establish our own sales, marketing, distribution, training and support capabilities and instead enter into arrangements with third parties to perform these services, our product revenues and our profitability, if any, are likely to be lower than if we were to market, sell and distribute the ELAD System ourselves. In addition, we may not be successful in entering into arrangements with third parties to sell, market and distribute the ELAD System, or may be unable to do so on terms that are favorable to us. We likely will have little control over such third parties, and any of them may fail to devote the necessary resources and attention to commercialize the ELAD System effectively. If we do not establish sales, marketing, distribution, training and support capabilities successfully, either on our own or in collaboration with third parties, we will not be successful in commercializing the ELAD System and achieving profitability, and our business would be harmed.

We have incurred losses since our inception and expect to incur significant losses in the foreseeable future and may never become profitable. Even if we ultimately achieve profitability, it may not be sustained and we may require additional capital.

We are a clinical-stage company and clinical development of a novel therapy is a highly speculative undertaking. We have incurred significant losses in each fiscal year since our inception, including net losses of \$47.7 million and \$32.7 million for the years ended December 31, 2014 and 2013, respectively, and \$14.8 million for the three months ended March 31, 2015. As of March 31, 2015, we had an accumulated deficit of \$165.6 million. We expect to spend a considerable amount of our resources on the completion of our clinical programs and the work necessary to submit and gain approval of our ELAD System, on the production of the ELAD cartridges and bedside units, on investment in production facilities, and on the commercial launch and sales and marketing of the ELAD System. We also expect to expend considerable resources on research and development to develop new and improved products and to understand the mechanism of action of the ELAD System. We do not expect to earn revenues until 2017 at the earliest, and anticipate incurring additional losses and negative cash flow from operations for at least the next several years. Even if we do achieve profitability in the future, there is no guarantee that we will be able to sustain this profitability in subsequent periods and we may need to raise additional capital.

Our ability to use our net operating losses to offset future taxable income may be subject to certain limitations.

As of December 31, 2014, we had net operating loss, or NOL, carryforwards of approximately \$84.8 million and \$79.4 million, net of estimated limitations caused by certain ownership changes under Section 382 of the Internal Revenue Code, for federal and state income tax purposes, respectively. In general, under Section 382, a corporation that undergoes an “ownership change” is subject to limitations on its ability to utilize its pre-change NOLs to offset future taxable income. We believe our existing NOLs are subject to limitations arising from previous ownership changes, and if we undergo any further ownership changes, our ability to utilize NOLs could be further limited. Future changes in our stock ownership, some of which are outside of our control, could also result in additional ownership changes under Section 382. Furthermore, our ability to utilize NOLs of companies that we may acquire in the future may be subject to limitations. For these reasons, we may not be able to utilize a material portion of the NOLs, even if we attain profitability.

Our internal computer systems, or those used by our clinical investigators, contract research organizations or other contractors or consultants, may fail or suffer security breaches, which could result in a material disruption of development programs for the ELAD System.

We rely on information technology systems to keep financial records, maintain laboratory and corporate records, communicate with staff and external parties and operate other critical functions. Despite the implementation of security measures, our internal computer systems and those used by our clinical investigators, contract research organizations, or CROs, and other contractors and consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war, and telecommunication and electrical failures. The techniques that could be used by criminal elements or foreign governments to attack these computer systems are sophisticated, change frequently and may originate from less regulated and remote areas of the world. Activities in China may be particularly at risk. As a result, we may not be able to address these techniques proactively or implement adequate preventative measures. While, to our knowledge, we have not experienced any significant system failure, theft of information, accident or security breach to date, if such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our clinical development activities. For example, the loss of clinical trial data from ongoing or future clinical trials could result in delays in regulatory approval efforts and significantly increase costs to recover or reproduce the data. To the extent that any disruption, theft of information, or security breach were to result in a loss of or damage to data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability and the clinical development and the future development of the ELAD System could be delayed.

Risks Related to the ELAD System’s Clinical Development

We have limited experience in conducting pivotal clinical trials used to support regulatory approval and our prior clinical trials of the ELAD System did not demonstrate a statistically significant improvement in survival, the primary endpoint that is needed to support regulatory approval.

We are currently undertaking our first pivotal clinical trials for the ELAD System. While the endpoints and populations for the pivotal trials are derived from results of initial studies and medical literature, in none of those prior studies have we demonstrated an effect in the population and on the endpoints prospectively described in the study plan. The pivotal trials are primarily based on trends derived from post-hoc, retrospective analyses of data subsets. Our prior clinical trials of the ELAD System in AILD were not powered to, and did not, demonstrate statistically significant improvement over standard of care in the primary endpoint of 90-day survival. Similarly, our prior clinical trials of the ELAD System in FHF did not demonstrate statistically significant improvement in the primary endpoint of 28-day survival. The lack of statistical significance could be attributed to various factors including the lack of power to demonstrate significance, the design of the studies or the lack of an ELAD System treatment benefit. Although we did complete a pivotal clinical program in subjects with liver failure (principally hepatitis) in China in 2007, the underlying clinical trial was terminated early by the lead hospital due to achievement of safety and efficacy goals and a determination that it was unethical to continue. We are now in the process of conducting two Phase 3 clinical programs for the U.S. and Europe. We have not previously completed a pivotal clinical trial program of the size and complexity of our current planned pivotal programs and we cannot provide any guarantee that we will successfully complete such a program. If this pivotal program is completed, there can be no assurance that the data generated can be used to support marketing approval for any indication in the U.S. or Europe. If our Phase 3 clinical trials do not achieve statistical significance for the primary endpoint, we will not receive marketing approval and we will not be able to commercialize the ELAD System.

The results of previous clinical trials may not be predictive of future results.

Positive results from our prior clinical trials, including either statistical significance in some endpoints or trends towards statistical significance in other endpoints, should not be relied upon as evidence that our current or future clinical trials will necessarily succeed. While we believe that we have learned valuable lessons from the results of prior trials and have attempted to use these lessons to guide our design of current and future clinical trials, there can be no guarantee that these lessons are correct or that we will effectively incorporate them into the design of current and future clinical trials. For example, our primary endpoint in VTI-208 is based on the results of a subset of subjects in VTI-206. Though that subset showed a trend toward increased survival up to at least study day ninety-one, it consisted of only 29 subjects. The FDA has noted its belief that this preliminary clinical evidence does not indicate that our product may demonstrate a substantial improvement over standard of care. We cannot provide any guarantee that our current and future clinical trials will provide statistically significant data sufficient to support regulatory approval.

[Table of Contents](#)

If we fail to select appropriate subjects for our Phase 3 clinical trials or if these subjects do not progress as expected, it will be difficult for us to demonstrate the statistically significant efficacy of the ELAD System therapy necessary to gain approval.

We have designed VTI-208 and VTI-210 in accordance with input provided by regulatory authorities that we must demonstrate a statistically significant improvement in a survival endpoint. VTI-208 includes and VTI-210 will include concurrent control subjects in a 1:1 ratio with treated subjects and all subjects will be included in the statistical analysis. Also, each study is designed to enroll subjects with an expected death rate between 50% and 75% in 30 to 90 days without the ELAD System therapy. It is necessary to select subjects with these death rates in order to be able to determine whether the ELAD System has an effect on treated subjects with a manageable number of subjects in the clinical trial. We monitor certain baseline characteristics of the subjects we are enrolling in our studies (such as age and mean model for end-stage liver disease, or MELD, score) to assess that the population characteristics are similar to those from prior studies in which death rates were in the target range. Although subjects enrolled in VTI-208 have similar ages and MELD scores to AILD subjects enrolled in VTI-206, there is no assurance that these parameters are sufficient to predict survival. Moreover, if we do not succeed in selecting appropriate subjects or if the subjects we select do not progress as expected, we may not be able to demonstrate statistically significant efficacy of the ELAD System therapy to gain approval.

Random variation or changes in standard of care could cause our clinical trials to be delayed and/or fail.

Regulatory authorities worldwide have adopted the standard that, to gain marketing approval, clinical trials should produce a result that has less than a 5% probability of being due to random variation. There is no assurance that any of our clinical trials will meet that standard. In addition, we have designed all of our clinical trials to be judged by a survival primary endpoint, which may be difficult to achieve for many reasons, including unanticipated survival rates of control subjects due to random variations, deficiencies in our exclusion and inclusion criteria, and the standard of care of the subjects, which may vary from site to site and country to country and is continuously evolving. For example, FDA has expressed concern that the VTI-208 study may not be adequately designed to provide convincing evidence of efficacy if there are significant differences in how the ELAD System subjects and controls are treated during the treatment period and after hospital discharge. Variations in length of hospital stay, rates of hospital re-admission, alcohol recidivism rates, nutritional support, and concomitant medications, which are not within our control, could significantly confound the study results and call into question whether any difference in survival is due to the ELAD System or to these factors. Moreover, evolution in the standard of care for the treatment of patients with acute forms of liver failure could make our trials difficult to enroll and interpret. For instance, in consideration of the results of the Steroids or Pentoxifylline for Alcoholic Hepatitis (STOPAH) study funded by the UK National Institute for Health Research, we modified the VTI-210 trial protocol to allow subject enrollment independent of steroid administration. STOPAH failed to demonstrate any significant benefit in the primary analysis of overall survival for subjects treated with either steroids, pentoxifylline or a combination of the two at one, three or twelve months, as compared with placebo. Any of these factors, which are beyond our control, could materially and adversely affect the results of our Phase 3 clinical trials and prevent us from gaining regulatory approval of our ELAD System therapy. In addition, even if the results of our clinical programs are positive, our inability to control or adequately account for these factors between treatment arms could cause the FDA or other regulatory authorities to determine that the results are not adequate to support marketing approval.

The ELAD System treatment could result in significant clinical risks to the patient, including death.

The ELAD System therapy is targeted towards very sick patients who are likely to die if left untreated. Patients with liver failure resulting from acute hepatocellular insult quickly develop failure of other organs including lungs, kidney, brain, and blood coagulation systems. Patients who receive the ELAD System therapy may die due to other serious health problems even if the ELAD System is effective.

All extracorporeal therapy systems cause a decline in blood platelets, which can lead to coagulation problems and uncontrolled bleeding because platelets are critical to the formation of blood clots. Patients with liver failure generally have serious blood clotting problems since the liver produces most of the body's blood clotting proteins. These patients therefore have wide variations in their ability to coagulate their blood. To minimize blood clotting issues during ELAD treatment, some patients require an infusion of small amounts of anti-coagulant therapy, which can aggravate bleeding. Because every patient is different, the need for anti-coagulant therapy is not predictable and must be established during therapy, a process that can affect the course of the therapy. The risk of uncontrolled bleeding may be addressed during the ELAD System therapy by administering platelet transfusions to patients whose platelets drop below a safe level or by administering blood coagulation factors. However, there have been cases of uncontrolled bleeding during and after the ELAD System therapy. Additionally, some patients have abnormal red blood cells, which have weakened cell walls subject to rupture by physical force, a process known as hemolysis. The physical force exerted on the red blood cells by the ultrafiltrate generator in the ELAD System line can, in some cases, be enough to cause hemolysis which, if not arrested, can be fatal. The incidence of hemolysis was approximately 2% in subjects enrolled in our prior clinical trials.

[Table of Contents](#)

Human liver-derived C3A cells have been shown in animal studies to have the capacity to grow into a tumor mass under certain conditions. Although this has not been seen in the subjects treated with the ELAD System to date, it is possible that some VTL C3A cells could escape from the ELAD cartridges and cause tumors in patients or produce substances that could lead to the development of malignant tumors. These or other adverse events, even those that are currently unforeseen, could significantly affect our development and commercialization efforts, cause the regulatory authorities to place our clinical trials on hold or to refuse to grant or maintain the marketing approval or result in withdrawal of the ELAD System from the market.

Ethical considerations require us to conduct open-label clinical trials of the ELAD System where control subjects do not receive a sham treatment and this could introduce unacceptable bias into our trial results.

We are not conducting any of our clinical trials with a sham control extracorporeal circuit that includes empty cartridges. This is due to the potential harm that the extracorporeal circuit can cause to control subjects without the potential for any benefit, which makes it unethical to subject the controls to a sham. Although regulatory agencies agree that, due to the nature of the ELAD System therapy, it is not possible to conduct a blinded study, they have expressed concern that the open-label nature of the study may introduce significant bias in the treatment of the ELAD System or control subjects, since the study subject, physicians and caregivers know who has, and has not received the ELAD System therapy. We have developed a protocol that attempts to minimize this bias to the extent possible, including defining a protocol-specific standard of care, specifying steroid treatment, standardizing the discharge criteria for both the ELAD System and control subjects, requiring that follow-up visits are conducted by a blinded reviewer, ensuring home healthcare nurses and other clinical personnel are unaware of treatment assignment, educating subjects not to reveal treatment assignment to their caregivers and monitoring concomitant medications, alcohol recidivism and interaction with the healthcare system to provide evidence that there is no meaningful difference between the groups that could significantly confound the trial data. However, there is no guarantee that bias will not enter into the trial, affect the results or cause regulatory agencies to refuse marketing approval of the ELAD System.

If we encounter difficulties enrolling subjects in our clinical trials, our clinical trials could be delayed or otherwise adversely affected.

Clinical trials for the ELAD System require us to identify and enroll a large number of subjects that meet all of the entry criteria set forth in our protocols, including having the disease under investigation. We may not be able to enroll a sufficient number of subjects who meet our protocol requirements in a timely manner. Subject enrollment is affected by numerous factors, many of which fall outside our control, including:

- timeliness of contracting with clinical trial sites, and obtaining approval of the trial by the institutional review boards, or IRBs, at each site;
- lack of a sufficient number of subjects who meet the enrollment criteria for our clinical trials;
- perceived risks and benefits of the product candidate under study;
- availability of competing therapies and clinical trials;
- efforts to facilitate timely enrollment in clinical trials;
- scheduling conflicts with participating clinicians; and
- proximity and availability of clinical trial sites for prospective subjects.

Additionally, even if we are able to identify an appropriate subject population for a clinical trial, there can be no assurance that the subjects will complete the study.

If we have difficulty enrolling a sufficient number of subjects to conduct our clinical trials as planned or if enrolled subjects fail to complete the study or comply with our protocols, particularly with regard to follow-up appointments, the completion of our clinical trials will be delayed and our business would be harmed.

[Table of Contents](#)

We may face delays in completing our clinical trials, and we may be required to suspend, repeat or terminate our clinical trials if they are not conducted in accordance with applicable regulatory requirements, the results are negative or inconclusive, or the clinical trials are not well-designed or executed as expected.

Our current and future clinical trials must be conducted in accordance with regulations governing clinical studies, and are subject to oversight by the FDA, foreign governmental agencies, ethics committees and IRBs at the medical institutions where the clinical trials are conducted. In addition, clinical trials may require large numbers of test subjects. Changes in regulatory requirements may occur at any time and we may need to amend clinical trial protocols to reflect such changes. In addition, we may voluntarily amend our protocols, as we did for VTI-210. Amendments may require us to resubmit our clinical trial protocols to ethics committees or IRBs for reexamination, which may impact the costs, timing or successful completion of the underlying trial.

Our current and future clinical trials may require amendment or be delayed, unsuccessful or terminated as a result of many factors, including:

- delays or failures in designing an appropriate clinical trial protocol with sufficient statistical power and in reaching agreement on trial design with investigators and regulatory authorities;
- delays or failure in reaching agreement on acceptable terms with prospective CROs and clinical trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- delays or failure by CROs, investigators and clinical trial sites in ensuring the proper and timely conduct of our clinical trials;
- delays or failure by us in manufacturing sufficient quantities of the ELAD System pursuant to required quality standards for use in our clinical trials and by third-party manufacturers in supplying necessary and suitable components for the system;
- delays or failure in transporting the ELAD System to clinical trial sites with sufficient rapidity to enable treatment to begin early enough to have an opportunity for clinical benefit;
- delays or failure in completing data analysis and achieving primary and secondary endpoints;
- regulators or clinical site ethics committees or IRBs may suspend or terminate clinical research for various reasons, including noncompliance with regulatory requirements or concerns about patient safety;
- we may suspend or terminate our clinical trials if we believe the ELAD System is exposing the participating subjects to unacceptable health risks or for other reasons;
- subjects may not complete our clinical trials due to safety issues, adverse events, inconvenience or other reasons;
- subjects in our clinical trials may die or suffer other adverse events for reasons that may be either related or unrelated to the ELAD System, particularly given the critically ill nature of these subjects;
- we may have difficulty in maintaining contact with subjects after treatment, preventing us from collecting the data required by our study protocol; and
- final analysis of the data of our clinical trials may conclude that the ELAD System lacks sufficient clinical efficacy or presents unacceptable safety risks.

Should any of our clinical trials fail to provide evidence of safety and efficacy sufficient to satisfy the requirements of the regulatory authorities, the ELAD System will not be approved. If we experience delays in the completion of, or termination of, any clinical trial of the ELAD System, the commercial prospects of the ELAD System will be harmed, and our ability to generate revenues will be delayed or eliminated. In addition, any delays in completing our clinical trials will increase our costs, slow down our development and approval process and delay or jeopardize our ability to commercialize the ELAD System. Any of these occurrences may harm our business, financial condition and prospects significantly.

Risks Related to Regulatory Matters

The FDA regulatory approval process is complex, time-consuming and unpredictable.

In the U.S., the ELAD System is regulated as a combination biologic and medical device. Before the ELAD System can be marketed in the U.S., we must submit and the FDA must approve a Biologic License Application, or a BLA. In addition, the device components of the ELAD System must be found acceptable as part of the BLA. Because the ELAD System is a novel therapy involving a combination biologic and medical device, the regulatory review process is complex, time-consuming and unpredictable. As a result, our development costs, timelines and approvals are not readily predictable.

The time required to obtain approval by the FDA to market a new therapy is unpredictable but typically takes many years and depends upon many factors, including the substantial discretion of the regulatory authorities.

The ELAD System could fail to receive regulatory approval for many reasons, including the following:

- the FDA may disagree with the design or implementation of our clinical trials or study endpoints. For example, it has expressed concern about the open-label design and multiplicity of confounding variables, including the need for delineating the standard of care that both treatment and controls will receive during our studies;
- we may be unable to demonstrate to the satisfaction of the FDA that the ELAD System is safe and effective for its proposed indications or that the ELAD System provides significant clinical benefits;
- the results of our clinical trials may not meet the level of statistical significance required by the FDA for approval or may not support approval of a label that could command a price sufficient for us to be profitable;
- the FDA may disagree with our interpretation of data from preclinical studies or clinical trials. For example, the FDA has stated there are insufficient preclinical and clinical data to determine whether the ELAD System has the potential to provide a clinically meaningful improvement in liver function;
- the opportunity for bias in the clinical trials as a result of the open-label design may not be adequately handled and may cause our trial to fail;
- the ELAD System may be subject to an FDA advisory committee review, which is triggered by an FDA request, which is solely within the FDA's discretion, which may result in unexpected delays or hurdles to approval;
- the FDA may determine that the manufacturing processes at our facilities or facilities of third party manufacturers with which we contract for clinical and commercial supplies are inadequate;
- even if VTI-208 is successful in demonstrating a statistically significant improvement over standard of care, in light of the fact that certain confounding factors may be viewed by the FDA as limiting the persuasiveness of the study results, a single Phase 3 clinical trial may not be sufficient to provide the substantial evidence of effectiveness necessary to support regulatory approval, and therefore we may need more than one Phase 3 clinical trial to secure regulatory approval;
- the FDA has commented that even if one of our Phase 3 clinical trials, including VTI-208, is a statistical and clinical success, a second confirmatory trial that substantiates positive results may be necessary to support a BLA; and
- the approval policies or regulations of the FDA may significantly change in a manner rendering our clinical data insufficient for approval.

The FDA has expressed concern that the VTI-208 study may not be adequately designed to provide convincing evidence of efficacy if there are significant differences in how the ELAD System subjects and control subjects are treated during the study and after discharge from the hospital. Differences in length of hospital stay, rates of hospital re-admission, alcohol recidivism rates, nutritional support, and concomitant medications could significantly confound the study results.

In addition, even if we were to obtain approval, the FDA may grant approval contingent on the performance of costly post-marketing clinical trials, or may approve the ELAD System with a label that does not include the labeling claims necessary or desirable for successful commercialization of the ELAD System. Any of the above could materially harm the ELAD System's commercial prospects.

[Table of Contents](#)

The regulatory approval processes of foreign regulatory authorities are lengthy, time-consuming and inherently unpredictable.

Outside the U.S., our ability to market the ELAD System is contingent upon receiving marketing authorizations from appropriate regulatory authorities. If our clinical programs are successful, we currently anticipate submitting applications for marketing authorization to the EMA in the European Union. The requirements governing the conduct of clinical trials, marketing authorization, pricing and reimbursement vary widely from country to country and we may be unable to meet such requirements. If the regulatory authority is satisfied that adequate evidence of safety, efficacy, and quality has been presented, a marketing authorization will be granted. The foreign regulatory approval process involves all of the risks associated with FDA approval.

Even if the ELAD System receives regulatory approval, we will be subject to ongoing regulatory requirements and may face regulatory or enforcement action.

If any ELAD System product receives regulatory approval, we will be subject to significant ongoing regulation by the FDA and other regulatory authorities, including regulation of our manufacturing operations, and any third-party manufacturing operations for compliance with applicable current Good Manufacturing Practices, or cGMP, and/or Quality System Regulation, or QSR, post-approval clinical data, adverse event reporting and complaint handling, and advertising and promotional activities. Failure to comply with regulatory requirements may subject us to sanctions. These may include warning letters, adverse publicity, civil and criminal penalties, injunctions, product seizures or detention, and refusal to approve pending product marketing applications.

Risks Related to the Medical Device Components of the ELAD System

If we or our third-party manufacturers fail to comply with the Quality System Regulation in the U.S. or Medical Device Directives and Standards in Europe, our business would suffer.

We are required to demonstrate and maintain compliance with applicable regulations for the manufacturing of combination biologic products, including specified parts of the QSR and European Medical Device Directives, or MDD. Our third-party medical device manufacturers, are required to demonstrate and maintain compliance with the QSR and MDD. The QSR and MDD are complex regulatory schemes that cover the methods and documentation of the design, testing, control, manufacturing, labeling, quality assurance, packaging, storage and shipping of the ELAD System. Regulatory agencies enforce the QSR and MDD through periodic inspections. Prior to approval of the ELAD System, our manufacturing facility will be subject to a preapproval inspection to determine compliance with the applicable regulations, including cGMPs, parts of the QSR, the European drug cGMP regulations, and the MDD. In addition, our third-party medical device component manufacturers will be subject to a preapproval inspection to determine compliance with QSR and MDD requirements. Our failure, or the failure of our third-party manufacturers, to pass a preapproval inspection, or take satisfactory and prompt corrective action in response to an adverse inspection, could prevent or significantly delay approval of the ELAD System.

The ELAD System bedside unit is based on a cardio-pulmonary bypass system that has been replaced with an updated system, and regulatory authorities may not view the systems as interchangeable.

The ELAD System bedside unit was originally based exclusively on the Sorin Stöckert Perfusion System S3 Double Head Pump Module, a medical device indicated for use during cardio-pulmonary bypass surgery. Our prior clinical trials have been carried out using an ELAD System bedside unit based on Sorin's S3 system. However, Sorin stopped selling the S3 system and replaced it with an updated S5 system. We have carried out testing of an ELAD System bedside unit based on the S5 and we believe that the S3 and S5 systems are equivalent and interchangeable from a clinical and regulatory perspective. We have submitted information to both the U.S. and the European regulatory authorities to support equivalence. Both the S3 and S5 systems are being used in our ongoing clinical trials. There can be no assurance that regulatory authorities will view the S3 and S5 systems interchangeably, or that Sorin will cooperate with us or provide us with the documentation necessary for inclusion in our BLA submission, which will be required to obtain regulatory approval of our ELAD System. If regulatory authorities do not view the S3 and S5 systems as equivalent, or Sorin fails to provide the information necessary for inclusion in our regulatory filings, approval of our ELAD System may be significantly delayed or prevented.

[Table of Contents](#)

One of the ELAD System component suppliers is subject to an FDA consent decree which, if not lifted, would force us to find another supplier for these components.

One of the components of the ELAD System bedside unit is manufactured by Terumo Cardiovascular System, or Terumo. In March 2011, Terumo entered into a consent decree with the FDA which limits its ability to ship products from certain of its manufacturing facilities including the one that manufactures the component we use. We received notice from Terumo in March 2015 that although Terumo remains under its consent decree, all injunctive restrictions were lifted for the component used in the ELAD System. However, should Terumo not be able to fulfil the requirements of the consent decree, we will have to source these components from an alternative supplier. There is no guarantee that Terumo will be able to fulfill the requirements of the consent decree, or that an alternative supplier can be found or will agree to acceptable terms.

Changes in any of the device components could affect our ability to complete our clinical trials and to obtain and maintain approval and commercialization efforts.

The device components of the ELAD System will be reviewed as part of the BLA for the ELAD System. If the manufacturers of those components make modifications, discontinue supplying or are unable to supply sufficient quantities of such components during our clinical testing or after any approval, or if we elect to change a component, we will need to perform validation testing and obtain FDA and other regulatory approval prior to using the modified or replacement component. For example, one of our suppliers had an issue sourcing a raw material that is used in manufacturing of tubing which is a component of the ELAD System. If we had not been able to obtain sufficient quantities of this tubing on a timely basis, we would have had to delay enrollment in our clinical trials until additional supplies became available or we would have been required to validate an alternative tubing to use, which could have delayed our clinical trials and increased our costs. If the FDA or any other regulatory body fails to approve use of those modified or replacement devices, takes significant enforcement action against the manufacturer or if we are unable to validate a replacement component, we would not be able to complete our clinical trials or, in the future, we might not be able to market or could have to suspend marketing of the ELAD System in certain jurisdictions.

We may be unable to demonstrate that devices cleared for different uses may be safe and effectively used in the ELAD System.

Most device components of the ELAD System have been previously cleared for use by the FDA or other regulatory authorities. However, in some instances, we will be using the components outside the scope of their cleared indications. Other device components have no regulatory approvals. We may need to conduct additional testing to bridge the differences between the cleared indications for use and the proposed use in the ELAD System in order to obtain approval, or we could be required to obtain separate clearance for one or more of the components used in the ELAD System. The failure to provide adequate bridging information or to obtain separate clearance of these device components for use in the ELAD System, if required, could delay or prevent approval of the ELAD System.

Risks Related to the Cellular Component of ELAD System and Related Components

If we fail to comply with cGMPs our business will suffer.

We are required to demonstrate and maintain compliance with cGMPs. The cGMPs describe the methods to be used in, and the facilities or controls to be used for, the manufacture, processing, packing, or holding of a biologic to assure the biologic meets the requirements for safety, and has the quality, purity, and potency characteristics that it purports or is represented to possess. Regulatory agencies enforce these requirements through periodic inspections. Prior to approval of the ELAD System, our manufacturing facilities will be subject to a preapproval inspection to determine compliance with U.S. and European cGMPs and applicable QSR and MDD requirements. Our failure to pass such an inspection, or take satisfactory and prompt corrective action in response to an adverse inspection, could prevent or significantly delay approval of the ELAD System.

We rely on third party suppliers, and in some instances, a single third party supplier, for critical components of the ELAD System and these suppliers could cease to manufacture the components, go out of business or otherwise not perform as anticipated.

While the growing of our VTL C3A cells is under our control, the manufacture of all of the other parts and components of the ELAD System are undertaken by third party suppliers. We currently rely on a single source of supply for many critical components, including components of the ELAD System bedside unit, the ultrafiltrate generator cartridges, the media we use to grow and ship our VTL C3A cells, the cartridges in which our VTL C3A cells are grown and the bioreactors that have been developed to grow and store the ELAD cartridges. We are currently investigating additional sources of supply for these components to support future clinical development and, ultimately, commercialization of the ELAD System. If we were to fail to develop additional sources of supply, and a single source of supply of a critical component of the ELAD System were to become unavailable, our ability to continue clinical development or to initiate commercialization of the ELAD System would be severely compromised. In addition, we rely on third party suppliers for the safety of products of human and animal origin that are incorporated in the ELAD System production process and these suppliers could cease to manufacture the components, inadequately test these components, go out of business or otherwise not perform as anticipated. We do not have long-term agreements with our suppliers, and we purchase components on a purchase order basis. For components that are not readily available from other sources, we are subject to the risks that our suppliers will raise their prices or impose other terms or conditions that are less favorable or unacceptable to us.

[Table of Contents](#)

For instance, newborn calf serum, which is a component of the cell growth media, is used in the manufacture of the ELAD System. It is obtained from an outside supplier. We are wholly reliant on the guarantee of our supplier that the calf serum used in our manufacturing procedures is free of transmitted animal viruses and other pathogens. Should the source of supply become infected, or the supplier become unable to continue to supply calf serum of the quality necessary to support human use, or the regulations change such that the calf serum cannot be used for human use, we would have to find alternative sources of supply and manufacturing methods, for which there is no guarantee of success.

Human albumin and Trypsin-EDTA are also used in the manufacture of our ELAD System and are each provided by a single supplier. In addition, while these products are tested to be free of contamination by the supplier, we cannot guarantee that will continue to be the case.

If our facility becomes inoperable, we will be unable to continue manufacturing our product candidate and as a result, our business will be harmed until we are able to secure a new facility.

We manufacture and assemble the ELAD System at our facility in San Diego, California. No other manufacturing or assembly facilities are currently available to us, and any additional manufacturing or assembly facilities that we use will need to be approved by regulatory authorities prior to our use. Our facility and the equipment we use to manufacture the ELAD System would be costly to replace and could require substantial lead-time to repair or replace. The facility may be harmed or rendered inoperable by natural or man-made disasters, including fire, earthquakes, flooding and power outages, which may render it difficult or impossible for us to perform our research, development and manufacturing for some period of time. The inability to perform our research, development and manufacturing activities, combined with our limited inventory of reserve raw materials and manufactured supplies, may result in the delay of clinical trials or, if approved for sale, the loss of customers, or harm our reputation, and we may be unable to reestablish relationships with those customers in the future. Although we possess insurance for damage to our property and the disruption of our business, this insurance may not be sufficient to cover all of our potential losses and may not continue to be available to us on acceptable terms, or at all.

We may be unable to manage our anticipated manufacturing growth to support our clinical development activities and long-term commercial demand for the ELAD System.

In order to support our ongoing clinical programs, we will need to increase production of our ELAD System. Similarly, if and when the ELAD System is approved for sale, we will need to expand our manufacturing space in San Diego and build new manufacturing facilities to meet anticipated demand for the ELAD System in the U.S. and abroad. These activities involve significant expense, including the construction of new clean rooms and bioreactors, the movement and installation of key manufacturing equipment and the modification of manufacturing processes. In addition, we must also notify, and in some cases obtain approval from, the FDA and other regulatory authorities of any changes or modifications to our manufacturing facilities and processes, and there can be no assurance that they will authorize us to proceed. If we are not able to expand our manufacturing capacity to meet future demand, our business would be harmed.

Further, our anticipated growth will place additional strain on our organization, employees and third-party suppliers, resulting in an increased need for us to carefully monitor quality. Any failure by us to manage our growth effectively could have an adverse effect on our ability to achieve our development and commercialization goals.

We forecast the requirements for components and materials used in the ELAD System, and if our forecasts are incorrect, we may experience delays in shipments or increased inventory costs.

We keep limited materials, components and finished product on hand. To manage our manufacturing operations with our suppliers, we forecast anticipated product orders and material requirements to predict our future inventory needs and to enter into purchase orders on the basis of these requirements. Our limited historical experience may not provide us with enough data to accurately predict future demand. If our business expands, our demand for components and materials would increase and our suppliers may be unable to meet our demand. Many of our components are medical devices, which have fixed future expiration dates. If we overestimate our component and material requirements, we will have excess inventory, which may have to be disposed of if it exceeds approved expiration dates, which would increase our expenses. If we underestimate our component and material requirements, we may have inadequate inventory, which could interrupt, delay or prevent delivery of the ELAD System to our customers. Any of these occurrences would negatively affect our financial performance and the level of satisfaction our customers have with our business.

[Table of Contents](#)

We may not be able to grow our VTL C3A cells reliably and cost-effectively.

Operations with human cells, even a stable, immortal cell line such as the VTL C3A cells used in the ELAD System, can be subject to conditions and influences that we may not be able to control. Although our VTL C3A cells are stored at three separate locations in the U.S. and the U.K., it is possible that all three locations could be destroyed and we will lose all or a portion of our cell banks. It is also possible that the cells will simply cease to function. While we take precautions to prevent this from happening, the ELAD System employs new technologies and we could encounter unforeseen complications. To date, we have only produced the small number of the ELAD cartridges required to support our clinical trials. As we increase production to support Phase 3 clinical trials and long-term commercial demand, we may experience significant scale-up issues, which may cause quality and cost problems. If we cannot produce the required number of the ELAD cartridges in a cost-effective manner, our business could be materially harmed.

Cellular therapy is complex and we do not have a complete understanding of the mechanism of action of the ELAD System.

Cellular therapy is a complex treatment with multiple variables that are not fully understood. Our VTL C3A cells used in the ELAD cartridges produce hundreds of metabolites. Likewise, the plasma ultrafiltrate formed from blood, which has been treated by our VTL C3A cells in our ELAD cartridges, is a similarly complex material. The composition and stability of the treated blood can be affected by the conditions of its generation in the ELAD System bedside unit and could affect treatment outcomes. For instance, while subjects treated with the ELAD System typically only require a single set of cartridges, some subjects require more than one set during their three to ten day treatment period, which may have implications for not only efficacy, but also cost of goods. While we believe that we have identified the key parameters of the ELAD System VTL C3A cartridges and set them in an appropriate range, it is possible that there are other variables that are important to safety and efficacy that have not been anticipated. We believe that we have set these parameters at realistic levels that can be controlled by the specification set for a supplier and confirmed by us in our quality control procedures, but it is possible that unanticipated complications will emerge.

Risks Related to the ELAD System's Future Commercialization

It is difficult to forecast future performance; our financial results may fluctuate unpredictably.

Our limited operating history makes it difficult for us to predict our future commercialization efforts. A number of factors, over which we have limited or no control, may contribute to fluctuations in our financial results, such as:

- delays in receipt of anticipated purchase orders;
- our ability to recruit, train and retain sales, marketing, training and support personnel;
- our inability to educate physicians about the ELAD System and drive the adoption of the ELAD System therapy for any approved indications;
- performance of our targeted sales force in the U.S. and Europe and future partners in other markets;
- results of clinical trials evaluating the ELAD System therapy;
- positive or negative media coverage of the ELAD System or products of our competitors or our industry;
- our ability to obtain further regulatory clearances or approvals, including for other indications;
- delays in, or failure of, product and component deliveries by our subcontractors and suppliers;
- changes in the length of the sales process;
- changes in healthcare coverage and reimbursement policies;
- customer response to the introduction of new product offerings; and
- fluctuations in foreign currencies.

[Table of Contents](#)

The human clinical trial results may not be representative of the results that are obtained after the ELAD System product launch.

Human clinical trials are very complicated undertakings and working with subjects in liver failure is particularly difficult because of the serious nature of the disease and the co-morbidities experienced by the subjects. Not enough is known about the function of the liver to understand the progression of liver disease and any single subject can react differently to the ELAD System therapy. This means that clinical trials done at different times in different groups of subjects may obtain different results. Safety risks not identified in our clinical trials may first appear after we obtain approval and commercialize the ELAD System. Any new post-marketing adverse events may significantly impact our ability to market the ELAD System and may require that we recall and discontinue commercialization of the product. Any of these events will harm our business.

The ELAD System is a very complicated therapy and will need to be delivered by well-trained staff. There is no guarantee that we will be able to implement such training and find sufficient numbers of people to enable us to grow at an acceptable rate.

In the initial commercialization period, it will be essential for us to have our own trained staff present during the delivery of the ELAD System therapy. This may entail the construction and operation of training centers and will require the hiring of personnel of appropriate ability to be adequately trained. The differences in language and culture may make this a difficult undertaking. If we cannot recruit, train and retain significant numbers of physicians and nurses, our ability to grow will be restrained and we may find that the ELAD System therapy is being delivered by people with a substandard level of training, and with potentially material adverse results. If the ELAD System therapy is delivered improperly or the bedside device or the ELAD cartridges are not properly maintained by our customers, the ELAD System may not provide the intended benefit or could harm patients. This may in turn result in perceptions, even if unfounded, that the ELAD System is ineffective or that our bedside device or the ELAD cartridges are defective, which could materially harm our reputation and ability to market the ELAD System effectively.

We could lose our valuable employees and thereby lose our advantage in the marketplace.

We are highly dependent on the efforts of our key employees, including senior management and senior scientific, clinical, regulatory, operational and other personnel. The development of new therapeutic products requires expertise from a number of different disciplines, some of which are not widely available.

Our key employees have a significant amount of know-how and experience in our company and the loss of one or more of them could have a material and adverse effect on our operations. While we have taken steps to incentivize and to retain our employees, including the granting of stock options, paying competitive salaries and implementing appropriate bonus programs, these factors may not be enough to retain the key employees that we need.

The loss of the services of existing personnel, the failure to recruit additional key scientific, managerial, clinical, regulatory, operational and other personnel in a timely manner, and the loss of our employees to our competitors would harm our research and development programs and our business. We may experience difficulty in hiring and retaining highly skilled employees with appropriate qualifications. If we fail to attract new personnel or fail to retain and motivate our current personnel, our business and future growth prospects would be harmed.

Competitive products could be developed which make the ELAD System obsolete.

The biotherapeutic and medical device industries are highly competitive and we face potential competition from pharmaceutical companies, specialty pharmaceutical, medical device and biotechnology companies worldwide. Given the significant unmet medical need for novel therapies to treat liver failure, many companies, universities and research organizations are actively engaged in the discovery, research and development of potential therapies in this field. Several of these entities are engaged in research on cell-based approaches to liver failure. Although we are not aware of any ongoing human clinical trials involving potentially competitive product candidates, such trials could be taking place or could begin in the near future. We are not aware of any company that is in human clinical trials with a human cell-based product for the treatment of liver failure. At least four companies have prior research work on various human hepatocyte cell lines including Exten Industries, Hepalife Technologies, Fresenius, and Hybrid Organ GmbH. In addition, the University College London, and the University of Amsterdam and its spinout Hep-Art Medical Devices are actively pursuing animal research in this area. Several companies have also attempted to develop extracorporeal therapy based upon primary porcine hepatocytes, although ongoing research in this area is difficult to ascertain. Two commercially available liver dialysis systems, from Baxter International and Fresenius, have undergone extensive clinical development, although both have failed to show an improvement in long-term survival among patients with liver failure. Both rely on not only traditional dialysis circuits to remove water-soluble toxins, but also albumin dialysis circuits to remove albumin-bound molecules. In addition, there are several drugs available to treat symptoms associated with liver failure, including steroids, pentoxifylline and N-acetylcysteine. These three drugs, alone or in combination, are used frequently in patients with liver failure resulting from acute hepatocellular insult. While we are not aware of any of these other entities being close to undergoing human clinical trials with a human cell-based product for the treatment of liver failure, it is possible that these trials are occurring without our knowledge and that such a product may get to market much faster than we expect, which could harm our business.

[Table of Contents](#)

The coverage and reimbursement status of new therapies is uncertain, and failure to obtain adequate coverage and reimbursement for the ELAD System therapy could limit our ability to generate revenue and become profitable.

There is significant uncertainty surrounding the third-party coverage and reimbursement of novel and newly approved therapies, particularly for indications for which there is no current effective treatment or the current standard of care is relatively inexpensive. Due to the novel nature of the ELAD System and the potential for it to offer therapeutic benefit after a single administration of continuous therapy lasting three to ten days, we face additional uncertainty related to coverage and reimbursement. We will depend in large part on the availability of coverage and the establishment of adequate reimbursement levels for the ELAD System from third-party payors, including government payors, such as the Medicare and Medicaid programs, and managed care organizations. Although we believe that the single largest category of ELAD-appropriate patients are covered by private insurance, followed by Medicaid and then Medicare, this analysis is based on small numbers, may not be accurate, and may change in the future.

Third-party payors are increasingly focused on containing healthcare costs by limiting both coverage and the level of reimbursement for new therapies and, as a result, they may not cover or provide adequate payment for the ELAD System. Obtaining adequate coverage and reimbursement approval for a product from a third-party payor is a time-consuming, costly and sometimes unpredictable process that could require us to provide supporting scientific, clinical and cost-effectiveness data for the use of the ELAD System. However, we cannot guarantee that we will be able to provide data sufficient to gain acceptance with respect to adequate coverage and reimbursement. Payors may conclude that the ELAD System is less safe, less effective or less cost-effective than existing or later introduced therapies, and third-party payors may not approve the ELAD System for coverage and reimbursement or may cease providing or provide inadequate coverage and reimbursement. Coverage and reimbursement determinations are made on a payor-by-payor basis and it may take several years to obtain appropriate reimbursement codes, if ever. Obtaining acceptable coverage and reimbursement from one payor does not guarantee that we will obtain similar acceptable coverage or reimbursement from another payor. As there is a large number of third-party payors, obtaining coverage and reimbursement in the U.S. and internationally will consume significant time and resources. A third-party payor's decision to provide coverage does not imply that an adequate reimbursement rate will be approved. There can be no assurance that our clinical data will allow for satisfactory pricing of the ELAD System and the failure to obtain coverage and adequate reimbursement for the ELAD System would materially and adversely affect our business. Moreover, healthcare cost containment initiatives that limit or deny reimbursement for the ELAD System would also materially and adversely affect our business.

Our relationships with investigators, healthcare professionals, institutional providers, consultants, third-party payors, and customers are subject to applicable anti-kickback, fraud and abuse and other healthcare laws and regulations, which could expose us to penalties, including without limitation, civil, criminal and administrative penalties, damages, monetary fines, disgorgement, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, contractual damages, reputational harm, diminished profits and future earnings, and the curtailment or restructuring of our operations.

Healthcare providers, physicians and others play a primary role in the recommendation and prescribing of any product candidates for which we may obtain marketing approval. In the U.S., our current business operations and future arrangements with investigators, healthcare professionals, institutional providers, consultants, third-party payors and customers, may expose us to broadly applicable fraud and abuse and other healthcare laws and regulations. These laws may constrain the business or financial arrangements and relationships through which we research, market, sell and distribute our products that obtain marketing approval. Restrictions under applicable federal and state healthcare laws and regulations, include, but are not limited to, the following:

- the federal healthcare program anti-kickback statute prohibits, among other things, persons or entities from knowingly and willfully soliciting, offering, receiving or paying any remuneration (including any kickback, bribe, or rebate), directly or indirectly, overtly or covertly, in cash or in kind, to induce or in return, for purchasing, leasing, ordering, or arranging for or recommending the purchase, lease, or order of any good, facility, service or item for which payment is made, in whole or in part, under a federal healthcare program;
- the federal civil and criminal false claims laws and civil monetary penalties laws, including civil whistleblower or qui tam actions, prohibit, among other things, individuals or entities from knowingly presenting, or causing to be presented, to the federal government, claims for payment or approval that are false or fraudulent or from knowingly making a false statement to improperly avoid, decrease or conceal an obligation to pay money to the federal government;

[Table of Contents](#)

- the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, imposes criminal liability for, among other things, knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program or to obtain, by means of false or fraudulent pretenses, representations, or promises, any of the money or property owned by, or under the custody or control of, any healthcare benefit program, regardless of the payor (e.g., public or private) and knowingly or willfully falsifying, concealing, or covering up by any trick, scheme or device a material fact or making any materially false statement in connection with the delivery of, or payment for, healthcare benefits, items or services relating to healthcare matters;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, or HITECH, and its implementing regulations, and as amended again by the final HIPAA omnibus rule, Modifications to the HIPAA Privacy, Security, Enforcement, and Breach Notification Rules Under HITECH and the Genetic Information Nondiscrimination Act; Other Modifications to HIPAA, published in January 2013, imposes certain obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information without appropriate authorization by entities subject to the rule, such as health plans, clearinghouses and healthcare providers;
- the federal transparency law, enacted as part of the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act (collectively, the ACA), and its implementing regulations, require manufacturers of drugs, devices, biologicals and medical supplies to report to the U.S. Department of Health and Human Services information related to payments and other transfers of value made to physicians and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members; and
- analogous state laws and regulations, including but not limited to: state anti-kickback and false claims laws, which may apply to our business practices, including but not limited to, research, distribution, sales and marketing arrangements and claims involving healthcare items or services reimbursed by state governmental and non-governmental third-party payors, including private insurers; state laws that require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government; and state laws and regulations that require manufacturers to file reports relating to pricing and marketing information, which requires tracking gifts and other remuneration and items of value provided to healthcare professionals and entities.

Efforts to ensure that our business arrangements with third parties will comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities will conclude that our business practices may not comply with current or future statutes, regulations, agency guidance or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations are found to be in violation of any of these or any other health regulatory laws or any other governmental regulations that may apply to us, we may be subject to penalties, including without limitation, civil, criminal and administrative penalties, damages, monetary fines, disgorgement, enhanced government reporting and oversight under a corporate integrity agreement or other similar arrangement, possible exclusion from participation in Medicare, Medicaid and other federal healthcare program, contractual damages, reputational harm, diminished profits and future earnings, and the curtailment or restructuring of our operations. Any action against us for violation of these laws, even if we successfully defend against it, could cause us to incur significant legal expenses or divert our management's attention from the operation of our business. If any of the physicians or other providers or entities with whom we expect to do business are found to be not in compliance with applicable healthcare laws, they also may be subject to similar penalties.

Healthcare policy changes, including recent laws to reform the U.S. healthcare system, may have a material adverse effect on us.

In the U.S. and in other countries, there have been and we expect there will continue to be a number of legislative and regulatory proposals to change the healthcare system in ways that could significantly and adversely affect the business of developing and marketing new therapies by reducing the costs paid for medical products and services. For instance, the U.S. government and other governments have shown significant interest in pursuing healthcare reform, as evidenced by the passing of the ACA. Such government-adopted reform measures may adversely impact the pricing of healthcare products and services in the U.S. or internationally and the amount of reimbursement available from third-party payors. For instance, under the ACA, there is a new 2.3% U.S. federal excise tax on the sale of certain medical devices. While we do not believe the tax will be applicable to us, the U.S. may seek to enforce the tax on us. In addition, in some foreign jurisdictions, there have been a number of legislative and regulatory proposals to change the healthcare system in ways that could affect our ability to sell the ELAD System profitably, if it is ultimately approved. The continuing efforts of U.S. and other governments, insurance companies, managed care organizations and other payors of healthcare services to contain or reduce healthcare costs may adversely affect the prices we are able to charge for the ELAD System, if approved, and our ability to generate revenues and achieve and maintain profitability.

Risks Related to Doing Business Internationally

We plan to do business internationally, which may prove to be difficult and fraught with economic, regulatory and political issues.

We may commercialize the ELAD System in countries where the business, economic and political climates are very different from those of the U.S. We may not be aware of some of these issues and it may be difficult for a U.S. company to overcome these issues and ultimately become profitable. For instance, we completed our Chinese pivotal clinical trial in 2007 and submitted our data to the China FDA, or CFDA, showing a statistically significant improvement in transplant-free survival among the ELAD System-treated subjects compared with control subjects. However, in the past seven years this application has been neither approved nor rejected and the timing and nature of any potential decision is highly uncertain. Moreover, currency controls are in effect in many foreign countries and could become much tighter in the future, which will hinder our ability to repatriate any profits or capital. These foreign countries may also favor businesses that are owned by nationals of those countries as opposed to foreign-owned businesses operating locally. As a small company, we may not have the resources to engage in the negotiation and time-consuming work needed to overcome some of these potential issues.

In the event that we receive marketing approval in foreign countries outside of the U.S. and Europe, we currently anticipate, in most cases, creating wholly-owned subsidiaries in those countries. These subsidiaries will need to build an effective sales, marketing, distribution, training and support staff and system, find an effective marketing partner or both. Any internal sales, marketing, training and support capabilities of the subsidiaries will need to be developed by these subsidiaries and will need to be built from scratch. The culture and accepted practices related to selling medical products in many foreign countries are unique and it is possible that we will not be able to successfully penetrate these markets. A similar consideration applies to selling in the U.S. since each medical system is very different and requires a different strategic approach. We cannot guarantee that our approach to the U.S., European, Chinese or any other international market will be effective.

The medical systems in many foreign countries are very different from that of the U.S. and could cause significant problems for the ELAD System.

The medical systems in many countries around the world pose challenges to the commercialization of the ELAD System. For instance, most medical care in China is delivered on a private pay basis and it may be difficult to receive payment for the ELAD System therapy delivered or the price of our product, which we expect to be relatively high, may prove to be beyond the capability of the targeted Chinese patient to pay. Further, as we have encountered in our clinical trials, the standard and the operation of the delivery of care in China are different, causing problems with the operation of the ELAD System therapy. These issues include the withholding of necessary medicines, the inadequate staffing of Chinese hospitals, the shortage of blood products, the differing practice of delivery of extracorporeal therapies, and the attitude of physicians and nurses. These issues and others are likely to occur in other countries around the world and there is no assurance that we will overcome these challenges or succeed in commercializing the ELAD System in foreign countries.

We face increased risks of doing business due to the extent of our operations internationally.

We currently anticipate our foreign commercialization efforts will be through wholly-owned, foreign domiciled subsidiaries. Our efforts to expand internationally pose risks that could adversely affect our business. These risks include, among others, the effects of:

- fluctuations in foreign currency exchange rates and controls;
- competitive disadvantages to established foreign businesses with significant current market share and business and customer relationships;
- nationalization;
- tax and regulatory policies of local governments and the possibility of trade embargoes;
- political instability, war or other hostilities; and
- laws and policies of the U.S. and foreign governments affecting foreign trade and investment.

Any of these risks could cause significant interruptions in our operations, which would adversely affect our ability to commercialize the ELAD System internationally and our financial condition, results of operations and business.

[Table of Contents](#)

Revenues, profits and cash flows derived in foreign countries by foreign subsidiaries may be denominated in foreign currency. The value of this currency may be controlled or adjusted periodically by foreign governments, and may be subject to changes in the political and economic conditions.

Foreign economic, political and social conditions and government policies could materially and adversely affect our business.

A significant portion of our operations may be conducted in foreign countries and it is anticipated that a significant percentage of our revenues may be derived from these countries. Accordingly, our results of operations, financial condition and prospects are subject, to a significant degree, to economic, political, legal and social developments around the world. The economies of many of these countries differ from the economy of the U.S. in many respects, including:

- level of government involvement;
- economic structure;
- allocation of resources;
- level of development;
- inflation rates;
- growth rate; and
- control of foreign exchange.

The legal systems in many foreign countries have inherent uncertainties that could limit the legal protections available to us.

We are subject to the laws and regulations of foreign governments, including those applicable to foreign investment and, in particular, laws applicable to wholly foreign-owned enterprises. Any litigation in these countries may be protracted and may result in substantial costs and diversion of resources and management attention. For example, in 2007, one of our clinical sites in China was sued in connection with the death of a subject of our clinical trial. An expert panel concluded that neither the ELAD System nor the clinical site was at fault and dismissed the lawsuit. Nevertheless, we were later informed that the subject's family had been awarded approximately \$100,000 in a subsequent civil proceeding brought against the clinical site. We ultimately decided to reimburse the clinical site for \$100,000, which was partially insured. In addition, these countries may enact new laws or amend current laws that may be detrimental to us, which may have a material adverse effect on our business operations.

We have limited business insurance coverage internationally.

The insurance industry in many parts of the world is still in an early stage of development. Insurance companies in many countries offer only limited business insurance options. As a result, we may not be able to maintain any liability, hazard or other insurance covering our services, business, operations, errors, acts or omissions, personnel or properties in all countries where we ultimately commercialize the ELAD System. To the extent that we are unable to recover from others for any uninsured losses, such losses could result in a loss of capital and significant harm to our business. If any action, suit, or proceeding is brought against us and we are unable to pay a judgment rendered against us or defend ourselves against such action, suit, or proceeding, our business, financial condition and operations could be negatively affected.

We must comply with the U.S. Foreign Corrupt Practices Act and similar foreign anti-corruption laws.

The U.S. Foreign Corrupt Practices Act, to which we are subject, prohibits corporations and individuals from engaging in certain activities to obtain or retain business or to influence a person working in an official capacity. It is illegal to pay, offer to pay or authorize the payment of anything of value to any foreign government official, government staff member, political party or political candidate in an attempt to obtain or retain business or to otherwise influence a person working in an official capacity. Other countries, such as the U.K. and China, have similar laws with which we must comply. Although we attempt to rigidly adhere to the requirements of the U.S. Foreign Corrupt Practices Act and all similar laws to which we are subject, there remains the risk that an employee or agent of ours could be accused of violating one or more of these laws, particularly in geographies where significant overlap exists between local government and healthcare industries. Such an accusation, even if unwarranted, could prove disruptive to our developmental and commercialization efforts.

We could be subject to additional income and other tax liabilities.

We are subject to income and other taxes in the U.S. and may be subject to income and other taxes in various other foreign jurisdictions. Significant planning is required in evaluating a worldwide provision for income and other taxes. During the ordinary course of business, there may be transactions for which the ultimate tax determination is uncertain. We may be subject to audit in various jurisdictions and such jurisdictions may assess additional income or other tax against us. Although we believe our tax positions are reasonable, the final determination of tax audits and any related litigation could be materially different from our historical income tax provisions and accruals. The results of an audit or litigation could have a material and adverse effect on our operating results or cash flows in the period or periods for which that determination is made.

Risks Related to Intellectual Property

Our patent rights may prove to be an inadequate barrier to competition.

We hold a patent in the U.S. which claims a method of using C3A cells to treat a patient's blood, which we believe covers the ELAD System therapy. In addition, we have been granted a patent with claims covering an extracorporeal device configuration, which we believe includes our ELAD System, independent of cell-type used. Foreign counterparts of these patents have been issued in Australia, Canada, Indonesia, Israel, Japan, Mexico, New Zealand, Singapore, South Africa, South Korea and Taiwan and remain under review in certain other jurisdictions, including Europe, Brazil, China, Hong Kong, India and the Philippines. In addition to these two U.S. patents, we hold three additional patents in the U.S. However, the lifespan of any one patent is limited, and each of these patents will ultimately expire and we cannot be sure that pending applications will be granted, or that we will discover new inventions which we can successfully patent. Moreover, any of our granted patents may be held invalid by a court of competent jurisdiction, and any of these patents may also be construed narrowly by a court of competent jurisdiction in such a way that it is held to not directly cover the ELAD System. Furthermore, even if our patents are held to be valid and broadly interpreted, third parties may find legitimate ways to compete with the ELAD System by inventing around our patent. Finally, the process of obtaining new patents is lengthy and expensive, as is the process for enforcing patent rights against an alleged infringer. Any such litigation could take years, cost large sums of money and pose a significant distraction to management. Indeed, certain jurisdictions outside of the U.S. and Europe where we hope to commercialize the ELAD System have a history of inconsistent, relatively lax or ineffective enforcement of patent rights. In such jurisdictions, even a valid patent may have limited value. Our failure to effectively prosecute our patents would have a harmful impact on our ability to commercialize the ELAD System in these jurisdictions.

We do not hold any patents covering our VTL C3A cells or the production processes we use to grow the VTL C3A cells in the ELAD cartridges.

C3A cells are publicly available and the proprietary methods and production process that we use to grow our VTL C3A cells in the ELAD cartridges are our trade secrets, but they are not currently covered by a patent and no patents are pending. Although we have sought patent protection for certain aspects of our technology, such as our method of using human liver-derived C3A cells to treat a patient's blood, and we have obtained orphan designation in the U.S. and Europe for the use of C3A cells to treat acute liver failure, we have not sought patent protection for the proprietary methods we use to grow VTL C3A cells in our facility. Although we believe that some of these methods may be patentable, we prefer to avoid the disclosure requirements inherent in the patenting process, as such disclosure could provide competitors with insights that allow them to invent around any granted patents. We believe that this concern is particularly appropriate since C3A cells are now publicly available, and have been available for research purposes for more than twenty years. Despite this availability, we are not aware of any third parties who have either demonstrated an ability to grow C3A cells in the quantities we do, or succeeded in treating a human subject with such cells. In addition, patent protection expires 20 years after the application's priority date which does not apply to trade secret protection. In light of the foregoing, we do not currently contemplate seeking patent protection for our production methods and instead intend to keep our production methods protected as trade secrets, which does not require us to publicly disclose these methods and which is not subject to a formal expiration date. However, trade secrets are vulnerable to inadvertent disclosure and misappropriation. In addition, independent discovery and publication of these methods by third parties, which is feasible given the public availability of C3A cells, would also destroy their trade secret protection. If any of these were to occur, our business may be harmed.

We protect much of our intellectual property as trade secrets. Confidentiality agreements with employees and third parties may not prevent unauthorized disclosure of trade secrets and other proprietary information.

Trade secrets offer a relatively limited form of protection as they do not create any barrier for third-parties who independently develop this information and who may even patent the information. In the course of our research and development activities and our business activities, we often rely on confidentiality agreements to protect our proprietary information. Such confidentiality agreements may be used, for example, when we talk to vendors of laboratory or clinical development services or potential strategic partners. In addition, each of our employees is required to sign a confidentiality agreement upon joining us. We take steps to protect our proprietary information, and our confidentiality agreements are carefully drafted to protect our proprietary interests. Nevertheless, there can be no assurance that an employee or an outside party will not make an unauthorized disclosure of our proprietary confidential information. This might happen intentionally or inadvertently. It is possible that a competitor will make use of such information, and that our competitive position will be compromised, in spite of any legal action we might take against persons making such unauthorized disclosures. Enforcing a claim that a third party illegally obtained and is using any of our trade secrets is expensive and time consuming, and the outcome is unpredictable. In addition, courts outside the U.S. sometimes are less willing than U.S. courts to protect trade secrets. Moreover, our competitors may independently develop equivalent knowledge, methods and know-how, which would harm our business.

[Table of Contents](#)

If our ELAD cartridges or our VTL C3A cells are stolen, misappropriated or reverse engineered, others could produce competing products.

Third parties, including those involved in shipping our ELAD System cartridges or in any manufacturing abroad that we may undertake, often have custody or control of our ELAD cartridges. If our ELAD cartridges, or VTL C3A cells from our proprietary VTL C3A cell bank that are stored to grow in these cartridges, were stolen, misappropriated or reverse engineered, they could be used by other parties who may be able to reproduce these cartridges for their own commercial gain. If this were to occur, it would be difficult for us to challenge this type of use, especially in countries with limited intellectual property protection or in countries in which we do not have patents covering the misappropriated ELAD cartridges. In such instance, our business would be harmed.

Ownership of our intellectual property may be claimed by others.

The ELAD System has been under development for over 20 years and certain of our predecessor companies have filed for reorganization and bankruptcy. We were founded in 2003 by acquisition of the assets of a prior company after a bankruptcy. While we believe we have performed extensive diligence on the ownership of the intellectual property rights and have developed our own innovative technology which is independent of prior intellectual property rights, there could be claims by parties associated with the prior entities that could lead to costly and time consuming legal actions. In addition, we have engaged in collaborations with third parties where intellectual property has been developed. In one instance, we were engaged in a dispute over the ownership of intellectual property when a collaborator of ours pursued patent rights over technology which we believe we may have held rights to under the collaboration agreement. Although a patent which claims a different configuration than our ELAD System was ultimately issued in the U.S. to our former collaborator, we do not hold any rights to this patent. We are unaware of any active development with respect to the claimed system. Other such disputes could arise in the future or emerge from past activities which could lead others to claim our intellectual property.

We may be involved in future costly intellectual property litigation, which could impact our future business and financial performance.

Our industry has been characterized by frequent intellectual property litigation. Our competitors or other patent holders may assert that our ELAD System and the methods we employ are covered by their patents. For instance, we are aware of other patents issued in the liver support field which we believe do not cover our ELAD System or its use. If our ELAD System or methods are found to infringe any valid patents, we could be prevented from marketing our ELAD System. In addition, we do not know whether our competitors or potential competitors have applied for, or will apply for or obtain, patents that will prevent, limit or interfere with our ability to make, use, sell, import or export our ELAD System.

Litigation related to infringement and other intellectual property claims, with or without merit, is unpredictable, can be expensive and time-consuming and could divert management's attention from our core business. If we lose this kind of litigation, a court could require us to pay substantial damages, and prohibit us from using technologies essential to our ELAD System, any of which would have a material adverse effect on our business, results of operations and financial condition. We do not know whether necessary licenses would be available to us on satisfactory terms, or whether we could redesign our ELAD System or processes to avoid infringement.

Competing products may also appear in other countries in which our patent coverage might not exist or be as strong. If we lose a foreign patent lawsuit, we could be prevented from marketing our ELAD System in one or more countries.

In addition, we may hereafter become involved in litigation to protect our trademark rights associated with our company name or the names used with our ELAD System. Names used with our ELAD System and procedures may be claimed to infringe names held by others or to be ineligible for proprietary protection. If we have to change the name of our company or our ELAD System, we may experience a loss in goodwill associated with our brand name, customer confusion and a loss of sales.

[Table of Contents](#)

We may be subject to damages resulting from claims that we or our employees have wrongfully used or disclosed alleged trade secrets owned by third parties.

Many of our employees were previously employed at universities or other life science 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 inadvertently or otherwise used or disclosed trade secrets or other confidential or proprietary information of their former employers. Litigation may be necessary to defend against these claims. If we fail in defending such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. A loss of key personnel could hamper our ability to develop and commercialize the ELAD System, which could severely harm our business. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management.

Risks Related to Our Capital Requirements and Finances

Our future capital needs are uncertain and we will need to raise additional funds in the future.

We will need to raise substantial additional capital to:

- complete clinical trials and related regulatory applications;
- fund our operations;
- commence and expand the commercialization of our products; and
- further our research and development.

Our future funding requirements will depend on many factors, including:

- market acceptance of our products;
- the cost of our research and development activities;
- the cost and timing of our clinical development activities, in particular the rate of initiation of our clinical sites and the rate of enrollment of our clinical trials;
- the cost of filing and prosecuting patent applications;
- the cost of defending, in litigation or otherwise, any claims that we infringe third-party patents or violate other intellectual property rights;
- the cost and timing of regulatory clearances or approvals, if any;
- the cost and timing of establishing sales, marketing and distribution capabilities;
- the cost and timing of establishing additional technical support capabilities;
- the effect of competing technological and market developments; and
- the extent to which we acquire or invest in businesses, products and technologies, although we currently have no commitments or agreements relating to any of these types of transactions.

We cannot assure you that we will be able to obtain additional funds on acceptable terms, or at all. If we raise additional funds by issuing equity securities, our stockholders will experience dilution. Debt financing, if available, may involve covenants restricting our operations or our ability to incur additional debt. Any debt or additional equity financing that we raise 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, which we have no prior experience in, it may be necessary to relinquish some rights to our technologies or our products, or grant licenses on terms that are not favorable to us. If we are unable to raise adequate funds, we may have to liquidate some or all of our assets, or delay, reduce the scope of or eliminate some or all of our development programs.

If we do not have, or are not able to obtain, sufficient funds, we may have to delay development or commercialization of our products or license to third parties the rights to commercialize products or technologies that we would otherwise seek to commercialize. We also may have to reduce marketing, customer support or other resources devoted to our products or cease operations. Any of these factors could harm our operating results.

[Table of Contents](#)

Any acquisitions that we make could disrupt our business and harm our financial condition.

We expect to evaluate potential strategic acquisitions of complementary businesses, products or technologies. We may also consider joint ventures, licensing and other collaborative projects. We may not be able to identify appropriate acquisition candidates or strategic partners, or successfully negotiate, finance or integrate acquisitions of any businesses, products or technologies. Furthermore, the integration of any acquisition and management of any collaborative project may divert our management's time and resources from our core business and disrupt our operations. We do not have any experience with acquiring companies or products. Any cash acquisition we pursue would diminish the proceeds from our public offerings otherwise available to us for other uses, and any stock acquisition would dilute our stockholders' ownership. While we from time to time evaluate potential collaborative projects and acquisitions of businesses, products and technologies, and anticipate continuing to make these evaluations, we have no present understandings, commitments or agreements with respect to any acquisitions or collaborative projects.

Risks Related to Being a Public Company

The requirements of being a public company may strain our resources, divert management's attention and affect our ability to attract and retain executive management and qualified board members.

As a public company, we are subject to the reporting requirements of the Securities Exchange Act of 1934, as amended, or the Exchange Act, the Sarbanes-Oxley Act, the Dodd-Frank Act, the listing requirements of the NASDAQ Stock Market LLC and other applicable securities rules and regulations. Compliance with these rules and regulations has and will continue to increase our legal and financial compliance costs, make some activities more difficult, time-consuming or costly and increases demand on our systems and resources, particularly after we are no longer an "emerging growth company," as defined in the Jumpstart Our Business Startups Act, or the JOBS Act. The Exchange Act requires, among other things, that we file annual, quarterly and current reports with respect to our business and operating results. The Sarbanes-Oxley Act requires, among other things, that we maintain effective disclosure controls and procedures and internal control over financial reporting. In order to maintain and, if required, improve our disclosure controls and procedures and internal control over financial reporting to meet this standard, significant resources and management oversight are required. As a result, management's attention may be diverted from other business concerns, which could adversely affect our business and operating results. Although we have already hired additional employees to assist us in complying with these requirements, we may need to hire more employees in the future or engage outside consultants, which will increase our costs and expenses.

In addition, changing laws, regulations and standards relating to corporate governance and public disclosure are creating uncertainty for public companies, increasing legal and financial compliance costs and making some activities more time consuming. These laws, regulations and standards are subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices. We intend to invest resources to comply with evolving laws, regulations and standards, and this investment may result in increased general and administrative expenses and a diversion of management's time and attention from revenue-generating activities to compliance activities. If our efforts to comply with new laws, regulations and standards differ from the activities intended by regulatory or governing bodies due to ambiguities related to their application and practice, regulatory authorities may initiate legal proceedings against us and our business may be adversely affected.

For as long as we remain an "emerging growth company," we may take advantage of certain exemptions from various reporting requirements that are applicable to public companies that are not "emerging growth companies" including, but not limited to, not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, reduced disclosure obligations regarding executive compensation and financial statements in our periodic reports and proxy statements, and exemptions from the requirements of holding a nonbinding advisory vote to approve executive compensation and shareholder approval of any golden parachute payments not previously approved. We will take advantage of these reporting exemptions until we are no longer an "emerging growth company."

We will cease to be an "emerging growth company" upon the earliest of: (1) the beginning of the first fiscal year following the fifth anniversary of our initial public offering, or January 1, 2020, (2) the beginning of the first fiscal year after our annual gross revenue is \$1.0 billion or more, (3) the date on which we have, during the previous three-year period, issued more than \$1.0 billion in non-convertible debt securities and (4) as of the end of any fiscal year in which the market value of our common stock held by non-affiliates exceeded \$700 million as of the end of the second quarter of that fiscal year.

As a public company it is more expensive for us to maintain and obtain director and officer liability insurance, and we may be required to accept reduced coverage or incur substantially higher costs to obtain coverage. These factors may also make it more difficult for us to attract and retain qualified members of our board of directors, particularly to serve on our audit committee and compensation committee, and qualified executive officers.

[Table of Contents](#)

Under Section 107(b) of the JOBS Act, emerging growth companies can delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected not to avail our company of this exemption from new or revised accounting standards and, therefore, we are subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

As a public company, we are obligated to develop and maintain proper and effective internal control over financial reporting. We may not complete our analysis of our system of internal control over financial reporting in a timely manner, or these internal controls may not be determined to be designed or operating effectively, which may adversely affect investor confidence in our company and, as a result, the value of our common stock.

We are required, pursuant to Section 404 of the Sarbanes-Oxley Act, to furnish a report by management on, among other things, the effectiveness of our internal control over financial reporting for the 2015 fiscal year. This assessment will need to include disclosure of any material weaknesses identified by our management in our internal control over financial reporting.

We are in the process of the costly and challenging process of compiling the system and processing documentation necessary to perform the evaluation needed to comply with Section 404. We may not be able to complete our evaluation, testing or any required remediation in a timely fashion. During the evaluation and testing process, if we identify one or more material weaknesses in our internal control over financial reporting, we will be unable to assert that our internal controls are effective, which could result in a loss of investor confidence in the accuracy and completeness of our financial reports. This could cause the price of our common stock to decline, and we may be subject to investigation or sanctions by the Securities and Exchange Commission, or SEC.

We will be required to disclose changes made in our internal control and procedures on a quarterly basis. However, our independent registered public accounting firm will not be required to report on the effectiveness of our internal control over financial reporting pursuant to Section 404 until the later of our annual report for 2015 and the date we are no longer an “emerging growth company” pursuant to the exemptions contained in the JOBS Act. At such time, our independent registered public accounting firm may issue a report that is adverse in the event it is not satisfied that our internal controls over financial reporting are designed and operating effectively to prevent or detect a material misstatement to the financial statements. To comply with these requirements, we may need to undertake various additional actions, such as implementing new internal controls and procedures or hiring accounting or internal audit staff.

If we do not remediate material weaknesses in our internal control over financial reporting, the accuracy and timeliness of our financial reporting may be adversely affected.

We have not maintained an effective control environment to ensure that the design and execution of our controls has consistently resulted in effective review of our financial statements and supervision by appropriate individuals. As a result of these factors, certain misstatements in our annual financial statements were identified and brought to the attention of management by our independent registered public accounting firm for correction. We and our independent registered public accounting firm concluded that these control deficiencies constituted a material weakness in our internal control over financial reporting. A material weakness is a control deficiency, or a combination of control deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of our annual or interim financial statements will not be prevented or detected on a timely basis.

We are in the process of implementing and testing measures designed to improve our internal control over financial reporting to remediate the control deficiencies that led to our material weakness. We cannot assure you that the measures we have taken to date, or any measures we may take in the future, will be sufficient to remediate the control deficiencies that led to our material weakness in our internal control over financial reporting or to avoid potential future material weaknesses. In addition, neither our management nor an independent registered public accounting firm has ever performed an evaluation of our internal control over financial reporting in accordance with the provisions of the Sarbanes-Oxley Act because no such evaluation has been required. Had we or our independent registered public accounting firm performed an evaluation of our internal control over financial reporting in accordance with the provisions of the Sarbanes-Oxley Act, additional significant deficiencies or material weaknesses may have been identified. If we are unable to successfully remediate any significant deficiency or material weakness in our internal control over financial reporting, or identify any additional significant deficiencies or material weaknesses that may exist, the accuracy and timing of our financial reporting may be adversely affected, we may be unable to maintain compliance with securities law requirements regarding timely filing of periodic reports in addition to applicable stock exchange listing requirements, investors may lose confidence in our financial reporting, and our stock price may decline as a result.

[Table of Contents](#)

Risks Related to our Common Stock

If securities or industry analysts do not continue to publish research or publish unfavorable research about our business, our stock price and trading volume could decline.

The trading market for our common stock will rely in part on the research and reports that equity research analysts publish about us and our business. Although certain equity research analysts currently cover us, we do not have any control of the analysts or the content and opinions included in their reports or whether any such analysts will continue to, or whether new analysts will, cover us for any given period of time. The price of our stock could decline if one or more equity research analysts downgrade our stock or issue other unfavorable commentary or research. If one or more equity research analysts ceases coverage of our company or fails to publish reports on us regularly, demand for our stock could decrease, which in turn could cause our stock price or trading volume to decline.

We expect that the price of our common stock will fluctuate substantially.

The market price of our common stock has been and is likely to continue to be highly volatile and may fluctuate substantially due to many factors, including:

- clinical data and government approvals relating to the ELAD System;
- changes in governmental regulations or in the status of our regulatory approvals or applications;
- disputes or other developments with respect to our intellectual property rights or the intellectual property rights of others;
- product liability claims or other litigation;
- sales of large blocks of our common stock, including sales by our executive officers and directors;
- changes in earnings estimates or recommendations by securities analysts;
- our ability to meet investors expectations regarding our future operating performance;
- media exposure of the ELAD System or products of our competitors;
- volume and timing of sales of the ELAD System;
- the introduction of new products or product enhancements by us or our competitors;
- our ability to develop, obtain regulatory clearance or approval for and market new and enhanced products on a timely basis;
- quarterly variations in our or our competitors' results of operations;
- developments in our industry; and
- general market conditions and other factors, including factors unrelated to our operating performance or the operating performance of our competitors.

In addition, an active and liquid market may not develop or persist and you may not be able to sell your shares quickly or at the recently reported price. These and other factors may make the price of our stock volatile and subject to unexpected fluctuations.

Sale of a substantial number of shares of our common stock by existing stockholders or us may cause the price of our common stock to decline.

Sales of a substantial number of shares of our common stock in the public market or the perception that these sales might occur could depress the market price of our common stock and could impair our ability to raise adequate capital through the sale of additional equity securities. We are unable to predict the effect that sales may have on the prevailing market price of our common stock.

As of March 31, 2015, we had 24,010,351 shares of common stock outstanding, 16,779,875, shares of which are freely tradable (subject in some cases to the provisions of our insider trading policy), and 7,230,476 shares of which are subject to lock-up agreements entered into by our executive officers, directors and certain of our security holders in conjunction with our follow-on public offering.

The lock-up agreements entered into with us expire at the start of the third full trading day following the date of issuance of a press release that includes topline results from our VTI-208 Phase 3 clinical trial. Following the expiration of such lock-up agreements (or earlier if permitted by our board of directors), these shares will be eligible for sale in the public market, subject in some cases to compliance with Rule 144 and the manner of sale, volume limitation or notice provisions thereof, as well as our insider trading policy.

[Table of Contents](#)

Sales of our common stock by our current stockholders may make it more difficult for us to sell equity or equity-related securities in the future at a time and price that we deem reasonable or appropriate, and make it more difficult for you to sell shares of our common stock.

In addition, on June 6, 2014, we filed a registration statement on Form S-8 registering 3,732,152 shares of common stock subject to options or reserved for future issuance under our 2012 Stock Option Plan and 2014 Equity Incentive Plan. Shares registered under this registration statement on Form S-8 will be available for sale in the public market subject to vesting arrangements and the exercise of such options, the lock-up agreements described above and, in the case of our affiliates, the restrictions of Rule 144. As of March 31, 2015, options to purchase 2,958,072 shares of our common stock were exercisable.

Certain of our existing stockholders are also entitled, under contracts providing for registration rights, to require us to register shares of our common stock owned by them for public sale in the U.S. Any sales of securities by these stockholders, or the expectation that such sales may occur, could have a material adverse effect on the trading price of our common stock and make it more difficult for you to sell shares of our common stock.

To the extent we raise additional capital by selling and issuing common stock, convertible securities or other equity securities, it may result in material dilution to our existing stockholders and new investors could gain rights superior to our existing stockholders. Sales by us or by our current stockholders also could cause the price of our common stock to fall and make it more difficult for you to sell shares of our common stock.

Our directors, officers and principal stockholders have significant voting power and may take actions that may not be in the best interests of our other stockholders.

Our officers, directors and principal stockholders and their affiliates collectively control approximately 30.1% of our outstanding common stock, and in particular, one stockholder and his affiliates control approximately 28.0% of our outstanding common stock as of March 31, 2015. As a result, these stockholders, if they act together, will be able to exert substantial influence over the management and affairs of our company and most matters requiring stockholder approval, including the election of directors. This concentration of ownership may have the effect of delaying or preventing a change in control and might adversely affect the market price of our common stock. This concentration of ownership may not be in the best interests of our other stockholders.

We have broad discretion in the use of proceeds from our public offerings for working capital and general corporate purposes.

The net proceeds of our public offerings are being allocated to fund the continuing clinical development of the ELAD System and the remainder for working capital and other general corporate purposes. Our management has broad discretion over the use and investment of the net proceeds of our public offerings within those categories, and accordingly investors will need to rely upon the judgment of our management with respect to the use of proceeds, with only limited information concerning management's specific intentions.

Anti-takeover provisions in our amended and restated certificate of incorporation, amended and restated bylaws, and Fourth Amended and Restated Investors' Rights Agreement, as well as Delaware law, could discourage a takeover.

Our amended and restated certificate of incorporation, bylaws, Fourth Amended and Restated Investors' Rights Agreement, and Delaware law, contain provisions that might enable our management to resist a takeover, and might make it more difficult for an investor to acquire a substantial block of our common stock. These provisions:

- authorize our board of directors to issue, without further action by our stockholders, up to 20,000,000 shares of undesignated preferred stock;
- require that any action to be taken by our stockholders be effected at a duly called annual or special meeting and not by written consent;
- specify that special meetings of our stockholders can be called only by a supermajority (75%) vote of our directors then in office;
- specify that our board of directors may amend or repeal our bylaws only pursuant to a supermajority (75%) vote of our directors then in office;
- specify that our stockholders may amend or repeal our bylaws only pursuant to a supermajority (75% and majority of the minority, if applicable) vote of the outstanding shares of our capital stock;

Table of Contents

- require in general the approval of a supermajority (75% and majority of the minority, if applicable) vote of our outstanding shares of capital stock to amend or repeal certain provisions of our certificate of incorporation;
- require the approval of a supermajority (75% and majority of the minority, if applicable) vote of our outstanding shares of capital stock to approve the sale or liquidation of the company;
- establish an advance notice procedure for stockholder approvals to be brought before an annual meeting of our stockholders, including proposed nominations of persons for election to our board of directors;
- provide that directors may be removed only for cause by a supermajority (75%) vote of our outstanding shares of capital stock;
- provide that vacancies on our board of directors may be filled only by a majority of directors then in office, even though less than a quorum;
- provide that in general the number of directors on our board may only be fixed from time to time by a supermajority (75%) vote of our directors then in office;
- establish that our board of directors is divided into three classes, Class I, Class II and Class III, with each class serving staggered terms; and
- provide that certain stockholders affiliated with Muneer A. Satter, referred to as the Satter Investors, have rights to nominate up to a specific percentage of our directors (currently 30%) based on the Satter Investors' ownership percentage in our Company.

These provisions might discourage, delay or prevent a change in control of our company or a change in our management. The existence of these provisions could adversely affect the voting power of holders of common stock and limit the price that investors might be willing to pay in the future for shares of our common stock.

Our certificate of incorporation also contains a provision that provides us with protections similar to Section 203 of the Delaware General Corporation Law and will prevent us from engaging in a business combination with a person who acquires at least 15% of our common stock for a period of three years from the date such person acquired such common stock, except for certain of our current stockholders, including Mr. Satter and entities affiliated with him, and, in certain instances, persons who purchase common stock from certain of our current stockholders, and unless board or stockholder approval is obtained prior to the acquisitions. These anti-takeover provisions and other provisions under Delaware law could discourage, delay or prevent a transaction involving a change in control of our company, even if doing so would benefit our stockholders. These provisions could also discourage proxy contests and make it more difficult for you and other stockholders to elect or remove directors of your choosing and to cause us to take other corporate actions you desire.

We have not paid dividends in the past and do not expect to pay dividends in the future, and any return on investment may be limited to the value of our stock.

We have never paid cash dividends on our common stock and do not anticipate paying cash dividends on our common stock in the foreseeable future. The payment of dividends on our common stock will depend on our earnings, financial condition and other business and economic factors affecting us at such time as our board of directors may consider relevant. If we do not pay dividends, our stock may be less valuable because a positive return on your investment will only occur if our stock price appreciates.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds

Use of Proceeds

Our initial public offering was effected through a registration statement on Form S-1 (File No. 333-191711), which was declared effective by the Securities and Exchange Commission, or SEC, on April 16, 2014. There has been no material change in our planned use of the net proceeds from our initial public offering as described in our final prospectus filed with the SEC pursuant to Rule 424(b) under the Securities Act and other periodic reports previously filed with the SEC. The amount and timing of our actual expenditures depend on numerous factors, including the ongoing status of and results from clinical trials, as well as any unforeseen cash needs.

Item 5. Other Information

On March 18, 2015, our board of directors approved an amended compensation policy for our non-employee directors. Under this amended compensation policy for non-employee directors, all non-employee directors will be entitled to receive the following cash compensation for their services:

- \$35,000 per year for service as a member of our board;
- \$7,500 per year additionally for service as chairman of the audit committee;
- \$7,500 per year additionally for service as an audit committee member;
- \$5,000 per year additionally for service as chairman of the compensation committee;
- \$5,000 per year additionally for service as a compensation committee member;
- \$5,000 per year additionally for service as chairman of the nominating and governance committee;
- \$5,000 per year additionally for service as a nominating and governance committee member;
- \$5,000 per year additionally for service as chairman of the quality and technology committee;
- \$5,000 per year additionally for service as a quality and technology committee member.

All cash payments to non-employee directors will be paid quarterly in arrears on a prorated basis. In addition, each non-employee director will be paid a per-meeting attendance fee of \$500 for attending telephonic meetings of the board, and a per-meeting attendance fee of \$2,500 for attending in-person meetings of the board in excess of four in-person meetings per year. We also reimburse our directors for their reasonable expenses incurred in connection with attending board and committee meetings.

Options. Each non-employee director who first joins us will be automatically granted an initial award of a nonstatutory stock option with a Black-Scholes value of approximately \$220,000. In addition, on the date of each annual meeting of stockholders (commencing with our 2016 annual meeting of stockholders), each non-employee director who has been a non-employee director for 6 months or more on the date of the annual meeting will be automatically granted an annual award of a nonstatutory stock option with a Black-Scholes value of approximately \$110,000. The initial award will vest in 48 equal monthly installments subject to the director's continued service with us. The annual award will vest in full on the earlier to occur of the one-year anniversary of its grant date or the day prior to the next annual meeting of stockholders subject to continued service with us.

In connection with the board's approval of the amended non-employee director compensation policy, our board granted each non-employee director (other than Mr. Satter) a stock option to purchase 5,604 shares of our common stock, which will vest in full on the earlier of the one-year anniversary from March 24, 2015 or the day prior to our 2016 annual meeting of stockholders.

Our co-chairman, Muneer Satter, has declined board compensation and accordingly, will not receive the cash or equity compensation discussed above.

On March 18, 2015, our board of directors approved base salaries for fiscal year 2015 (retroactive to March 13, 2015) for the Company's named executive officers as follows: Terence E. Winters, Ph.D., \$475,000; Duane Nash, M.D., \$360,000; and John M. Dunn, \$320,000. In addition, on March 18, 2015, our board of directors approved bonus targets for fiscal year 2015 for our named executive officers as a percentage of such named executive officer's fiscal year base salary as follows: Terence E. Winters, Ph.D., 50%; Duane Nash, M.D., 35%; and John M. Dunn, 30%.

[Table of Contents](#)

Item 6. Exhibits

Exhibit Number	Exhibit Title
10.16+	Outside Director Compensation Policy
31.1	Certification of Principal Executive Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Principal Financial Officer pursuant to Rule 13a-14(a) or Rule 15d-14(a) of the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1*	Certification of Principal Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
32.2*	Certification of Principal Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema Document
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Database
101.LAB	XBRL Taxonomy Extension Label Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document

+ Indicates a management contract or compensatory plan or arrangement.

* In accordance with Item 601(b)(32)(ii) of Regulation S-K and SEC Release No. 33-8238 and 34-47986, Final Rule: Management's Reports on Internal Control Over Financial Reporting and Certification of Disclosure in Exchange Act Periodic Reports, the certifications furnished in Exhibits 32.1 and 32.2 hereto are deemed to accompany this Form 10-Q and will not be deemed "filed" for purposes of Section 18 of the Exchange Act. Such certifications will not be deemed to be incorporated by reference into any filings under the Securities Act or the Exchange Act, except to the extent that the registrant specifically incorporates it by reference.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

Date: May 12, 2015

VITAL THERAPIES, INC.

By: /s/ Michael V. Swanson
Michael V. Swanson
Chief Financial Officer
(Principal Financial and Accounting Officer and Duly
Authorized Officer)

VITAL THERAPIES, INC.

OUTSIDE DIRECTOR COMPENSATION POLICY

Adopted and approved May 13, 2013

As Amended March 18, 2015

Vital Therapies, Inc. (the “**Company**”) believes that the granting of equity and cash compensation to its members of the Board of Directors (the “**Board**,” and members of the Board, the “**Directors**”) represents an effective tool to attract, retain and reward Directors who are not employees of the Company (the “**Outside Directors**”). This Outside Director Compensation Policy (the “**Policy**”) is intended to formalize the Company’s policy regarding cash compensation and grants of equity to its Outside Directors. The Co-Chairmen of the Board are not eligible to receive any compensation under this Policy. This Policy is effective as of the date set forth above, with the amendments effective as of the amendment date set forth above.

Unless otherwise defined herein, capitalized terms used in this Policy will have the meaning given such term in the Company’s 2014 Equity Incentive Plan (as may be amended from time to time, the “**Plan**”). Each Outside Director will be solely responsible for any tax obligations incurred by such Outside Director as a result of the equity and cash payments such Outside Director receives under this Policy.

1. CASH COMPENSATION*Annual Cash Retainer*

Each Outside Director will be paid an annual cash retainer of \$35,000. This cash compensation will be paid quarterly in arrears on a prorated basis.

Committee Annual Cash Retainer

Effective as of the Registration Date, each Outside Director who serves as the chairman or a member of a committee of the Board will be eligible to earn additional annual fees (paid quarterly in arrears on a prorated basis) as follows:

Chairman of Audit Committee:	\$7,500
Member of Audit Committee:	\$7,500
Chairman of Compensation Committee:	\$5,000
Member of Compensation Committee:	\$5,000
Chairman of Nominating and Governance Committee:	\$5,000
Member of Nominating and Governance Committee:	\$5,000
Chairman of Quality and Technology Committee:	\$5,000
Member of Quality and Technology Committee:	\$5,000

For clarity, each Outside Director who serves as the chairman of a committee will receive both the additional annual fee as the chairman of the committee and the additional annual fee as a member of the committee.

Board Meeting Fees

Each Outside Director will be paid a per-meeting attendance fee of \$500 for attending telephonic meetings of the Board. In addition, each Outside Director will be paid a per-meeting attendance fee of \$2,500 for attending in-person meetings of the Board in excess of four (4) in-person meetings during each calendar year. For clarity, there are no per-meeting attendance fees for attending meetings of the committees of the Board.

2. EQUITY COMPENSATION

Outside Directors will be entitled to receive all types of Awards (except Incentive Stock Options) under the Plan (or the applicable equity plan in place at the time of grant), including discretionary Awards not covered under this Policy. All grants of Awards to Outside Directors pursuant to Sections 2(b) and (c) of this Policy will be automatic and nondiscretionary, except as otherwise provided herein, and will be made in accordance with the following provisions:

(a) No Discretion. No person will have any discretion to select which Outside Directors will be granted any Awards under this Policy or to determine the number of Shares to be covered by such Awards.

(b) Initial Awards. Subject to Section 11 of the Plan, on the date on which any person first becomes an Outside Director, he or she automatically will be granted a Nonstatutory Stock Option with a Black-Scholes value of approximately \$220,000 and the number of shares covered by such option rounded down to the nearest whole share (an “**Initial Award**”). Subject to Section 5 below and Section 14 of the Plan, each Initial Award will vest monthly in 48 equal installments beginning with the first month following the grant date (on the same day of the month as the grant date and if there is no corresponding date, then the last day of the month) and continuing for each month thereafter, in each case, provided that the Outside Director continues to serve as a Service Provider through the applicable vesting date.

(c) Annual Awards. Subject to Section 11 of the Plan, on the date of each Annual Meeting of the Company’s stockholders (the “**Annual Meeting**”) beginning with the 2016 Annual Meeting, each Outside Director who was a Director for the entire 6-month period preceding an Annual Meeting automatically will be granted a Nonstatutory Stock Option with a Black-Scholes value of approximately \$110,000 and the number of shares covered by such option rounded down to the nearest whole share (an “**Annual Award**”). Subject to Section 5 below and Section 14 of the Plan, each Annual Award will fully vest on the earlier of (i) the 1-year anniversary of its grant date or (ii) the day prior to the next Annual Meeting, provided that the Outside Director continues to serve as a Service Provider through the applicable vesting date.

(d) Terms Applicable to all Options Granted Under this Policy. The per share exercise price for an Option granted under this Outside Director Compensation Policy will be 100% of the Fair Market Value on the grant date.

3. TRAVEL EXPENSES

Each Outside Director's reasonable, customary, and documented travel expenses to Board meetings will be reimbursed by the Company.

4. ADDITIONAL PROVISIONS

All provisions of the Plan not inconsistent with this Policy will apply to Awards granted to Outside Directors.

5. ADJUSTMENTS

In the event that any recapitalization, stock split, reverse stock split, stock dividend, reorganization, merger, consolidation, split-up, spin-off, combination, repurchase, or exchange of Shares or other securities of the Company, or other change in the corporate structure of the Company affecting the Shares occurs, the Administrator, in order to prevent diminution or enlargement of the benefits or potential benefits intended to be made available under this Policy, will adjust the number of Shares issuable pursuant to then outstanding Awards granted under this Policy as provided in the Plan. For the avoidance of doubt, the foregoing adjustment will not result in any adjustment to the Black-Scholes values as set forth in paragraphs 2(b) and 2(c) herein.

6. REVISIONS

The Compensation Committee in its discretion may change and otherwise revise the terms of Awards granted under this Policy, including, without limitation, the number of Shares subject thereto, for Awards of the same or different type granted on or after the date the Compensation Committee determines to make any such change or revision.

CERTIFICATIONS

I, Terence E. Winters, Ph.D., certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Vital Therapies, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - c) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: May 12, 2015

By: /s/ Terence E. Winters, Ph.D.
Terence E. Winters, Ph.D.
Chief Executive Officer
(Principal Executive Officer)

CERTIFICATIONS

I, Michael V. Swanson, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Vital Therapies, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - b) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - c) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: May 12, 2015

By: /s/ Michael V. Swanson

Michael V. Swanson
Chief Financial Officer
(Principal Financial and Accounting Officer)

**CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Quarterly Report on Form 10-Q of Vital Therapies, Inc. (the "Company") for the period ended March 31, 2015 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Terence E. Winters, Ph.D., Chief Executive Officer of the Company, hereby certifies, pursuant to 18 U.S.C. Section 1350, that to his knowledge:

- (1) the Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: May 12, 2015

By: /s/ Terence E. Winters, Ph.D.
Terence E. Winters, Ph.D.
Chief Executive Officer
(Principal Executive Officer)

**CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Quarterly Report on Form 10-Q of Vital Therapies, Inc. (the "Company") for the period ended March 31, 2015 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Michael V. Swanson, Chief Financial Officer of the Company, hereby certifies, pursuant to 18 U.S.C. Section 1350, that to his knowledge:

- (1) the Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: May 12, 2015

By: /s/ Michael V. Swanson
Michael V. Swanson
Chief Financial Officer
(Principal Financial and Accounting Officer)

