UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549

FORM 10-Q

(Mark One)

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

For the quarterly period ended September 30, 2023

OR

o **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: 001-38829

Shockwave Medical, Inc.
(Exact Name of Registrant as Specified in its Charter)

Delaware	**27-0494101**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
5403 Betsy Ross Drive Santa Clara, California	**95054**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (510) 279-4262

Securities registered pursuant to Section 12(b) of the Act:

Title of each class of securities	Trading symbol(s)	Name of each national exchange and principal U.S. market for the securities
Shockwave Medical, Inc., common stock, par value $0.001 per share	SWAV	The Nasdaq Stock Market LLC (Nasdaq Global Select Market)

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 x No o

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted 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 such files). Yes x No o

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

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

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. o

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

As of November 1, 2023, the registrant had 36,896,750 shares of common stock, $0.001 par value per share, outstanding.

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SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Quarterly Report on Form 10-Q contains statements relating to our expectations, projections, beliefs, and prospects, which are forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. In some cases, you can identify these statements by forward-looking words such as “believe,” “will,” “may,” “estimate,” “continue,” “anticipate,” “intend,” “should,” “might,” “plan,” “expect,” “predict,” “could,” “potentially” or the negative of these terms or similar expressions. You should read these statements carefully because they may relate to future expectations around growth, strategy, and anticipated trends in our business, contain projections of future results of operations or financial condition, or state other “forward-looking” information. These statements are only predictions based on our current expectations, estimates, assumptions, and projections about future events and are applicable only as of the dates of such statements. Forward-looking statements contained in this Quarterly Report on Form 10-Q include, but are not limited to, statements about:

- our ability to design, develop, manufacture and market innovative products to treat patients with challenging medical conditions, particularly in peripheral artery disease, coronary artery disease and aortic stenosis;
- our ability to successfully execute our commercialization strategy for our approved or cleared products;
- our expected future growth, including growth in international sales;
- the size and growth potential of the markets for our products, and our ability to serve those markets;
- the rate and degree of market acceptance of our products;
- coverage and reimbursement for procedures performed using our products;
- the performance of third parties in connection with the development of our products, including third-party suppliers;
- the impact of government laws and regulatory developments in the United States and foreign countries;
- our ability to obtain and maintain regulatory approval or clearance of our products on expected timelines;
- our ability to scale our organizational culture of cooperative product development and commercial execution;
- our ability to satisfy our payment obligations and remain in compliance with covenants under our debt agreements, including our convertible debt, or to refinance our indebtedness;
- potential dilution from equity awards, convertible indebtedness and potential future convertible debt and stock issuances;
- the expected benefits of our acquisition of Neovasc Inc. in April 2023, a corporation existing under the Canada Business Corporations Act;
- the development, regulatory approval, efficacy and commercialization of competing products;
- our ability to develop and maintain our corporate infrastructure, including our internal controls;
- our estimates regarding expenses, future financial performance and capital requirements;
- our expectations regarding our ability to obtain and maintain intellectual property protection for our products, as well as our ability to operate our business without infringing the intellectual property rights of others; and
- the impact of global business, political and macroeconomic conditions, including inflation, rising interest rates, uncertainty with respect to the federal budget, instability in the global banking system, volatile market conditions, supply chain disruptions, cybersecurity events, and global events, including regional conflicts around the world, on our operations, financial results, liquidity and capital resources, sales, expenses, supply chain, manufacturing, research and development activities, clinical trials and employees.

We caution you that the foregoing list may not contain all of the forward-looking statements made in this Quarterly Report on Form 10-Q. We have based these forward-looking statements on our current expectations and projections about future events and trends that we believe may affect our financial condition, results of operations, business strategy, short-term and long-term business operations and objectives, and financial needs. These forward-looking statements are subject to a number of risks, uncertainties, and assumptions and other factors that could cause our actual results, level of activity, performance, or achievements to differ materially from the results, level of activity, performance or achievements expressed or implied by the forward-looking statements, including those described in the section titled "Risk Factors" in our Annual Report on Form 10-K for the year ended December 31, 2022, together with any updates in the section titled "Risk Factors" of our Quarterly Reports on Form 10-Q for the quarters ended March 31, 2023 and June 30, 2023 and in this Quarterly Report on Form 10-Q, and the section titled "Management's Discussion and Analysis of Financial Condition and Results of Operations" in this Quarterly Report on Form 10-Q. There may also be additional risks of which we are not presently aware or that we currently believe are immaterial which could have an adverse impact on our business. Although we believe the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, level of activity, performance or achievements. Except to the extent required by law, we undertake no obligation to update any of these forward-looking statements after the date of this Quarterly Report on Form 10-Q to conform our prior statements to actual results or revised expectations.

PART I—FINANCIAL INFORMATION

Item 1. Financial Statements.

SHOCKWAVE MEDICAL, INC.
Condensed Consolidated Balance Sheets
(*Unaudited*)

(in thousands)

	September 30, 2023	December 31, 2022[1]
ASSETS		
CURRENT ASSETS:		
Cash and cash equivalents	$ 498,108	$ 156,586
Short-term investments	419,225	147,907
Accounts receivable, net	98,819	71,366
Inventory	97,180	75,112
Prepaid expenses and other current assets	15,210	8,292
Total current assets	1,128,542	459,263
Operating lease right-of-use assets	30,360	32,365
Property and equipment, net	62,017	48,152
Equity method investment	1,810	3,512
Intangible assets, net	93,775	—
Goodwill	39,789	—
Deferred tax assets	109,432	97,568
Other assets	8,234	5,229
TOTAL ASSETS	$ 1,473,959	$ 646,089
LIABILITIES AND STOCKHOLDERS' EQUITY		
CURRENT LIABILITIES:		
Accounts payable	$ 6,870	$ 6,721
Accrued liabilities	69,764	55,375
Lease liability, current portion	1,569	1,278
Total current liabilities	78,203	63,374
Lease liability, noncurrent portion	32,358	34,928
Convertible debt, noncurrent portion	730,926	—
Debt, noncurrent portion	—	24,198
Related party contract liability, noncurrent portion	12,273	12,273
Deferred tax liabilities	9,647	—
Other liabilities	9,307	—
TOTAL LIABILITIES	872,714	134,773
Commitments and contingencies (Note 8)		
STOCKHOLDERS' EQUITY:		
Preferred stock	—	—
Common stock	37	36
Additional paid-in capital	535,197	548,960
Accumulated other comprehensive loss	(149)	(867)
Retained earnings (accumulated deficit)	66,160	(36,813)
TOTAL STOCKHOLDERS' EQUITY	601,245	511,316
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	$ 1,473,959	$ 646,089

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

[1] The condensed consolidated balance sheet as of December 31, 2022 is derived from the audited consolidated financial statements as of that date.

SHOCKWAVE MEDICAL, INC.
Condensed Consolidated Statements of Operations and Comprehensive Income
(Unaudited)
(in thousands, except share and per share data)

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2023	**2022**	**2023**	**2022**
Revenue:				
Product revenue	$ 186,020	$ 131,330	$ 527,251	$ 345,707
Cost of revenue:				
Cost of product revenue	24,513	17,874	70,072	47,494
Gross profit	161,507	113,456	457,179	298,213
Operating expenses:				
Research and development	39,526	20,177	103,326	57,956
Sales and marketing	56,907	42,082	167,656	118,558
General and administrative	21,451	14,434	70,386	39,988
Total operating expenses	117,884	76,693	341,368	216,502
Income from operations	43,623	36,763	115,811	81,711
(Loss) income from equity method investment	(733)	97	(1,702)	(1,414)
Interest expense	(2,509)	(316)	(3,955)	(917)
Other income (expense), net	4,699	(1,423)	8,667	(3,206)
Net income before taxes	45,080	35,121	118,821	76,174
Income tax provision	10,094	118	15,848	1,089
Net income	$ 34,986	$ 35,003	$ 102,973	$ 75,085
Unrealized gain (loss) on available-for-sale securities	242	(275)	723	(1,410)
Adjustment for net gain realized and included in other income	—	—	(5)	—
Total comprehensive income	$ 35,228	$ 34,728	$ 103,691	$ 73,675
Net income per share				
Basic	$ 0.95	$ 0.97	$ 2.81	$ 2.10
Diluted	$ 0.92	$ 0.92	$ 2.70	$ 1.99
Shares used in computing net income per share				
Basic	36,797,072	36,003,931	36,630,575	35,807,264
Diluted	38,196,780	37,948,049	38,184,299	37,813,107

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

SHOCKWAVE MEDICAL, INC.
Condensed Consolidated Statements of Stockholders' Equity
(Unaudited)
(in thousands, except share data)

	Common Stock		Additional Paid-In Capital	Accumulated Other Comprehensive Loss	Retained Earnings (Accumulated Deficit)	Total Stockholders' Equity
	Shares	Amount				
Balances — December 31, 2022	36,235,546	$ 36	$ 548,960	$ (867)	$ (36,813)	$ 511,316
Exercise of stock options	77,230	1	319	—	—	320
Unrealized gain on available-for-sale securities, net of tax	—	—	—	505	—	505
Net gain reclassified from accumulated other comprehensive income	—	—	—	(5)	—	(5)
Issuance of common stock under employee stock purchase plan	19,124	—	3,092	—	—	3,092
Issuance of common stock in connection with vesting of restricted stock units	257,624	—	—	—	—	—
Taxes withheld on net settled vesting of restricted stock units	(19)	—	(3)	—	—	(3)
Stock-based compensation	—	—	16,337	—	—	16,337
Net income	—	—	—	—	39,125	39,125
Balances — March 31, 2023	36,589,505	$ 37	$ 568,705	$ (367)	$ 2,312	$ 570,687
Exercise of stock options	48,282	$ —	$ 403	$ —	$ —	$ 403
Unrealized loss on available-for-sale securities	—	—	—	(24)	—	(24)
Issuance of common stock in connection with vesting of restricted stock units	90,837	—	—	—	—	—
Taxes withheld on net settled vesting of restricted stock units	(7)	—	(4)	—	—	(4)
Stock-based compensation	—	—	16,988	—	—	16,988
Net income	—	—	—	—	28,862	28,862
Balances — June 30, 2023	36,728,617	$ 37	$ 586,092	$ (391)	$ 31,174	$ 616,912
Exercise of stock options	66,444	$ —	$ 459	$ —	$ —	$ 459
Unrealized gain on available-for-sale securities, net of tax	—	—	—	242	—	242
Issuance of common stock under employee stock purchase plan	19,506	—	3,138	—	—	3,138
Issuance of common stock in connection with vesting of restricted stock units	67,812	—	—	—	—	—
Taxes withheld on net settled vesting of restricted stock units	(139)	—	(34)	—	—	(34)
Stock-based compensation	—	—	18,516	—	—	18,516
Purchase of capped calls related to convertible debt, net of tax	—	—	(72,974)	—	—	(72,974)
Net income	—	—	—	—	34,986	34,986
Balances — September 30, 2023	36,882,240	$ 37	$ 535,197	$ (149)	$ 66,160	$ 601,245

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

	Common Stock		Additional Paid-In Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Total Stockholders' Equity
	Shares	Amount				
Balances — December 31, 2021	35,444,472	$ 35	$ 494,806	$ (202)	$ (252,809)	$ 241,830
Exercise of stock options	54,913	1	390	—	—	391
Unrealized loss on available-for-sale securities	—	—	—	(815)	—	(815)
Issuance of common stock under employee stock purchase plan	14,172	—	2,135	—	—	2,135
Issuance of common stock in connection with vesting of restricted stock units	210,835	—	—	—	—	—
Taxes withheld on net settled vesting of restricted stock units	(31)	—	(6)	—	—	(6)
Stock-based compensation	—	—	9,767	—	—	9,767
Net income	—	—	—	—	14,521	14,521
Balances — March 31, 2022	35,724,361	$ 36	$ 507,092	$ (1,017)	$ (238,288)	$ 267,823
Exercise of stock options	111,601	$ —	$ 500	$ —	$ —	$ 500
Unrealized loss on available-for-sale securities	—	—	—	(320)	—	(320)
Issuance of common stock in connection with vesting of restricted stock units	71,491	—	—	—	—	—
Stock-based compensation	—	—	11,504	—	—	11,504
Net income	—	—	—	—	25,561	25,561
Balances — June 30, 2022	35,907,453	$ 36	$ 519,096	$ (1,337)	$ (212,727)	$ 305,068
Exercise of stock options	170,620	$ —	$ 1,303	$ —	$ —	$ 1,303
Unrealized loss on available-for-sale securities	—	—	—	(275)	—	(275)
Issuance of common stock under employee stock purchase plan	15,473	—	2,352	—	—	2,352
Issuance of common stock in connection with vesting of restricted stock units	40,053	—	—	—	—	—
Stock-based compensation	—	—	12,479	—	—	12,479
Net income	—	—	—	—	35,003	35,003
Balances — September 30, 2022	36,133,599	$ 36	$ 535,230	$ (1,612)	$ (177,724)	$ 355,930

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

SHOCKWAVE MEDICAL, INC.
Condensed Consolidated Statements of Cash Flows
(Unaudited)
(in thousands)

	Nine Months Ended September 30,	
	2023	**2022**
CASH FLOWS FROM OPERATING ACTIVITIES:		
Net income	$ 102,973	$ 75,085
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	7,283	3,318
Loss from equity method investment	1,702	1,414
Stock-based compensation	51,423	32,247
Non-cash lease expense	2,393	2,300
Amortization of premium and discount on available-for-sale securities	(3,777)	303
Loss on write down of fixed assets	140	—
Loss on debt extinguishment	710	—
Deferred income taxes	9,756	—
Amortization of debt issuance costs	562	473
Foreign currency remeasurement	262	2,887
Changes in operating assets and liabilities:		
Accounts receivable	(26,064)	(27,113)
Inventory	(20,618)	(24,372)
Prepaid expenses and other current assets	(6,094)	(3,615)
Other assets	(3,347)	(1,174)
Accounts payable	(1,574)	109
Accrued and other current liabilities	11,295	4,377
Lease liabilities	(2,675)	(943)
Net cash provided by operating activities	124,350	65,296
CASH FLOWS FROM INVESTING ACTIVITIES:		
Purchase of available-for-sale securities	(398,330)	(85,252)
Proceeds from maturities of available-for-sale securities	131,750	72,423
Purchase of property and equipment	(22,474)	(14,045)
Business combination, net of cash acquired	(94,411)	—
Net cash used in investing activities	(383,465)	(26,874)
CASH FLOWS FROM FINANCING ACTIVITIES:		
Payments of taxes withheld on net settled vesting of restricted stock units	(41)	(6)
Proceeds from stock option exercises	1,182	1,672
Proceeds from issuance of common stock under employee stock purchase plan	6,230	4,487
Proceeds from convertible debt, net	730,809	—
Purchases of capped calls related to convertible debt	(96,375)	—
Principal payment of debt	(105,000)	(2,750)
Proceeds from debt financing	80,000	—
Payment of assumed warrant liability	(16,240)	—
Net cash provided by financing activities	600,565	3,403
Effect of exchange rate changes on cash and cash equivalents	(303)	(2,755)
Net increase in cash, cash equivalents and restricted cash	341,147	39,070
Cash, cash equivalents and restricted cash at beginning of period	158,302	90,874
Cash, cash equivalents and restricted cash equivalents at end of period	$ 499,449	$ 129,944
SUPPLEMENTAL DISCLOSURES OF CASH FLOW INFORMATION:		
Interest paid	$ 1,755	$ 442
Income tax paid	$ 6,230	$ 1,415
NON-CASH INVESTING AND FINANCING ACTIVITIES:		
Property and equipment purchases included in accounts payable and accrued liabilities	$ 2,661	$ 6,221

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

1. Organization and Basis of Presentation

Shockwave Medical, Inc. (the "Company") was incorporated on June 17, 2009. The Company is primarily engaged in the development and commercialization of novel technologies that transform the care of patients with cardiovascular disease. The Company is focused on the improvement of its Intravascular Lithotripsy ("IVL") technology for the treatment of calcified plaque in patients with peripheral vascular, coronary vascular and heart valve disease. Built on a balloon catheter platform, the IVL technology uses lithotripsy to disrupt both superficial and deep vascular calcium, while minimizing soft tissue injury, and an integrated angioplasty balloon to dilate blockages at low pressures, restoring blood flow. Additionally, the Company continues to develop its coronary sinus reducer ("Reducer") technology for the treatment of refractory angina.

The Company, which is headquartered in Santa Clara, California and operates primarily in the United States, began commercial and manufacturing operations in 2016. The unaudited condensed financial statements include the accounts of Shockwave Medical, Inc. and its wholly-owned subsidiaries. All intercompany balances and transactions have been eliminated upon consolidation.

As of September 30, 2023, the Company had cash, cash equivalents and short-term investments of $917.3 million, which are available to fund future working capital requirements, investments, acquisitions, or repayments of outstanding indebtedness. The Company believes that its cash, cash equivalents, and short-term investments as of September 30, 2023, will be sufficient for the Company to continue as a going concern for at least 12 months from the date these unaudited condensed consolidated financial statements are filed with the Securities and Exchange Commission ("SEC"). The Company's future capital requirements will depend on many factors, including its growth rate, the timing and extent of its spending to support research and development activities, and the timing and cost of establishing additional sales and marketing capabilities.

Risk and Uncertainties

The Company is subject to continuing risks and uncertainties in connection with the current global business, political and macroeconomic environments, including inflation, rising interest rates, uncertainty with respect to the federal budget, instability in the global banking system, volatile market conditions, supply chain disruptions, cybersecurity events, and global events, including regional conflicts around the world. The Company is closely monitoring the impact of these factors on all aspects of its business, including the impacts on its customers, patients, employees, suppliers, vendors, business partners and distribution channels.

In particular, while the Company has not experienced material disruptions in its supply chain to date, the Company has been and continues to be impacted by disruptions in the operations of certain of its third-party suppliers, resulting in increased lead-times, higher component costs and lower allocations for the purchase of some components. In certain cases, the Company has incurred higher logistical expenses. The Company is continuing to work closely with its manufacturing partners and suppliers to source key components and maintain appropriate inventory levels to meet customer demand.

The Company's future results of operations and liquidity could be adversely impacted by a variety of factors, including those discussed in the section titled "Risk Factors" of the Company's Annual Report on Form 10-K for the year ended December 31, 2022, filed with the SEC on February 27, 2023 (the "2022 Annual Report"), together with any updates in the section titled "Risk Factors" of the Quarterly Reports on Form 10-Q for the quarters ended March 31, 2023 and June 30, 2023 and in this Quarterly Report on Form 10-Q. As of the date of issuance of these condensed consolidated financial statements, the extent to which the current macroeconomic environment may materially impact the Company's financial condition, liquidity, or results of operations remains uncertain.

2. Summary of Significant Accounting Policies

Basis of Presentation

The accompanying unaudited condensed consolidated financial statements have been prepared in accordance with generally accepted accounting principles in the United States ("GAAP") and applicable rules and regulations of the SEC regarding interim financial reporting.

The unaudited interim condensed consolidated financial statements have been prepared on the same basis as the annual consolidated financial statements and, in the opinion of management, reflect all adjustments, which include only normal recurring adjustments, necessary to present fairly the Company's consolidated financial position, results of operations and cash flows. The results of operations for the three and nine months ended September 30, 2023 are not necessarily indicative of the results to be expected for the year ending December 31, 2023 or for any other future annual or interim period. The condensed consolidated balance sheet as of December 31, 2022 included herein was derived from the audited financial statements as of that date. The unaudited condensed consolidated financial statements should be read in conjunction with the Company's audited consolidated financial statements and related notes included in the 2022 Annual Report.

Cash, Cash Equivalents, and Restricted Cash

The Company considers all highly liquid investments purchased with original maturities of three months or less from the purchase date to be cash equivalents. Cash equivalents consist primarily of amounts invested in money market accounts.

The following table provides a reconciliation of cash, cash equivalents, and restricted cash reported within the condensed consolidated statements of cash flows:

	September 30, 2023	September 30, 2022
	(in thousands)	
Cash and cash equivalents	$ 498,108	$ 127,779
Restricted cash	1,341	2,165
Total cash, cash equivalents, and restricted cash	$ 499,449	$ 129,944

Restricted cash as of September 30, 2023 and December 31, 2022 relates to corporate credit card security, customer bank guarantee security, and letters of credit established for the real estate property leases relating to the Company's office buildings, and is recorded as other assets on the condensed consolidated balance sheets.

Equity Method Investments

Entities for which the Company has significant influence over the activities of the entity, but does not control, are accounted for under the equity method of accounting in accordance with Topic 323, *Investments - Equity Method and Joint Ventures*. The Company's carrying value in the equity method investment is reported as equity method investment on the Company's consolidated balance sheets. The Company records its proportionate share of the underlying income or loss which is recognized in earnings or loss from the equity method investment. The Company eliminates a portion of intra-entity profit to the extent the goods sold by the Company have not yet been sold through by the equity method investee to an end customer at the end of the reporting period. The profit earned by the Company from the equity method investee for items not yet sold through is eliminated through equity method earnings or loss which is recognized in income (loss) from equity method investment.

The Company assesses its equity method investment for impairment when events or circumstances suggest that the carrying amount of the investment may be impaired. The Company considers all available evidence in assessing whether a decline in fair value is other than temporary. If the decline in fair value is determined to be other than temporary, the difference between the carrying amount of the investment and estimated fair value is recognized as an impairment charge.

Revenue

To determine revenue recognition for arrangements that an entity determines are within the scope of Topic 606, *Revenue from Contracts with Customers*, the Company performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation.

Product Revenue

The Company records product revenue primarily from the sale of its IVL catheters and Reducer. The Company sells its products to hospitals, primarily through direct sales representatives, as well as through distributors in selected international markets. Additionally, a portion of the Company's revenue is generated through a consignment model under which inventory is maintained at hospitals.

Product revenue is recognized when a customer obtains control of promised goods or services, in an amount that reflects the consideration which the Company expects to receive in exchange for those goods or services.

For products sold through direct sales representatives, control is transferred upon delivery to customers. For products sold to distributors internationally and products sold to customers that utilize stocking orders, control is transferred upon shipment or delivery to the customer's named location, based on the contractual shipping terms. For consignment inventory, control is transferred at the time the IVL catheters are consumed in a procedure. The Company has elected to account for shipping and handling activities that occur after the customer has obtained control as a fulfillment activity, and not a separate performance obligation.

The Company may provide for the use of an IVL generator and connector cable under an agreement to customers at no charge to facilitate use of the IVL catheters. These agreements generally do not contain contractually enforceable minimum commitments and are generally cancellable by either party with 30 days' notice.

License Revenue

For arrangements that contain a license of the Company's functional intellectual property with a customer, the Company considers whether the license grant is distinct from other performance obligations in the arrangement. A license grant of functional intellectual property is generally considered to be capable of being distinct if a customer can benefit from the license on its own or together with other readily available resources. License revenue for licenses of functional intellectual property is recognized at a point in time when the Company satisfies its performance obligation of transferring the license to the customer.

Consideration received in advance of the satisfaction of a performance obligation is recognized as a contract liability. No license revenues were recognized for the three and nine months ended September 30, 2023.

Stock-Based Compensation

The Company accounts for share-based payments at fair value. The fair value of stock options is measured using the Black-Scholes option-pricing model. For share-based awards that vest subject to the satisfaction of a service requirement, the fair value measurement date for stock-based compensation awards is the date of grant and the expense is recognized on a straight-line basis, over the vesting period. For share-based awards that vest upon the satisfaction of a performance target, the related compensation cost is recognized over the requisite service period based on the expected achievement of the performance target. The Company accounts for forfeitures as they occur.

Business combinations

The Company applies the provisions of ASC 805, *Business Combinations* ("ASC 805"), in accounting of its acquisitions. ASC 805 requires recognition of assets acquired, liabilities assumed, and contingent consideration at their fair value on the acquisition date with subsequent changes recognized in earnings; requires acquisition-related expenses to be recognized separately from the business combination and expensed as incurred; requires in-process research and development to be capitalized at fair value as an indefinite-lived intangible asset until completion or abandonment; and requires that changes in accounting for deferred tax asset valuation allowances and acquired uncertain tax positions after the measurement period be recognized as a component of provision for taxes.

When an integrated set of assets and activities does not meet the practical screen test and otherwise meets the definition of a "business" under ASC 805, the Company accounts for such acquisitions as business combinations. The purchase price of an acquisition is allocated to the tangible and identifiable intangible assets acquired and liabilities assumed based on their estimated fair values as of the acquisition date. The Company bases the estimated fair value of identifiable intangible assets acquired in an acquisition on independent third-party valuations that use information and

assumptions provided by the Company's management and considers inputs and assumptions that a market participant would use. Any excess purchase price over the estimated fair values of the assets acquired and liabilities assumed is recorded as goodwill. During the measurement period, which may be up to one year from the acquisition date, the Company may record adjustments to the provisional amounts of assets acquired and liabilities assumed with the corresponding offset to goodwill. Upon the conclusion of the measurement period or final determination of the values of assets acquired or liabilities assumed, whichever comes first, any subsequent adjustments would be recorded in earnings.

In addition, uncertain tax positions and tax related valuation allowances assumed in a business combination are initially estimated as of the acquisition date and therefore are also provisional by nature. The Company reevaluates these items quarterly based upon facts and circumstances that existed as of the acquisition date with any adjustments to its preliminary estimates being recorded to goodwill if identified within the measurement period.

Goodwill

In accordance with ASC 350, *Intangibles-Goodwill and Other*, the acquired goodwill is not amortized but is tested for impairment on an annual basis or whenever events or changes in circumstances indicate that the carrying amount of these assets may not be recoverable. The Company performs annual impairment reviews of its goodwill balance during the fourth fiscal quarter or more frequently if business factors indicate. In testing for impairment, the Company compares the fair value of its reporting unit to its carrying value including the goodwill of that unit. If the carrying value, including goodwill, exceeds the reporting unit's fair value, the Company will recognize an impairment loss for the amount by which the carrying amount exceeds the reporting unit's fair value. The loss recognized cannot exceed the total amount of goodwill allocated to that reporting unit. The Company did not incur any goodwill impairment losses during the nine months ended September 30, 2023.

In-process research and development

Intangible assets related to in-process research and development costs are considered indefinite-lived intangible assets until the completion or abandonment of the associated research and development efforts. If and when development is complete, the associated assets would be deemed finite-lived intangible assets and would then be amortized based on their respective estimated useful lives at that point in time. Prior to the completion or abandonment of the associated research and development efforts, the assets are not amortized but are tested for impairment on an annual basis and between annual tests if the Company becomes aware of any events occurring or changes in circumstances that would indicate a reduction in the fair value of the in-process research and development projects below their respective carrying amounts.

During the fourth fiscal quarter and if business factors indicate more frequently, the Company performs an assessment of the qualitative factors affecting the fair value of its in-process research and development projects. If the fair value exceeds the carrying value, there is no impairment. Impairment losses on indefinite-lived intangible assets are recognized based solely on a comparison of the fair value of an asset to its carrying value, without consideration of any recoverability test.

Intangible assets

Amortizable intangible assets include customer relationships and developed technology acquired as part of the business combination. Customer relationships and developed technology acquired through business combinations subject to amortization are amortized using the straight-line method over their estimated useful lives ranging from five to 20 years. All intangible assets subject to amortization are reviewed for impairment during the fourth fiscal quarter or more frequently if business factors indicate in accordance with ASC 360, *Property, Plant and Equipment*.

Contingent Consideration Liabilities Related to Business Combination

At each reporting period, the Company evaluates the likelihood of any expected future payments and the associated discount rate to determine the fair value of the contingent consideration. The Company remeasures the fair value of contingent consideration liabilities each reporting period, based on new developments, and records any necessary adjustments as a component of total operating expenses within the condensed consolidated statements of operations until either the contingent consideration obligation is satisfied through payment upon the achievement of, or the obligation no longer exists due to the failure to achieve, the specified milestones. Contingent consideration liabilities are recorded within other liabilities in the condensed consolidated balance sheets.

Convertible Debt

The Company applies the provisions of Accounting Standards Update ("ASU") 2020-06-*Debt-Debt with Conversion and Other Options (Subtopic 470-20)* and *Derivatives and Hedging-Contracts in Entity's Own Equity (Subtopic 815-40)-Accounting For Convertible Instruments and Contracts in an Entity's Own Equity* ("ASU 2020-06") which simplify the accounting related to convertible debt instruments by removing major separation models required under current GAAP.

Accordingly, the Company does not bifurcate the liability and equity components of the convertible debt on the condensed consolidated balance sheets. The Company's convertible debt is are reflected as a liability on the Company's condensed consolidated balance sheets, with the initial carrying amount equal to the principal amount of the debt, net of issuance costs. The issuance costs are treated as a debt discount for accounting purposes, which will be amortized into interest expense over the term of the instruments utilizing the effective interest method.

The Company accounts for its convertible debt as a single liability with no separate accounting for embedded conversion features. The remaining consideration transferred, after reducing the carrying amount of the convertible debt, is recorded as a reduction to additional paid-in capital on the Company's condensed consolidated balance sheets.

3. Financial Instruments and Fair Value Measurements

The following tables summarize the Company's financial assets measured at fair value on a recurring basis by level within the fair value hierarchy:

	September 30, 2023			
	Level 1	Level 2	Level 3	Total
	(in thousands)			
Assets:				
U.S. Treasury securities	$ 362,160	$ —	$ —	$ 362,160
Money market funds	383,946	—	—	383,946
Commercial paper	—	25,316	—	25,316
Corporate bonds	—	12,202	—	12,202
U.S. agency securities	—	13,790	—	13,790
Asset-backed securities	—	5,757	—	5,757
Total assets	$ 746,106	$ 57,065	$ —	$ 803,171
Liabilities:				
Contingent consideration liability	$ —	$ —	$ 9,307	$ 9,307
Convertible debt	—	720,000	—	720,000
Total liabilities	$ —	$ 720,000	$ 9,307	$ 729,307

	December 31, 2022			
	Level 1	Level 2	Level 3	Total
	(in thousands)			
Assets:				
U.S. Treasury securities	$ 111,631	$ —	$ —	$ 111,631
Money market funds	12,076	—	—	12,076
Commercial paper	—	8,039	—	8,039
Corporate bonds	—	18,808	—	18,808
U.S. agency securities	—	9,429	—	9,429
Total assets	$ 123,707	$ 36,276	$ —	$ 159,983

During the three and nine months ended September 30, 2023 and 2022, there were no transfers between Level 1, Level 2 and Level 3.

Contingent Consideration Liabilities Related to Business Combination

In connection with the Company's acquisition of Neovasc Inc. ("Neovasc"), a preliminary fair value of $9.3 million was recorded for the Neovasc contingent consideration, which consisted of estimated amounts in relation to the CVR (as defined below), on April 11, 2023, the date on which the closing conditions for the acquisition were met and the transaction was consummated. There were no changes in the estimated fair value of the contingent consideration liability as of September 30, 2023. See Note 5 "Business Combination" for information regarding existing contingent consideration liabilities as of September 30, 2023.

Convertible Debt

As of September 30, 2023, the fair value of the Company's convertible debt was $720.0 million. The Company measures the fair value of its convertible debt for disclosure purposes. The fair value was determined based on the quoted price of the convertible debt in an over-the-counter market on the last trading day of the reporting period and has been classified as Level 2 in the fair value hierarchy. See Note 10 "Convertible Debt" for information regarding the Company's convertible debt as of September 30, 2023.

4. Cash Equivalents and Short-Term Investments

The following is a summary of the Company's cash equivalents and short-term investments:

	September 30, 2023			
	Amortized Cost Basis	Unrealized Gains	Unrealized Losses	Fair Value
	(in thousands)			
U.S. Treasury securities	$ 362,243	$ 32	$ (115)	$ 362,160
Money market funds	383,910	36	—	383,946
Commercial paper	25,391	—	(75)	25,316
Corporate bonds	12,197	32	(27)	12,202
U.S. agency securities	13,866	—	(76)	13,790
Asset-backed securities	5,761	6	(10)	5,757
Total	$ 803,368	$ 106	$ (303)	$ 803,171
Reported as:				
Cash equivalents				$ 383,946
Short-term investments				419,225
Total				$ 803,171

	December 31, 2022			
	Amortized Cost Basis	Unrealized Gains	Unrealized Losses	Fair Value
	(in thousands)			
U.S. Treasury securities	$ 112,719	$ 3	$ (1,091)	$ 111,631
Money market funds	12,076	—	—	12,076
Commercial paper	8,039	—	—	8,039
Corporate bonds	18,876	8	(76)	18,808
U.S. agency securities	9,432	4	(7)	9,429
Total	$ 161,142	$ 15	$ (1,174)	$ 159,983
Reported as:				
Cash equivalents				$ 12,076
Short-term investments				147,907
Total				$ 159,983

There were $63.8 million and $123.8 million of investments in unrealized loss positions of $0.3 million and $1.2 million as of September 30, 2023 and December 31, 2022, respectively. During the three and nine months ended September 30, 2023 and 2022, the Company did not record any other-than-temporary impairment charges on its available-for-sale securities. Based on the Company's procedures under the expected credit loss model, including an assessment of unrealized losses on the portfolio, the Company concluded that the unrealized losses for its marketable securities were not attributable to credit and therefore an allowance for credit losses for these securities has not been recorded as of September 30, 2023 and December 31, 2022. Also, based on the scheduled maturities of the investments, the Company was more likely than not to hold these investments for a period of time sufficient for a recovery of the Company's cost basis.

The remaining contractual maturities of the Company's cash equivalents and short-term investments were as follows:

	September 30, 2023
	Fair Value
	(in thousands)
Money market funds	$ 383,946
One year or less	409,382
Greater than one year and less than two years	9,843
Total	$ 803,171

5. Business Combination

Neovasc Inc.

On January 16, 2023, the Company entered into a definitive agreement to acquire Neovasc, a company focused on the minimally invasive treatment of refractory angina. On April 11, 2023, the closing conditions were met and the transaction was consummated. Upon the closing of the transaction, the Company acquired all of Neovasc's issued and outstanding common stock equity for a cash payment of $27.25 per share. During the three and nine months ended September 30, 2023, the Company incurred $0.7 million and $5.6 million of buyer related transaction costs related to the acquisition of Neovasc, which were recorded as general and administrative expenses.

The purchase price consideration for the acquisition totaled $121.4 million, which was comprised of cash paid of $112.1 million to the selling shareholders, and the estimated fair value of the contingent consideration liability in the amount of $9.3 million.

The contingent consideration liability consisted of estimated amounts in relation to a contingent value right (a "CVR") entitling the holders of Neovasc common stock and eligible equity awards to receive an additional cash payment of up to $12.00 per share or per share underlying an eligible equity award (equivalent to a maximum cash payment of $47.0 million) contingent on the attainment of a milestone. The milestone is defined as the grant by the United States Food and Drug Administration's final approval of the premarket approval application for Neovasc's coronary sinus reducer ("Reducer") product for the treatment of angina. The milestone achievement timeline and respective payment per share ranges from $12.00 per CVR if the milestone is achieved on or prior to June 30, 2026, $8.00 per CVR if the milestone is achieved between July 1, 2026 and December 31, 2026 and $4.00 per CVR if the milestone is achieved between January 1, 2027 and December 31, 2027. The Company estimated the fair value of the contingent consideration liability using the probability-weighted discounted cash flow method based on the probability of achieving the milestone on each specified milestone date and consequently calculated the fair value of the CVR in the amount of $9.3 million as of the acquisition date.

The material factors that may impact the fair value of the contingent consideration are (i) the number of diluted shares outstanding as of the acquisition date that are eligible for the CVR, (ii) the probabilities and timing of achievement of the milestone, and (iii) discount rates, all of which are unobservable Level 3 inputs not supported by market activity. Significant changes in any of these inputs may result in a significant change in fair value, which is estimated at each reporting date with changes reflected as general and administrative expense.

The following table summarizes the purchase price consideration for Neovasc:

Purchase Price	(in thousands)
Cash transferred	$ 112,129
Contingent consideration liability	9,307
Total	$ 121,436

Assets acquired and liabilities assumed are recorded based on valuations derived from estimated fair value assessments and Level 3 inputs and assumptions used by the Company. While the Company believes that its estimates and assumptions

underlying the valuations are reasonable, different estimates and assumptions could result in different valuations assigned to the individual assets acquired and liabilities assumed, and the residual amount of goodwill. The following table summarizes the preliminary fair values of assets acquired and liabilities assumed through the Company's Neovasc acquisition at the acquisition date based on management's best estimates and assumptions as of the reporting date:

Purchase Price	**(in thousands)**
Cash and cash equivalents	$ 17,273
Accounts receivable, net	1,345
Inventory	918
Prepaid expenses and other current assets	841
Operating lease right-of-use assets	310
Property and equipment	156
Intangible assets	95,500
Other assets	502
Total identifiable assets acquired	116,845
Accounts payable	3,334
Accrued liabilities	4,082
Lease liability, current portion	253
Lease liability, noncurrent portion	64
Deferred tax liabilities	11,185
Other liabilities	16,280
Total liabilities assumed	35,198
Net identifiable assets acquired	81,647
Goodwill	39,789
Total purchase price	$ 121,436

The purchase price allocation for the acquisition is preliminary and subject to revision as additional information about fair value of assets acquired and liabilities assumed becomes available, primarily related to the Company's deferred tax liability and the related impact to goodwill. Additional information that existed as of the acquisition date but at the time was unknown to the Company may become known to the Company during the remainder of the measurement period, a period not to exceed 12 months from the acquisition date. As of September 30, 2023, there were no changes to the preliminary allocation of the purchase consideration.

The Company measured the identifiable assets and liabilities assumed at their acquisition date fair values separately from goodwill. The intangible assets acquired are the developed technology related to Neovasc's Reducer, in-process research and development for its Reducer technology, and Neovasc's customer relationships in place at the time of acquisition. The fair value of the intangible assets acquired as of the acquisition date and, the method used to value these assets as well as the estimated economic lives for amortizable intangible assets were as follows (in thousands, except estimated useful life which is in years):

	Fair value	**Estimated useful life**	**Valuation method**
Customer relationships	$ 2,900	5 years	Avoided cost / lost profit
Developed technology	61,200	20 years	Multi-period excess earnings
In-process research and development	31,400	N/A	Multi-period excess earnings
Total	$ 95,500		

Goodwill represents the excess of the purchase price over the fair value of the net assets acquired. The acquisition of Neovasc resulted in the recognition of $39.8 million of goodwill which the Company believes relates primarily to the anticipated benefits of synergies created through the acquisition and assembled workforce.

The intangible assets and goodwill created as a result of the acquisition of Neovasc are not deductible for tax purposes. As such, the Company recorded deferred tax liabilities of $11.2 million related to the intangible assets in connection with the Company's acquisition of Neovasc.

Supplemental Unaudited Pro Forma Information

The following are the supplemental condensed consolidated financial results of the Company and Neovasc on an unaudited pro forma basis, as if the Neovasc acquisition had been consummated on January 1, 2022.

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2023	2022	2023	2022
	(in thousands)		(in thousands)	
Net revenue	$ 186,020	$ 132,253	$ 528,720	$ 348,059
Net income	$ 30,072	$ 27,287	$ 69,010	$ 45,815

The unaudited pro forma financial information presented is for informational purposes only and is not necessarily indicative of the results of operations that would have been achieved if the Neovasc acquisition was actually consummated on January 1, 2022 and is not indicative of future operating results. The pro forma results include adjustments related to purchase accounting, primarily amortization of acquisition-related intangible assets, and expense from assumed stock-based compensation awards, warrant and interest expense.

6. Goodwill and intangible assets

Goodwill

The changes in the carrying amounts of goodwill were as follows:

	(in thousands)
Balance as of December 31, 2022	$ —
Goodwill acquired - Neovasc	39,789
Goodwill deductions or impairment	—
Balance as of September 30, 2023	$ 39,789

The Company performs annual impairment reviews of goodwill during the fourth fiscal quarter or more frequently if required.

Intangible assets

The following table presents details of the acquired intangible assets as of September 30, 2023 (in thousands, except useful life and estimated remaining useful life which are in years):

	Gross Carrying Amount	Accumulated Amortization	Impairment	Intangible Assets, Net	Useful Life	Estimated Remaining Useful Life
Customer relationships	$ 2,900	$ 275	$ —	$ 2,625	5 years	4.5 years
Developed technology	61,200	1,450	—	59,750	20 years	19.5 years
In-process research and development	31,400	—	—	31,400	N/A	N/A
Total	$ 95,500	$ 1,725	$ —	$ 93,775	19.3 years	18.8 years

Acquisition-related intangible assets included in the above table are finite-lived, other than in-process research and development which has an indefinite life, and are carried at cost less accumulated amortization. Customer relationships and developed technology are amortized on a straight-line basis over their estimated lives, which approximates the pattern in which the economic benefits of the intangible assets are expected to be realized. Amortization expense was $0.9 million and $1.7 million for the three and nine months ended September 30, 2023, respectively, and was recorded to sales and marketing for customer relationships and to cost of revenue for developed technology.

The following table summarizes the estimated future amortization expense of intangible assets with finite lives as of September 30, 2023:

Years ending December 31,	(in thousands)
2023 (remainder)	$ 918
2024	3,640
2025	3,640
2026	3,640
2027	3,640
Thereafter	46,897
Total estimated future amortization expense	$ 62,375

Actual amortization expense to be reported in future periods could differ from these estimates as a result of asset impairments, acquisitions, or other facts and circumstances. The Company performs annual impairment reviews of its intangible assets during the fourth fiscal quarter or more frequently if business factors indicate.

7. Balance Sheet Components

Inventory

Inventory consists of the following:

	September 30, 2023	December 31, 2022
	(in thousands)	
Raw materials	$ 24,289	$ 18,456
Work in progress	17,493	7,666
Finished goods	54,907	48,735
Consigned inventory	491	255
Total inventory	$ 97,180	$ 75,112

Accrued Liabilities

Accrued liabilities consist of the following:

	September 30, 2023	December 31, 2022
	(in thousands)	
Employee compensation	$ 35,264	$ 32,885
Research and development costs	7,943	4,007
Asset purchases	4,718	4,600
Professional services	6,970	4,044
Excise, sales, income and other taxes	6,033	4,036
Other	8,836	5,803
Total accrued liabilities	$ 69,764	$ 55,375

8. Commitments and Contingencies

Operating Leases

The Company's operating leases consist of leased facilities for the Company's headquarter offices, leased facilities for Neovasc, and leased facilities for laboratory and manufacturing space. Also included in operating leases are leases for vehicles, for use by certain employees of the Company, which were not material for the periods presented.

Short-term leases are leases having a term of 12 months or less. The Company recognizes short-term leases on a straight-line basis and does not record a related lease asset or liability for such leases. As of September 30, 2023, the Company has no material finance leases.

In September 2021, the Company entered into an office lease agreement ("3003 Bunker Hill Lease") for the 3003 Bunker Hill facility which expires in December 2031. Concurrently, the Company entered into an Amendment to Office Lease (Net) (the "First Lease Amendment") which extended the lease terms of the 5353 Betsy Ross and 5403 Betsy Ross facilities to December 2031. The 5403 Betsy Ross lease ("5403 Lease") continued in its existing terms (and with no changes to its terms, including its base rent) until its expiration in August 2022, at which point the leased space under the 5403 Lease became subject to the terms of the First Lease Amendment. The 3003 Bunker Hill Lease and the First Lease Amendment contain options to extend the lease term at the respective facilities for up to two additional five-year terms at the then fair market rate. As of September 30, 2023, the Company is not reasonably certain it will exercise these extension options.

Additionally, included in the First Lease Amendment was an expansion option that stipulated that the Company had an option to lease the space in the adjacent building located at 5303 Betsy Ross ("5303 Lease"). The Company exercised this expansion option by entering into a Second Amendment to Office Lease (Net) (the "Second Lease Amendment") on May 26, 2023. The 5303 Lease will commence on February 1, 2024 and will expire on December 31, 2031.

The Company recognizes rent expense for these operating leases on a straight-line basis over the lease period. The components of lease costs, which the Company includes in operating expenses in the condensed consolidated statements of operations and comprehensive income, were as follows:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2023	2022	2023	2022
	(in thousands)		(in thousands)	
Operating lease cost	$ 1,223	$ 1,168	$ 3,651	$ 3,451
Variable lease cost	366	453	955	696
Total lease cost	$ 1,589	$ 1,621	$ 4,606	$ 4,147

During the three months ended September 30, 2023 and 2022, the Company recorded operating lease cost of $1.2 million and $1.2 million, respectively, and paid $1.4 million and $1.0 million of operating lease payments, respectively, related to the lease liabilities.

During the nine months ended September 30, 2023 and 2022, the Company recorded operating lease cost of $3.7 million and $3.5 million, respectively, and paid $4.1 million and $2.1 million of operating lease payments, respectively, related to the lease liabilities.

The Company includes operating lease payments in net cash used in operating activities in the condensed consolidated statements of cash flows.

The weighted average remaining lease term and discount rate used to measure the Company's operating lease liabilities were 8.2 years and 5.2%, respectively. The Company estimated the discount rate using the incremental borrowing rate as the rate implicit in the lease was not readily determinable.

As of September 30, 2023, the maturities of the payments due under the Company's operating lease liabilities were as follows:

Years ending December 31,	(in thousands)
2023 (remainder)	$ 1,383
2024	5,517
2025	5,526
2026	5,690
2027	5,832
Thereafter	24,959
Total minimum lease payments	$ 48,907
Less: imputed interest	(9,312)
Less: Lease incentive	(5,668)
Total lease liability	$ 33,927
Less: current portion	(1,569)
Lease liability, noncurrent portion	$ 32,358

The table below summarizes the undiscounted future non-cancellable lease payments for the 5303 Lease facility under the Second Lease Amendment, which had not yet commenced as of September 30, 2023.

Years ending December 31,	(in thousands)
2023 (remainder)	$ —
2024	476
2025	1,173
2026	1,207
2027	1,244
Thereafter	5,359
Total undiscounted lease payments	$ 9,459

Contingent Consideration Liabilities Related to Business Combination

See Note 5 “Business Combination” for information regarding existing contingent consideration liabilities as of September 30, 2023.

9. Debt

On October 19, 2022, the Company entered into a Credit Agreement (the “Credit Agreement”) with Wells Fargo Bank, National Association, as administrative agent, Wells Fargo Bank, National Association, as swingline lender and an issuing lender, Wells Fargo Securities, LLC and Silicon Valley Bank, as joint lead arrangers and joint bookrunners, Silicon Valley Bank, as syndication agent, and the several lenders party thereto. The Credit Agreement provides for a revolving credit facility in an aggregate principal amount of $175.0 million with the right to request increases to the revolving commitments (subject to certain conditions) of up to the greater of (x) $100 million or (y) the Company’s consolidated EBITDA for the four fiscal quarter period most recently ended prior to the date of such increase.

Concurrent with entering into the Credit Agreement, the Company drew down $25.0 million thereunder. The Company repaid the $25.0 million drawn under the Credit Agreement on August 29, 2023. The Company recognized a loss on debt extinguishment of $0.7 million in connection with this repayment, which is included in interest expense in the condensed consolidated statement of operations for the three and nine months ended September 30, 2023.

On March 16, 2023, the Company drew down an additional $80.0 million under the Credit Agreement. The Company repaid the $80.0 million drawn under the Credit Agreement on April 26, 2023.

The revolving credit facility accrues for interest, at the election of the Company, at (A) the Base Rate (as defined below) plus a margin ranging from 0% to 1% depending on the Company’s Consolidated Total Net Leverage Ratio (as defined in the Credit Agreement) (which rate is currently 0%) or (B) the applicable secured overnight financing rate (“SOFR”) plus a margin from 1% to 2%, depending on the Company’s Consolidated Total Net Leverage Ratio (which rate is currently 2%). Base Rate means, at any time, the highest of (a) the Wells Fargo Bank, National Association’s announced prime rate, (b) the federal funds rate plus 0.5% and (c) Term SOFR for a one-month tenor in effect on such day plus 1%. The Credit Agreement matures on October 19, 2027. The interest rate was 7.3% as of August 29, 2023.

The Company recorded interest expense of $0.4 million and $0.3 million for the three months ended September 30, 2023 and 2022, respectively.

The Company recorded interest expense of $1.8 million and $0.9 million for the nine months ended September 30, 2023 and 2022, respectively.

10. Convertible Debt

On August 15, 2023, the Company issued $750.0 million in aggregate principal amount of 1.0% convertible senior notes due 2028 (the “Notes”). The issuance included the full exercise of an option granted by the Company to the initial purchasers of the Notes to purchase an additional $100.0 million in aggregate principal amount of Notes. The Notes were

issued pursuant to and subject to the terms of an indenture, dated August 15, 2023, between the Company and U.S. Bank Trust Company, National Association, as trustee (the "Indenture"). The Indenture includes customary covenants and sets forth certain events of default, including certain types of bankruptcy and insolvency events, after which the Notes may be declared immediately due and payable. The Notes were offered and sold in a private offering to qualified institutional buyers pursuant to Rule 144A under the Securities Act of 1933, as amended.

The Notes are senior, unsecured obligations of the Company. The Notes will mature on August 15, 2028, unless earlier converted, redeemed, or repurchased in accordance with their terms. The Notes bear interest at a rate of 1.0% per year, payable semiannually in arrears on February 15 and August 15 of each year, beginning on February 15, 2024. The Notes are convertible, in multiples of $1,000.0 principal amount and at the option of the noteholder, on or after May 15, 2028. Prior to May 15, 2028, holders of the Notes may convert all or a portion of their Notes, in multiples of $1,000.0 principal amount, only under the following circumstances: (1) during any calendar quarter commencing after December 31, 2023 (and only during such calendar quarter) if the closing price of the Company's common stock for at least 20 trading days (whether or not consecutive) in a period of 30 consecutive trading days ending on the last trading day of the immediately preceding calendar quarter is greater than or equal to 130% of the then applicable conversion price for the Notes on each applicable trading day; (2) during the five business days immediately after any five consecutive trading day period in which the trading price (as defined in the Indenture) per $1,000.0 principal amount of Notes for each day of that period was less than 98% of the product of the closing price of the Company's common stock and the then applicable conversion rate; (3) if the Company calls such Notes for redemption, at any time prior to the close of business on the scheduled trading day immediately preceding the redemption date, but only with respect to the Notes called (or deemed called) for redemption; or (4) upon the occurrence of specific corporate events as specified in the Indenture. The Company will settle any conversions of Notes by paying or delivering, as applicable, cash up to the aggregate principal amount of the Notes to be converted and by paying or delivering, as the case may be, cash, shares of common stock or a combination of cash and shares of common stock, at the election of the Company, in respect of the remainder, if any, of the Company's conversion obligation in excess of the aggregate principal amount of the Notes being converted.

The conversion rate for the Notes was initially 3.4595 shares of common stock per $1,000.0 principal amount of Notes, which is equivalent to an initial conversion price of approximately $289.06 per share of common stock. The initial conversion price of the Notes represents a premium of approximately 30% over the $222.35 per share last reported sale price of common stock on August 10, 2023. The conversion rate is subject to adjustment under certain circumstances in accordance with the terms of the Indenture, with a maximum conversion rate of 4.4974 shares of common stock per $1,000.0 principal amount of Notes.

The Company may not redeem the Notes prior to August 20, 2026. The Company may redeem, for cash equal to 100% of the principal amount of the Notes being redeemed plus accrued and unpaid interest, all or any portion of the Notes, at its option, on or after August 20, 2026, if the last reported sales price of its common stock has been at least 130% of the conversion price then in effect for at least 20 trading days (whether or not consecutive) during any 30 consecutive trading day period ending on, and including, the trading day immediately preceding the date on which the Company provides notice of the redemption. No sinking fund is provided for the Notes and therefore the Company is not required to redeem or retire the Notes periodically.

If the Company undergoes a fundamental change, as defined in the Indenture, then subject to certain conditions, holders may require the Company to repurchase for cash all or any portion of their Notes at a price equal to 100% of the principal amount of the Notes to be repurchased plus any accrued and unpaid interest to, but excluding, the repurchase date. In addition, under certain circumstances, holders of the Notes are entitled to an increase in the conversion rate. The conditions allowing holders of the Notes to convert were not met this quarter.

As of September 30, 2023, the Notes were classified as a long-term liability, net of issuance costs of $19.5 million, on the condensed consolidated balance sheets. As of September 30, 2023, the net carrying amount of the Notes approximates fair value as the Notes were issued on August 15, 2023. Interest expense recognized related to the Notes for each of the three and nine months ended September 30, 2023 was $1.4 million. The Notes were issued at par and costs associated with

the issuance of the Notes are amortized to interest expense over the contractual term of the Notes. As of September 30, 2023, the effective interest rate of the Notes was 1.5%.

Capped Call Transactions

On August 10, 2023, in connection with the pricing of the Notes and the initial purchasers' exercise of their option to purchase additional Notes, the Company entered into privately negotiated capped call transactions ("Capped Call Transactions"). The Capped Call Transactions initially covered, subject to customary anti-dilution adjustments, the number of shares of common stock that underlie the Notes. The cap price of the Capped Call Transactions was initially $444.70 per share, which represents a premium of 100% over the last reported sale price of the Company's common stock of $222.35 per share on August 10, 2023, and is subject to certain adjustments under the terms of the Capped Call Transactions. The Company used approximately $96.4 million of the proceeds from the offering of Notes to pay the cost of the Capped Call Transactions.

The Company evaluated the Capped Call Transactions and determined that they should be accounted for separately from the Notes. The cost of $96.4 million to purchase the Capped Call Transactions was recorded as a reduction to additional paid-in capital in the condensed consolidated balance sheet as of September 30, 2023 as the Capped Call Transactions are indexed to the Company's own stock and met the criteria to be classified in stockholders' equity.

11. Stock-Based Compensation

Total stock-based compensation was as follows:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2023	2022	2023	2022
	(in thousands)		(in thousands)	
Cost of product revenue	$ 1,321	$ 388	$ 3,649	$ 1,559
Research and development	4,559	2,695	12,230	7,409
Sales and marketing	7,117	4,901	20,176	13,241
General and administrative	5,413	3,748	15,368	10,038
Total stock-based compensation	$ 18,410	$ 11,732	$ 51,423	$ 32,247

Stock-based compensation of $0.1 million and $0.7 million was capitalized into inventory for the three months ended September 30, 2023 and 2022, respectively. Stock-based compensation of $0.4 million and $1.5 million was capitalized into inventory for the nine months ended September 30, 2023 and 2022, respectively. Stock-based compensation capitalized into inventory is recognized as cost of product revenue when the related product is sold.

2009 Equity Incentive Plan and 2019 Equity Incentive Plan

On June 17, 2009, the Company adopted the 2009 Equity Incentive Plan (the "2009 Plan") under which the Company's Board of Directors (the "Board") had the authority to issue stock options to employees, directors and consultants.

In February 2019, the Company adopted the 2019 Equity Incentive Plan (the "2019 Plan"), which became effective in connection with the Company's initial public offering (the "IPO"). As a result, effective as of March 6, 2019, the Company may not grant any additional awards under the 2009 Plan. The 2009 Plan will continue to govern outstanding equity awards granted thereunder. The Company initially reserved 2,000,430 shares of common stock for the issuance of a variety of awards under the 2019 Plan, including stock options, stock appreciation rights, awards of restricted stock and awards of restricted stock units ("RSUs"). In addition, the number of shares of common stock reserved for issuance under the 2019 Plan will automatically increase on the first day of January for a period of up to ten years, which commenced on January 1, 2020, in an amount equal to 3% of the total number of shares of the Company's capital stock outstanding on the last day of the preceding year, or a lesser number of shares determined by the Board. As of September 30, 2023, there were 3,617,756 shares available for issuance under the 2019 Plan.

Stock Options

Option activity under the 2009 Plan and 2019 Plan is set forth below:

	Number of Shares	Weighted-Average Exercise Price Per Share	Weighted-Average Remaining Term	Aggregate Intrinsic Value
			(in years)	(in thousands)
Balance, December 31, 2022	1,122,009	$ 5.87	4.60	$ 224,115
Options exercised	(191,956)	6.15		
Options cancelled	(6,133)	2.41		
Balance, September 30, 2023	923,920	$ 5.83	3.86	$ 213,029
Vested and exercisable, September 30, 2023	923,920	$ 5.83	3.86	$ 213,029
Vested and expected to vest, September 30, 2023	923,920	$ 5.83	3.86	$ 213,029

Restricted Stock Units

RSUs are share awards that entitle the holder to receive freely tradable shares of the Company's common stock upon vesting. RSUs cannot be transferred and the awards are subject to forfeiture if the holder's employment terminates prior to the release of the vesting restrictions. RSUs generally vest over a four-year period with straight-line quarterly vesting with a one year cliff or straight-line annual vesting, provided the employee remains continuously employed with the Company. The fair value of RSUs is equal to the closing price of the Company's common stock on the grant date.

In February 2022 and 2023, the Company granted performance-based restricted stock units ("PRSUs") to certain key executives. The vesting of these PRSUs is dependent on the achievement of certain performance targets related to the Company's compound annual growth rate of revenue over a two or three year performance period, provided the executives remain employed with the Company at the time of vesting. The number of PRSUs that vest will vary from 0% to 200% of the target which will be determined based on the level of performance attained for each performance period. The fair value of these PRSUs is equal to the closing price of the Company's common stock on the grant date. Compensation cost for PRSUs is recognized over the requisite service period based on the expected achievement of performance targets.

RSU and PRSU activity under the 2019 Plan is set forth below. Grant activity for all PRSUs is disclosed at target (100%):

	Restricted Stock Units		Performance-Based Restricted Stock Units	
	Number of Shares	Weighted-Average Grant Date Fair Value Per Share	Number of Shares	Weighted-Average Grant Date Fair Value Per Share
Balance, December 31, 2022	1,125,991	$ 127.39	38,797	$ 165.74
RSUs and PRSUs granted	489,260	217.33	29,473	191.36
RSUs and PRSUs forfeited	(68,149)	161.93	(713)	265.17
RSUs and PRSUs vested	(416,063)	110.39	(210)	266.73
Balance, September 30, 2023	1,131,039	170.46	67,347	175.58

Employee Stock Purchase Plan

In February 2019, the Company adopted the 2019 Employee Stock Purchase Plan ("ESPP"), which became effective in connection with the IPO on March 6, 2019. The Company initially reserved 300,650 shares of common stock for purchase under the ESPP. Each offering under the ESPP to Company employees to purchase stock under the ESPP begins on each September 1 and March 1 and ends on the following February 28 or 29 and August 31, respectively. On each purchase date, which falls on the last date of each offering period, ESPP participants will purchase shares of common stock at a price per share equal to 85% of the lesser of (1) the fair market value per share of the common stock on the offering date or (2) the fair market value of the common stock on the purchase date. The occurrence and duration of offering periods under the ESPP are subject to the determinations of the Company's Compensation Committee of the Board, in its sole discretion.

The fair value of the ESPP shares is estimated using the Black-Scholes option pricing model. The Company recorded $0.6 million and $0.8 million of stock-based compensation expense related to the ESPP for the three months ended September 30, 2023 and 2022, respectively. The Company recorded $2.5 million and $1.6 million of stock-based compensation expense related to the ESPP for the nine months ended September 30, 2023 and 2022, respectively. At September 30, 2023, a total of 1,521,021 shares were available for issuance under the ESPP.

12. Net Income Per Share

Basic net income per share is calculated by dividing net income by the weighted-average number of shares of common stock outstanding for the period, without consideration of potential dilutive shares of common stock. Diluted net income per share attributable to the Company's stockholders is calculated based on the weighted-average number of shares of its common stock and other dilutive securities outstanding.

Potentially dilutive common shares from employee equity incentive plans are determined by applying the treasury stock method to the assumed exercise of outstanding stock options and the assumed vesting of outstanding RSUs. Prior to conversion of the Company's convertible debt, the Company will include, in the diluted net income per common share calculation, the effect of the additional shares that may be issued when the Company's common stock price exceeds the conversion price using the if-converted method. The Company's convertible debt has no impact on diluted net income per

common share unless the average price of the Company's common stock exceeds the conversion price because the Company is required to settle the principal amount of the convertible debt in cash upon conversion.

The components of basic and diluted net income per share were as follows (in thousands, except share and per share amounts):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2023	2022	2023	2022
Numerator:				
Net income	$ 34,986	$ 35,003	$ 102,973	$ 75,085
Denominator:				
Basic:				
Weighted average number of common shares outstanding - basic	36,797,072	36,003,931	36,630,575	35,807,264
Diluted:				
Weighted average number of common shares outstanding - basic	36,797,072	36,003,931	36,630,575	35,807,264
Dilutive effect of outstanding common stock options	934,847	1,250,350	988,941	1,348,908
Dilutive effect of restricted stock units	460,615	690,128	560,371	655,016
Dilutive effect of common stock pursuant to employee stock purchase plan	4,246	3,640	4,412	1,919
Weighted average number of common shares outstanding - diluted	38,196,780	37,948,049	38,184,299	37,813,107
Net income per share:				
Basic	$ 0.95	$ 0.97	$ 2.81	$ 2.10
Diluted	$ 0.92	$ 0.92	$ 2.70	$ 1.99

All restricted shares, employee stock purchase plan options, and capped call options for the three and nine months ended September 30, 2023 and 2022 have been excluded from the calculation of the diluted net income per share, because all such securities are anti-dilutive for all periods presented. The total number of potential shares excluded from the calculation of diluted net income per share are as follows:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2023	2022	2023	2022
Restricted stock units	115,361	17,318	96,548	5,966
Employee stock purchase plan	—	3,806	—	1,100
Capped call options	333,409	—	333,409	—
Total	448,770	21,124	429,957	7,066

13. Revenue

The following table represents the Company's product revenue based on product line:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2023	2022	2023	2022
	(in thousands)		(in thousands)	
Coronary	$ 136,325	$ 93,043	$ 375,977	$ 251,208
Peripheral	47,835	37,045	146,227	91,783
Reducer	1,288	—	2,519	—
Other	572	1,242	2,528	2,716
Product revenue	$ 186,020	$ 131,330	$ 527,251	$ 345,707

Coronary product revenue encompasses sales of the Company's C^2 catheter and C^{2+} catheter. Peripheral product revenue encompasses sales of the Company's M^5 catheter, M^{5+} catheter, S^4 catheter, and L^6 catheter. Reducer revenue encompasses sales of the Company's Reducer product, which was acquired through the Neovasc acquisition. Other product revenue encompasses sales of the Company's generators and related accessories.

The following table represents the Company's product revenue based on the location to which the product is shipped:

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2023	2022	2023	2022
	(in thousands)		(in thousands)	
United States	$ 146,899	$ 110,502	$ 423,463	$ 289,117
Europe	19,352	11,762	54,501	37,223
All other countries	19,769	9,066	49,287	19,367
Product revenue	$ 186,020	$ 131,330	$ 527,251	$ 345,707

14. Equity Method Investments

Genesis Shockwave Private Limited

On March 19, 2021, the Company entered into the Joint Venture Deed (or "JV Agreement") with Genesis MedTech International Private Limited ("Genesis") to establish a long-term strategic partnership to develop, manufacture and commercialize certain of the Company's interventional products in the People's Republic of China, excluding Taiwan and the Special Administrative Regions of Hong Kong and Macau (the "PRC"). Under the JV Agreement, Genesis Shockwave Private Ltd. (the "JV") was formed under the laws of Singapore to serve as a joint venture of Genesis and the Company for the purpose of establishing and managing the strategic partnership.

On the same date, Genesis and the Company entered into a Share Subscription Agreement pursuant to which, among other things, the JV issued (i) 54,900 ordinary shares, which represents 55% of the total equity of the JV, to Genesis in exchange for a cash contribution of $15.0 million, of which 50% was due upon signing and the remaining 50% was due within one year of signing, and (ii) 45,000 ordinary shares, which represents 45% of the total equity of the JV, to the Company as consideration for the Shockwave License Agreement (the "License Agreement"). Under the License Agreement, the Company has agreed to contribute to the JV an exclusive license under certain of the Company's intellectual property rights to develop, manufacture, distribute and commercialize certain products in the PRC and is entitled to receive royalties on the sales of the licensed products in the PRC. Further, the Company entered into a Distribution Agreement, pursuant to which the Company has agreed to sell certain Company-manufactured products to the JV or a PRC subsidiary of the JV for commercialization and distribution in the PRC. In May 2022, the JV obtained

regulatory approval from the China National Medical Products Administration to sell the Company-manufactured Shockwave IVL System with the Company's C^2 catheter, M^5 catheter, and S^4 catheter in the PRC.

The Company has accounted for its investment in the JV under the equity method of accounting. As of September 30, 2023, the carrying value of the Company's investment in the JV was $1.8 million and the Company owned a 45% interest in the entity. During the three and nine months ended September 30, 2023, the Company continued to recognize product revenue on sales to the JV and eliminate a portion of intra-entity profit to the extent the goods have not yet either been consumed by the JV for use in clinical trials, or sold by the JV to an end customer at the end of the reporting period. The profit earned by the Company from the JV for items not yet sold through to an end customer is eliminated through equity method earnings or loss which is recognized in income (loss) from equity method investment.

The Company's product revenue for products sold to the JV during the three and nine months ended September 30, 2023 and related accounts receivable from the JV as of September 30, 2023 were immaterial. Intra-entity profit, which was recorded as a reduction to equity method investment as of and for the three and nine months ended September 30, 2023 was also immaterial.

For the three months ended September 30, 2023 and 2022, the Company recorded a loss from the equity method of $0.7 million and income of $0.1 million, respectively. For the nine months ended September 30, 2023 and 2022, the Company's loss from the equity method was $1.7 million and $1.4 million, respectively.

Upon execution of the License Agreement, on March 19, 2021, the Company received a 45% equity stake in the JV. The Company determined that the JV met the definition of a customer under Topic 606, and that the promised goods and services of the contribution of the license of intellectual property and associated manufacturing technology transfer to the JV were considered to be a single performance obligation. The transaction price of $12.3 million was estimated by reference to the cash value of the shares that were issued at the formation of the JV.

As of September 30, 2023, the associated manufacturing technology transfer to the JV has not yet been completed. The Company maintains a related party contract liability, noncurrent, of $12.3 million for the outstanding performance obligation. The Company will satisfy the outstanding performance obligation upon the completion of training provided by the Company to the JV, and successful regulatory approval for the JV manufactured product from the China National Medical Products Administration.

15. Income Taxes

On a quarterly basis, the Company provides for income taxes based upon an estimated annual effective income tax rate, adjusted for discrete items. The Company recognized income tax expense of $10.1 million and $0.1 million for the three months ended September 30, 2023 and 2022, respectively, representing an effective tax rate of 22.15% and 0.34%, respectively. The Company recognized income tax expense of $15.8 million and $1.1 million for the nine months ended September 30, 2023 and 2022, respectively, representing an effective tax rate of 13.31% and 1.43%, respectively.

The year-over-year increase in tax expense for the three and nine month periods ended September 30, 2023 was primarily due to the valuation allowance on the U.S. federal and other-than-California state deferred tax assets as of September 30, 2023, which was released in the fourth quarter of fiscal year 2022.

For the three months ended September 30, 2023, the effective tax rate differed from the U.S. federal statutory rate primarily due to stock-based compensation for tax purposes. For the three months ended September 30, 2022, the effective tax rate differed from the U.S. federal statutory rate primarily due to the valuation allowance on the U.S. deferred tax assets.

For the nine months ended September 30, 2023, the effective tax rate differed from the U.S. federal statutory rate primarily due to stock-based compensation for tax purposes. For the nine months ended September 30, 2022, the effective

tax rate differed from the U.S. federal statutory rate primarily due to the valuation allowance on the U.S. deferred tax assets.

The Company's effective tax rate may be subject to fluctuation due to several factors, including the Company's ability to accurately predict the pre-tax earnings in the various jurisdictions, valuation allowances against deferred tax assets, the recognition or de-recognition of tax benefits related to uncertain tax positions and the effects of tax law changes.

During the fourth quarter of 2022, the Company determined that the positive evidence overcame any negative evidence, primarily due to the Company's transition from a cumulative loss in recent years to cumulative income in 2022 and concluded that it was more likely than not that the U.S. federal and other-than-California state deferred tax assets were realizable. As a result, the Company released the valuation allowance against all of the U.S. federal deferred tax assets and other-than-California state deferred tax assets during the fourth quarter of fiscal year 2022.

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

You should read the following discussion and analysis of our financial condition and results of operations together with our condensed financial statements and related notes included in this Quarterly Report on Form 10-Q and our audited consolidated financial statements and related notes thereto contained in our Annual Report on Form 10-K for the year ended December 31, 2022, filed with the SEC on February 27, 2023 (the "2022 Annual Report"). Some of the information contained in this discussion and analysis or set forth elsewhere in this Quarterly Report on Form 10-Q, including information with respect to our plans and strategy for our business, includes forward-looking statements that involve risks and uncertainties. As a result of many important factors, including those set forth under "Special Note Regarding Forward-Looking Statements," in the "Risk Factors" section of this Quarterly Report on Form 10-Q and in the "Risk Factors" section of our 2022 Annual Report and our Quarterly Reports on Form 10-Q for the fiscal quarters ended March 31, 2023 and June 30, 2023, our actual results could differ materially from the results described in, or implied, by those forward-looking statements.

Overview

We are a medical device company focused on developing and commercializing novel technologies that transform the care of patients with cardiovascular disease. We aim to establish a new standard of care for medical device treatment of atherosclerotic cardiovascular disease through our differentiated and proprietary local delivery of sonic pressure waves for the treatment of calcified plaque, which we refer to as intravascular lithotripsy ("IVL"). Our IVL system (our "IVL System"), which leverages our IVL technology (our "IVL Technology"), is a minimally invasive, easy-to-use, and safe way to significantly improve outcomes for patients with calcified cardiovascular disease. Additionally, we aim to transform the standard of care for patients suffering from refractory angina with our coronary sinus reducer (the "Reducer") technology, which we recently acquired through our acquisition of Neovasc Inc. ("Neovasc").

We are currently selling the following products in a number of countries around the world where we have applicable regulatory approvals:

Products for the Treatment of Peripheral Artery Disease ("PAD"):

- Our Shockwave M^5 IVL catheter ("M^5 catheter") and Shockwave M^{5+} IVL catheter ("M^{5+} catheter") are five-emitter catheters for use in our IVL System in medium-diameter vessels for the treatment of PAD. The M^5 catheter was CE-marked in the European Union ("CE-Marked") in April 2018 and cleared by the U.S. Food and Drug Administration ("FDA") in July 2018. The M^{5+} catheter was CE-Marked in November 2020 and cleared by the FDA in April 2021. In May 2022, we obtained regulatory approval, through our joint venture with Genesis MedTech International Private Limited ("Genesis"), from the China National Medical Products Administration ("NMPA") to sell our M^5 catheter in the People's Republic of China, excluding Taiwan and the Special Administrative Regions of Hong Kong and Macau (the "PRC").

- Our Shockwave S^4 IVL catheter ("S^4 catheter") is a four-emitter catheter for use in our IVL System in small-diameter vessels for the treatment of PAD. The S^4 catheter was CE-Marked in April 2018. The second version of our S^4 catheter was cleared by the FDA in August 2019 and accepted by our EU notified body in May 2020 for use in our IVL System. In May 2022, we obtained regulatory approval, through our joint venture with Genesis, from the NMPA to sell our S^4 catheter in the PRC.

- Our Shockwave L^6 IVL catheter ("L^6 catheter") is a six-emitter catheter for use in our IVL System in large-diameter vessels for the treatment of PAD. Our L^6 catheter was cleared by the FDA in August 2022. We commenced a U.S. limited market release for our L^6 catheter in the fourth quarter of 2022 followed by a full market release in March 2023.

Products for the Treatment of Coronary Artery Disease ("CAD"):

- Our Shockwave C^2 IVL catheter ("C^2 catheter") and Shockwave C^{2+} IVL catheter ("C^{2+} catheter") are two-emitter catheters for use in our IVL System for the treatment of CAD. The C^2 catheter was CE-Marked in June 2018. We received FDA approval of our C^2 catheter in February 2021. In March 2022, we received regulatory approval in Japan for our C^2 catheter and commenced a limited market release in Japan in May 2022, followed by a full market release in January 2023. In May 2022, we obtained

regulatory approval, through our joint venture with Genesis, from the NMPA to sell our C^2 catheter in the PRC. The C^{2+} catheter was CE-Marked in August 2022 and approved by the FDA in December 2022. We commenced a limited market release for our C^{2+} catheter in select international locations in the fourth quarter of 2022, followed by a full market release in those locations in March 2023. The commercial launch of our C^{2+} catheter in the United States is planned for the fourth quarter of 2023.

Product for the Treatment of Refractory Angina:

- Our Reducer is an hourglass-shaped, balloon-expandable, stainless steel, bare metal device used to treat refractory angina. The Reducer was CE-Marked in November 2011 and is under clinical investigation to support FDA approval in the COSIRA-II trial, which is being conducted in the United States and Canada.

IVL

Our differentiated range of IVL catheters enables delivery of IVL therapy to diseased vasculature throughout the body for calcium modification. Our currently approved IVL catheters resemble a standard balloon angioplasty catheter, the device most commonly used by interventional cardiologists. This familiarity makes our IVL System easy to learn, adopt and use on a day-to-day basis.

Since inception, we have focused on generating clinical data to demonstrate the safety and effectiveness of our IVL Technology. These studies have consistently shown low rates of complications regardless of which vessel was being studied. In addition to supporting our regulatory approvals or clearances, the data from our clinical studies strengthen our ability to drive adoption of our IVL Technology across multiple therapies in existing and new market segments. Our studies have also guided optimal IVL procedure technique and informed the design of our IVL System and future IVL products in development. In addition, we have ongoing clinical programs across several IVL products and indications, which, if successful, could allow us to expand commercialization of our IVL products into new geographies and indications.

The first two indications that our IVL System addresses are PAD, the narrowing or blockage of vessels that carry blood from the heart to the extremities, and CAD, the narrowing or blockage of the arteries that supply blood to the heart. In the future, we see significant opportunity in the potential treatment of cardiac valvular disease, a condition where the heart's valves become increasingly calcified with age, causing them to narrow and obstruct blood flow from the heart, and carotid artery stenosis, a condition where the carotid arteries become calcified and restrict the flow of blood and oxygen to the brain.

We have adapted the use of lithotripsy, which has been used to successfully treat kidney stones (deposits of hardened calcium) for over 30 years, to the cardiovascular field with the aim of creating what we believe is the safest, most effective means of addressing the growing challenge of cardiovascular calcification. By integrating lithotripsy into a device that resembles a standard balloon catheter, physicians can prepare, deliver, and treat calcified lesions using a familiar form factor, without disruption to their standard procedural workflow. Our differentiated IVL System works by delivering shockwaves through the entire depth of the artery wall, modifying both deep wall and thick calcium, not just at the thin, superficial most intimal layer. The shockwaves modify this calcium and enable the narrowed artery to expand at low pressures, thereby minimizing complications inherent to traditional balloon dilations, such as dissections or perforations. Preparing the vessel with IVL facilitates optimal outcomes with other adjacent therapies, including stents and drug-eluting technologies. Using IVL also avoids complications associated with atherectomy devices such as dissection, perforation, and embolism.

Coronary sinus reduction

Our Reducer is a treatment for patients with refractory angina, a painful and debilitating condition that occurs when the coronary vasculature delivers an inadequate supply of blood to the heart muscle, despite treatment with standard revascularization or cardiac drug therapies. A refractory angina patient, by definition, is resistant to other existing interventional cardiology therapies and is not receiving adequate relief from available drug regimens to manage their chest pain, shortness of breath and other debilitating symptoms. The Reducer is initially targeting a patient population with obstructive coronary artery disease that has failed to gain relief of their symptoms, despite other medical treatment options. We believe that further studies may demonstrate that additional patient populations may benefit from treatment with the Reducer which could further increase its market potential.

Our markets

We market our products to hospitals whose interventional cardiologists, vascular surgeons and interventional radiologists treat patients with PAD, CAD and refractory angina. We have dedicated meaningful resources to establish a direct sales capability in the United States, Germany, Austria, Switzerland, France, Ireland, Japan, the United Kingdom, Spain, Portugal and Canada and are working to build out our direct sales teams in Italy. We have complemented our direct sales capabilities with distributors actively selling our products in over 55 countries in North and South America, Europe, the Middle East, Asia, Africa, and Australia/New Zealand. We are continuing to add new U.S. sales territories and are actively expanding our international field presence through new distributors, as well as additional sales and clinical personnel and expanded direct sales territories.

Financial overview

For the three months ended September 30, 2023 and 2022, we generated product revenue of $186.0 million and $131.3 million, respectively, and income from operations of $43.6 million and $36.8 million, respectively. For the three months ended September 30, 2023 and 2022, 21% and 16%, respectively, of our product revenue was generated from customers located outside of the United States.

For the nine months ended September 30, 2023 and 2022, we generated product revenue of $527.3 million and $345.7 million, respectively, and income from operations of $115.8 million and $81.7 million, respectively. For the nine months ended September 30, 2023 and 2022, 20% and 16%, respectively, of our product revenue was generated from customers located outside of the United States.

Although we had net income for the year ended December 31, 2022 and the three and nine months ended September 30, 2023, we may incur net losses in the future, which may vary significantly from period to period. We expect to continue to incur significant expenses as we (i) expand our marketing efforts to increase adoption of our products, (ii) expand existing relationships with our customers, (iii) obtain regulatory clearances or approvals for our planned or future products, (iv) conduct clinical trials on our existing and planned or future products, and (v) develop new products or add new features to our existing products. We will need to continue to generate significant revenue in order to sustain profitability as we continue to grow our business. Even if we achieve profitability for any period, we cannot be sure that we will remain profitable for any substantial period of time.

To date, our principal sources of liquidity have been the net proceeds we received through the private sales of our equity securities, cash provided by our operating activities and proceeds from our debt financings. For the nine months ended September 30, 2023, we generated positive cash flows from operations of $124.4 million. As of September 30, 2023, we had $917.3 million in cash, cash equivalents and short-term investments and retained earnings of $66.2 million.

Convertible Debt

In August 2023, we issued $750.0 million aggregate principal amount of 1.0% convertible senior notes due 2028, or the Notes. In connection with the issuance of the Notes, we paid $96.4 million, including expenses, to enter into privately negotiated capped call transactions with certain initial purchasers of the Notes or their respective affiliates and certain other financial institutions, or capped call transactions. The capped call transactions are expected generally to reduce the potential dilution upon conversion of the Notes in the event that the market price per share of our common stock, as measured under the terms of the capped call transactions, is greater than the strike price of the capped call transactions, which initially corresponds to the conversion price of the Notes, and is subject to anti-dilution adjustments generally similar to those applicable to the conversion rate of the Notes. For additional information regarding the Notes and the capped call transactions, see the section titled “Liquidity and Capital Resources.”

Impact of current global business, political and macroeconomic conditions

Uncertainty in the global business, political and macroeconomic environments presents significant risks to our business. We are subject to continuing risks and uncertainties, including inflation, rising interest rates, uncertainty with respect to the federal budget, instability in the global banking system, volatile market conditions, supply chain disruptions, cybersecurity events, and global events, including regional conflicts around the world. We are closely monitoring the impact of these factors on all aspects of our business, including the impacts on our customers, patients, employees, suppliers, vendors, business partners and distribution channels.

In particular, while we have not experienced material disruptions in our supply chain to date, we have been and continue to be impacted by disruptions in the operations of certain of our third-party suppliers, resulting in increased lead-times, higher component costs and lower allocations for our purchase of some components. In certain cases, we have incurred higher logistical expenses. We are continuing to work closely with our manufacturing partners and suppliers to source key components and maintain appropriate inventory levels to meet customer demand.

The ultimate extent of the impact of global economic conditions on our business remains highly uncertain and will depend on future developments and factors that continue to evolve. Most of these developments and factors are outside of our control and could exist for an extended period of time. As a result, we are subject to continuing risks and uncertainties and continue to closely monitor the impact of the current conditions on our business. For more information regarding these risks and uncertainties, see the section titled "Risk Factors" in our 2022 Annual Report and our Quarterly Reports on Form 10-Q for the fiscal quarters ended March 31, 2023 and June 30, 2023, together with any updates in the section titled "Risk Factors" in this Quarterly Report on Form 10-Q.

Components of Our Results of Operations

Product revenue

Product revenue is primarily from the sale of our IVL catheters.

We sell our products to hospitals, primarily through direct sales representatives, as well as through distributors in selected international markets. For products sold through direct sales representatives, control is transferred upon delivery to customers. For products sold to distributors internationally and products sold to customers that utilize stocking orders, control is transferred upon shipment or delivery to the customer's named location, based on the contractual shipping terms. Additionally, a portion of our revenue is generated through a consignment model under which inventory is maintained at hospitals. For consignment inventory, control is transferred at the time the catheters are consumed in a procedure.

Cost of product revenue

Cost of product revenue consists primarily of the costs of the components for use in our products, the materials and labor that are used to produce our products, the manufacturing overhead that directly supports production and the depreciation relating to the equipment used in our IVL System to the extent that we loan generators to our hospital customers, without charge to facilitate the use of our IVL catheters in their procedures. We depreciate the equipment over a three-year period. We expect costs of product revenue to increase in absolute terms as our revenue grows.

Our gross margin has been and will continue to be affected by a variety of factors, primarily production volumes, the cost of direct materials, product mix, geographic mix, discounting practices, manufacturing costs, product yields, headcount, amortization of acquired developed technology, and cost-reduction strategies. We expect our gross margin percentage to marginally increase over the long term to the extent we are successful in increasing our sales volume and are therefore able to leverage our fixed costs. We intend to use our design, engineering and manufacturing capabilities to further advance and improve the efficiency of our manufacturing processes, which, if successful, we believe will reduce costs and enable us to increase our gross margin percentage. While we expect gross margin percentage to increase over the long term, it will likely fluctuate from quarter to quarter as we continue to introduce new products and adopt new manufacturing processes and technologies.

Research and development expenses

Research and development expenses consist of applicable personnel, consulting, materials, and clinical trial expenses. Research and development expenses include, but are not limited to:

- certain personnel-related expenses, including salaries, benefits, bonus, travel, and stock-based compensation;
- cost of clinical studies to support new products and product enhancements, including expenses for clinical research organizations, and site payments;
- materials and supplies used for internal research and development and clinical activities;

- allocated overhead including facilities and information technology expenses; and
- cost of outside consultants who assist with technology development, regulatory affairs, clinical affairs and quality assurance.

Research and development costs are expensed as incurred. In the future, we expect research and development expenses to increase in absolute dollars as we continue to develop new products, enhance existing products and technologies, and perform activities related to obtaining additional regulatory approvals.

Sales and marketing expenses

Sales and marketing expenses consist of personnel-related expenses, including salaries, benefits, sales commissions, travel, and stock-based compensation. Other sales and marketing expenses consist of marketing and promotional activities, including trade shows and market research. We expect to continue to grow our sales force and increase marketing efforts as we continue commercializing products based on our IVL Technology. As a result, we expect sales and marketing expenses to increase in absolute dollars over the long term.

General and administrative expenses

General and administrative expenses consist of personnel-related expenses, including salaries, benefits, bonus, travel, and stock-based compensation. Other general and administrative expenses consist of professional services fees, including legal, audit and tax fees, insurance costs, outside consultant fees and employee recruiting and training costs. Moreover, we incur expenses associated with operating as a public company, including legal, accounting, insurance, exchange listing and Securities and Exchange Commission ("SEC") compliance and investor relations.

Income (loss) from equity method investment

Income (loss) from equity method investment represents our proportionate share of the underlying income or loss incurred in connection with our joint venture with Genesis. Also included in income (loss) from equity method investment is the portion of intra-entity profit which is eliminated to the extent the goods have not yet either been consumed by the JV for use in clinical trials, or sold through by the JV to an end customer at the end of the reporting period.

Interest expense

Interest expense consists of the interest and amortization expense related to our Credit Agreement and the Notes, as well as the loss on debt extinguishment related to the repayment of the amount drawn under our Credit Agreement.

Other income (expense), net

Other income (expense), net consists of interest earned on our cash equivalents and short-term investments and the net impact of foreign exchange gains and losses.

Income tax provision

Income tax provision consists of income taxes from the U.S. and foreign jurisdictions.

Results of Operations

Comparison of the Three Months Ended September 30, 2023 and 2022

The following table shows our results of operations for the three months ended September 30, 2023 and 2022:

	Three Months Ended September 30,		Change	Change
	2023	2022	$	%
	(in thousands, except percentages)			
Revenue:				
Product revenue	$ 186,020	$ 131,330	$ 54,690	42%
Cost of revenue:				
Cost of product revenue	24,513	17,874	6,639	37%
Gross profit	161,507	113,456	48,051	42%
Operating expenses:				
Research and development	39,526	20,177	19,349	96%
Sales and marketing	56,907	42,082	14,825	35%
General and administrative	21,451	14,434	7,017	49%
Total operating expenses	117,884	76,693	41,191	54%
Income from operations	43,623	36,763	6,860	19%
(Loss) income from equity method investment	(733)	97	(830)	(856)%
Interest expense	(2,509)	(316)	(2,193)	694%
Other income (expense), net	4,699	(1,423)	6,122	(430)%
Net income before taxes	45,080	35,121	9,959	28%
Income tax provision	10,094	118	9,976	*
Net income	$ 34,986	$ 35,003	$ (17)	—%

* Not meaningful.

Product revenue

Product revenue increased by $54.7 million, or 42%, from $131.3 million during the three months ended September 30, 2022 to $186.0 million during the three months ended September 30, 2023.

The following table represents our product revenue based on product line:

	Three Months Ended September 30,		Change	Change
	2023	2022	$	%
	(in thousands, except percentages)			
Coronary	$ 136,325	$ 93,043	$ 43,282	47%
Peripheral	47,835	37,045	10,790	29%
Reducer	1,288	—	1,288	100%
Other	572	1,242	(670)	(54)%
Product revenue	$ 186,020	$ 131,330	$ 54,690	42%

Coronary product revenue increased by $43.3 million, or 47%, from $93.0 million for the three months ended September 30, 2022 to $136.3 million for the three months ended September 30, 2023. The increase in coronary product revenue was due an increase in the purchase volume of our C^2 catheters and C^{2+} catheters in the United States and increased adoption of our products internationally.

Peripheral product revenue increased by $10.8 million, or 29%, from $37.0 million for the three months ended September 30, 2022 to $47.8 million for the three months ended September 30, 2023 which was due to an increase in the purchase volume of our M^{5+} catheter, S^4 catheter, and L^6 catheter within the United States and internationally driven by increased adoption of our products.

Revenue from our Reducer product, which was acquired through the Neovasc acquisition, was $1.3 million for the three months ended September 30, 2023.

We sold to a greater number of customers in the United States and to a greater number of distributors internationally in the three months ended September 30, 2023 as compared to the three months ended September 30, 2022. Product revenue, classified by the major geographic areas into which our products are shipped, was $146.9 million, or 79%, within the United States and $39.1 million, or 21%, for all other countries in the three months ended September 30, 2023, compared to $110.5 million, or 84%, within the United States and $20.8 million, or 16%, for all other countries in the three months ended September 30, 2022.

Cost of product revenue, gross profit and gross margin percentage

Cost of product revenue increased by $6.6 million, or 37%, from $17.9 million during the three months ended September 30, 2022 to $24.5 million during the three months ended September 30, 2023. The increase was driven by higher product sales volume compared to the prior year.

Gross margin percentage improved to 87% for the three months ended September 30, 2023, compared to 86% for the three months ended September 30, 2022. This change in gross margin percentage was primarily due to increased sales of our IVL catheters, improvements to productivity, and process efficiencies.

Research and development expenses

The following table summarizes our research and development expenses incurred during the periods presented:

	Three Months Ended September 30,		Change	Change
	2023	2022	$	%
	(in thousands)			
Facilities and other allocated costs	$ 8,464	$ 2,418	$ 6,046	250%
Compensation and personnel-related costs	18,090	12,581	5,509	44%
Clinical-related costs	6,259	1,907	4,352	228%
Other research and development costs	2,607	429	2,178	508%
Outside consultants	1,553	850	703	83%
Materials and supplies	2,553	1,992	561	28%
Total research and development expenses	$ 39,526	$ 20,177	$ 19,349	96%

Research and development expenses increased by $19.3 million, or 96%, from $20.2 million during the three months ended September 30, 2022 to $39.5 million during the three months ended September 30, 2023. The increase was primarily due to a $6.0 million increase in facilities and other allocated costs due to increased information technology, rent and building expenditures, a $5.5 million increase in compensation and personnel-related costs due to an increase in headcount, an increase in clinical-related costs of $4.4 million, a $2.1 million increase in other research and development costs, a $0.7 million increase in outside consultants, and a $0.6 million increase in materials and supplies. Included in other research and development costs are $1.8 million in software license expenses related to research and development.

Sales and marketing expenses

Sales and marketing expenses increased by $14.8 million, or 35%, from $42.1 million during the three months ended September 30, 2022 to $56.9 million during the three months ended September 30, 2023. The change was primarily due to a $9.0 million increase in compensation and personnel-related costs, resulting from increased headcount and commissions driven by increased sales of our products. There was also a $2.6 million increase in travel related costs, a $1.8 million increase in facilities and other allocated costs, a $0.4 million increase in professional services and consulting costs, a $0.4 million increase in materials and supplies, a $0.3 million increase in general corporate costs, a $0.2 million increase in marketing and promotional costs, and a $0.1 million increase in recruiting and training costs.

General and administrative expenses

General and administrative expenses increased by $7.0 million, or 49%, from $14.4 million during the three months ended September 30, 2022 to $21.5 million during the three months ended September 30, 2023. The change was primarily due to a $3.3 million increase in compensation and personnel-related costs, a $2.1 million increase in professional services and consulting costs, a $0.8 million increase in general corporate costs, a $0.3 million increase in facilities and other allocated costs due to increased information technology, rent and building expenditures, a $0.3 million increase in travel related costs, and $0.2 million in recruiting and training related costs.

(Loss) income from equity method investment

Income (loss) from equity method investment decreased by $0.8 million, or 856%, from income of $0.1 million during the three months ended September 30, 2022 to loss of $0.7 million during the three months ended September 30, 2023 due to a decrease in the movement of the elimination of intra-entity profit for goods sold by us to the JV that have not yet been sold through by the JV to an end customer at the end of the reporting period, and increased sales by the JV to end customers following the NMPA approval of products in the PRC.

Interest expense

Interest expense increased by $2.2 million, or 694%, from $0.3 million during the three months ended September 30, 2022 to $2.5 million during the three months ended September 30, 2023. The increase in interest expense was related to the $25 million drawn under the Credit Agreement in October 2022 until its repayment in August 2023 and the convertible debt from the private offering in August 2023, as well as the loss on debt extinguishment of $0.7 million related to the repayment of the amount drawn under our Credit Agreement.

Other income (expense), net

Other income (expense), net increased by $6.1 million, or 430%, from $1.4 million in other expense during the three months ended September 30, 2022 to $4.7 million in other income, net during the three months ended September 30, 2023. The increase in other income, net was primarily due to an increase in interest income from increased interest rates, partially offset by an increase in foreign exchange losses.

Income tax provision

Income tax provision of $10.1 million for the three months ended September 30, 2023 primarily consisted of U.S. (federal and state) and foreign income taxes. The income tax expense for the three months ended September 30, 2023 reflected the impact of a change in U.S. tax law, effective January 1, 2022, which requires the capitalization and amortization of research and experimental expenditures incurred after December 31, 2022. Income tax provision of $0.1 million for the three months ended September 30, 2022 primarily consisted of U.S. (federal and state) and foreign income taxes.

Comparison of the Nine Months Ended September 30, 2023 and 2022

The following table shows our results of operations for the nine months ended September 30, 2023 and 2022:

	Nine Months Ended September 30,		Change	Change
	2023	2022	$	%
	(in thousands, except percentages)			
Revenue:				
Product revenue	$ 527,251	$ 345,707	$ 181,544	53%
Cost of revenue:				
Cost of product revenue	70,072	47,494	22,578	48%
Gross profit	457,179	298,213	158,966	53%
Operating expenses:				
Research and development	103,326	57,956	45,370	78%
Sales and marketing	167,656	118,558	49,098	41%
General and administrative	70,386	39,988	30,398	76%
Total operating expenses	341,368	216,502	124,866	58%
Income from operations	115,811	81,711	34,100	42%
Loss from equity method investment	(1,702)	(1,414)	(288)	20%
Interest expense	(3,955)	(917)	(3,038)	331%
Other income (expense), net	8,667	(3,206)	11,873	(370)%
Net income before taxes	118,821	76,174	42,647	56%
Income tax provision	15,848	1,089	14,759	*
Net income	$ 102,973	$ 75,085	$ 27,888	37%

* Not meaningful.

Product revenue

Product revenue increased by $181.5 million, or 53%, from $345.7 million during the nine months ended September 30, 2022 to $527.3 million during the nine months ended September 30, 2023.

The following table represents our product revenue based on product line:

	Nine Months Ended September 30,		Change	Change
	2023	2022	$	%
	(in thousands, except percentages)			
Coronary	$ 375,977	$ 251,208	$ 124,769	50%
Peripheral	146,227	91,783	54,444	59%
Reducer	2,519	—	2,519	100%
Other	2,528	2,716	(188)	(7)%
Product revenue	$ 527,251	$ 345,707	$ 181,544	53%

Coronary product revenue increased by $124.8 million, or 50%, from $251.2 million for the nine months ended September 30, 2022 to $376.0 million for the nine months ended September 30, 2023. The increase in coronary product revenue was due to an increase in the purchase volume of our C^2 catheters and C^{2+} catheters in the United States and increased adoption of our products internationally.

Peripheral product revenue increased by $54.4 million, or 59%, from $91.8 million for the nine months ended September 30, 2022 to $146.2 million for the nine months ended September 30, 2023, which was due to an increase in the purchase volume of our M[5+] catheter, S[4] catheter, and L[6] catheter within the United States and internationally driven by increased adoption of our products.

Revenue from our Reducer product, which was acquired through the Neovasc acquisition was $2.5 million for the nine months ended September 30, 2023.

We sold to a greater number of customers in the United States and to a greater number of distributors internationally in the nine months ended September 30, 2023 as compared to the nine months ended September 30, 2022. Product revenue, classified by the major geographic areas into which our products are shipped, was $423.5 million, or 80%, within the United States and $103.8 million, or 20%, for all other countries in the nine months ended September 30, 2023, compared to $289.1 million, or 84%, within the United States and $56.6 million, or 16%, for all other countries in the nine months ended September 30, 2022.

Cost of product revenue, gross profit and gross margin percentage

Cost of product revenue increased by $22.6 million, or 48%, from $47.5 million during the nine months ended September 30, 2022 to $70.1 million during the nine months ended September 30, 2023. The increase was driven by higher product sales volume compared to the prior year.

Gross margin percentage improved to 87% for the nine months ended September 30, 2023, compared to 86% for the nine months ended September 30, 2022. This change in gross margin percentage was primarily due to increased sales of our IVL catheters, improvements to productivity, and process efficiencies.

Research and development expenses

The following table summarizes our research and development expenses incurred during the periods presented:

	Nine Months Ended September 30,		Change $	Change %
	2023	2022		
	(in thousands)			
Compensation and personnel-related costs	$ 49,908	$ 34,774	$ 15,134	44%
Facilities and other allocated costs	21,314	6,718	14,596	217%
Clinical-related costs	14,183	6,609	7,574	115%
Other research and development costs	5,007	1,319	3,688	280%
Materials and supplies	8,353	5,906	2,447	41%
Outside consultants	4,561	2,630	1,931	73%
Total research and development expenses	$ 103,326	$ 57,956	$ 45,370	78%

Research and development expenses increased by $45.4 million, or 78%, from $58.0 million during the nine months ended September 30, 2022 to $103.3 million during the nine months ended September 30, 2023. The change was primarily due to a $15.1 million increase in compensation and personnel-related costs due to an increase in headcount, a $14.6 million increase in facilities and other allocated costs due to increased information technology, rent and building expenditures, an increase in clinical-related costs of $7.6 million, a $3.7 million increase in other research and development costs, a $2.5 million increase in materials and supplies, and a $1.9 million increase in outside consultants. Included in other research and development costs are $3.0 million in software license expenses related to research and development.

Sales and marketing expenses

Sales and marketing expenses increased by $49.1 million, or 41%, from $118.6 million during the nine months ended September 30, 2022 to $167.7 million during the nine months ended September 30, 2023. The change was primarily due to a $28.1 million increase in compensation and personnel-related costs, resulting from increased headcount and commissions driven by increased sales of our products. There was also a $9.0 million increase in travel related costs, a $4.7 million increase in facilities and other allocated costs, a $2.9 million increase in marketing and promotional costs, a $1.7 million

increase in professional services and consulting costs, a $1.4 million increase in materials and supplies, a $0.7 million increase in general corporate costs, and a $0.6 million increase in recruiting and training costs.

General and administrative expenses

General and administrative expenses increased by $30.4 million, or 76%, from $40.0 million during the nine months ended September 30, 2022 to $70.4 million during the nine months ended September 30, 2023. The change was primarily due to a $14.1 million increase in compensation and personnel-related costs, a $12.2 million increase in professional services and consulting costs, a $2.4 million increase in general corporate costs, a $1.0 million increase in facilities and other allocated costs, and a $0.7 million increase in travel related costs.

Loss from equity method investment

Loss from equity method investment increased by $0.3 million or 20%, from $1.4 million during the nine months ended September 30, 2022 to $1.7 million during the nine months ended September 30, 2023 due to the elimination of intra-entity profit for goods sold by us to the JV that have not yet been sold through by the JV to an end customer at the end of the reporting period, and increased sales by the JV to end customers following the NMPA approval of products in the PRC.

Interest expense

Interest expense increased by $3.0 million, or 331%, from $0.9 million during the nine months ended September 30, 2022 to $4.0 million during the nine months ended September 30, 2023. The increase in interest expense was related to the $80.0 million drawn under the Credit Agreement in March 2023 until its repayment in April 2023, the $25 million drawn under the Credit Agreement in October 2022 until its repayment in August 2023, which resulted in a loss on debt extinguishment of $0.7 million, and the convertible debt issued in the private offering in August 2023.

Other income (expense), net

Other income (expense), net increased by $11.9 million, or 370%, from $3.2 million in other expense during the nine months ended September 30, 2022 to $8.7 million in other income, net during the nine months ended September 30, 2023. The increase in other income, net was primarily due to an increase in interest income from increased interest rates, partially offset by an increase in foreign exchange losses.

Income tax provision

Income tax provision of $15.8 million for the nine months ended September 30, 2023 primarily consisted of U.S. (federal and state) and foreign income taxes. The income tax expense for the nine months ended September 30, 2023 reflected the impact of a change in U.S. tax law, effective January 1, 2022, which requires the capitalization and amortization of research and experimental expenditures incurred after December 31, 2022. Income tax provision of $1.1 million for the nine months ended September 30, 2022 primarily consisted of U.S (federal and state) income taxes.

Liquidity and Capital Resources

To date, our principal sources of liquidity have been the net proceeds of $750.0 million that we received through our convertible debt issuance, $280.0 million that we received through the sale of our common stock in our public offerings, $10.0 million from private sales of our equity securities, cash provided by our operating activities, and access to funds under our Credit Agreement (as defined below).

On October 19, 2022, we entered into the Credit Agreement with Wells Fargo Bank, National Association, as administrative agent, Wells Fargo Bank, National Association, as swingline lender and an issuing lender, Wells Fargo Securities, LLC and Silicon Valley Bank, as joint lead arrangers and joint bookrunners, Silicon Valley Bank, as syndication agent, and the several lenders party thereto (the “Credit Agreement”). The Credit Agreement provides for a revolving credit facility in an aggregate principal amount of $175 million with the right to request increases to the revolving commitments (subject to certain conditions) of up to the greater of (x) $100 million or (y) our consolidated EBITDA for the four fiscal quarter period most recently ended prior to the date of such increase.

Concurrent with entering into the Credit Agreement, we drew down $25.0 million and prepaid in full all outstanding amounts and related expenses under our previous credit agreement with Silicon Valley Bank, totaling $14.6 million, and terminated the credit facility thereunder. We repaid the $25.0 million drawn under the Credit Agreement on August 29, 2023.

On March 16, 2023, we drew down an additional $80.0 million under the Credit Agreement. We repaid the $80.0 million drawn under the Credit Agreement on April 26, 2023.

On August 15, 2023, we issued $750.0 million aggregate principal amount of our 1.0% convertible senior notes due 2028 (the "Notes"). The Notes mature on August 15, 2028 unless repurchased, redeemed, or converted in accordance with their terms prior to such date. The Notes were not convertible as of September 30, 2023. On August 10, 2023, in connection with the pricing of the Notes and the initial purchasers' exercise of their option to purchase additional Notes, we entered into privately negotiated capped call transactions ("Capped Call Transactions") for a cost of $96.4 million.

We have a number of ongoing clinical trials and expect to continue to make substantial investments in these trials as well as additional clinical trials designed to provide clinical evidence of the safety and efficacy of our existing products. We intend to continue to make significant investments in our sales and marketing organization by increasing the number of U.S. sales representatives and expanding our international marketing programs to help facilitate further adoption among existing hospital accounts and physicians as well as broaden awareness of our products to new hospitals. We also expect to continue to make investments in research and development, regulatory affairs, and clinical studies to develop future generations of products based on our IVL Technology, support regulatory submissions, and demonstrate the clinical efficacy of our products. Moreover, we expect to continue to incur expenses associated with operating as a public company, including legal, accounting, insurance, exchange listing and SEC compliance, investor relations and other expenses. Because of these and other factors, although we had net income and generated cash flows from operations for the nine months ended September 30, 2023 and for the year ended December 31, 2022, we may incur net losses and have negative cash flows from operations in the future.

As of September 30, 2023, we had $917.3 million in cash, cash equivalents and short-term investments and retained earnings of $66.2 million.

In the short term, we believe that our cash, cash equivalents and short-term investments will be sufficient for at least the next 12 months to meet our requirements and plans for cash, including supporting working capital, capital expenditure requirements, investments, acquisitions or repayments of indebtedness. In the long term, our ability to support our working capital and capital expenditure requirements will depend on many factors, including:

- the cost, timing and results of our clinical trials and regulatory reviews;
- the cost of our research and development activities for new and modified products;
- the cost and timing of establishing sales, marketing and distribution capabilities;
- the terms and timing of any other collaborative, licensing and other arrangements that we may establish including any contract manufacturing arrangements;
- the timing, receipt and amount of sales from our current and potential products;
- the degree of success we experience in commercializing our products;
- the emergence of competing or complementary technologies;
- the impact of global business, political and macroeconomic conditions, including inflation, rising interest rates, uncertainty with respect to the federal budget, instability in the global banking system, volatile market conditions, supply chain disruptions, cybersecurity events, and global events, including regional conflicts around the world;
- the cost of preparing, filing, prosecuting, maintaining, defending and enforcing any patent claims and other intellectual property rights; and

- the extent to which we acquire or invest in businesses, products or technologies, although we currently have no commitments or agreements relating to any of these types of transactions.

To the extent that current and anticipated future sources of liquidity are insufficient to fund our future business activities and cash and other requirements, we may be required to seek additional equity or debt financing. The sale of additional equity would result in additional dilution to our stockholders. The incurrence of additional debt financing would result in debt service obligations and the instruments governing such debt could provide for operating and financing covenants that would restrict our operations. In the event that additional financing is required from outside sources, there is a possibility we may not be able to raise it on terms acceptable to us or at all. Further, the current macroeconomic environment may make it difficult for us to raise capital on terms favorable to us or at all. If we are unable to raise additional capital when desired, our business, operating results, and financial condition could be adversely affected.

Our material cash requirements include the following contractual and other obligations:

Debt, Principal, and Interest

As of September 30, 2023, our debt, principal and interest commitments consist of our debt obligations under the Credit Agreement and the Notes.

As discussed above, on October 19, 2022, we entered into the Credit Agreement, which provides for a revolving credit facility in an aggregate principal amount of $175 million with the right to request increases to the revolving commitments (subject to certain conditions) of up to the greater of (x) $100 million or (y) our consolidated EBITDA for the four fiscal quarter period most recently ended prior to the date of such increase.

Concurrent with entering into the Credit Agreement, we drew down $25.0 million and prepaid in full all outstanding amounts and related expenses under our previous credit agreement with Silicon Valley Bank, totaling $14.6 million, and terminated the credit facility thereunder. We repaid the $25.0 million drawn under the Credit Agreement on August 29, 2023.

On March 16, 2023, we drew down an additional $80.0 million under the Credit Agreement. We repaid the $80.0 million drawn under the Credit Agreement on April 26, 2023.

The Credit Agreement is secured by substantially all of our assets, excluding intellectual property and certain other assets. The Credit Agreement is subject to customary affirmative and restrictive covenants, including with respect to our ability to enter into fundamental transactions, incur additional indebtedness, grant liens, and pay any dividend or make any distributions to stockholders.

As of September 30, 2023, there were no outstanding borrowings under the Credit Agreement.

As discussed above, on August 15, 2023, we issued $750.0 million aggregate principal amount of the Notes and on August 10, 2023 we entered into the Capped Call Transactions for a cost of $96.4 million. The net proceeds from the issuance of the Notes and the Capped Call Transactions are discussed further in Note 10 “Convertible Debt”. The Notes mature on August 15, 2028 unless repurchased, redeemed, or converted in accordance with their terms prior to such date. The Notes were not convertible as of September 30, 2023.

Manufacturing Purchase Obligations

We have engaged certain contract manufacturers to produce and supply us with certain products. We have fixed commitments of approximately $14.9 million within the next twelve months.

Operating Leases

Our operating lease commitments mostly consist of our lease obligations for our Santa Clara headquarter office spaces, leased facilities for Neovasc, and leased facilities for laboratory and manufacturing space. Our total operating lease commitments as of September 30, 2023 are approximately $48.9 million, of which $5.5 million is expected to be paid within the next twelve months.

Contingent Consideration Liabilities Related to Business Combination

Acquisition related contingent consideration liabilities consist of estimated amounts in relation to a contingent value right entitling certain holders of Neovasc common stock and eligible equity awards to receive an additional cash payment of up to $12.00 per share or per share underlying an eligible equity award contingent on the attainment of a milestone. The milestone is defined as the grant by the FDA's final approval of the Reducer premarket approval application regarding its treatment of angina. As of September 30, 2023, the total fair value of the contingent consideration liabilities was $9.3 million.

There were no other material changes during the three and nine months ended September 30, 2023 to our contractual obligations as compared to those disclosed in "Management's Discussion and Analysis of Financial Condition and Results of Operations" included in our 2022 Annual Report.

We did not have during the periods presented, and we do not currently have, any commitments or obligations, including contingent obligations, arising from arrangements with unconsolidated entities or persons that have or are reasonably likely to have a material current or future effect on our financial condition, changes in financial condition, revenues or expenses, results of operations, liquidity, cash requirements or capital resources.

Cash Flows

The following table summarizes our cash flows for the periods indicated:

	Nine Months Ended September 30,	
	2023	**2022**
Net cash provided by (used in):	**(in thousands)**	
Operating activities	$ 124,350	$ 65,296
Investing activities	(383,465)	(26,874)
Financing activities	600,565	3,403
Effect of exchange rate changes on cash and cash equivalents	(303)	(2,755)
Net increase in cash, cash equivalents and restricted cash	$ 341,147	$ 39,070

Operating activities

During the nine months ended September 30, 2023, cash provided by operating activities was $124.4 million, attributable to a net income of $103.0 million and non-cash charges of $70.5 million, partially offset by a net change in our net operating assets and liabilities of $49.1 million. Non-cash charges of $70.5 million primarily consisted of $51.4 million in stock-based compensation, $7.3 million in depreciation and amortization, $2.4 million in non-cash lease expense, and the loss on debt extinguishment of $0.7 million. The change in our net operating assets and liabilities of $49.1 million was primarily due to a $26.1 million increase in accounts receivable due to an increase in sales, and a $20.6 million increase in inventory driven by an increase in raw materials, work in progress, and finished goods inventory. These changes were partially offset by a $11.3 million increase in accrued and other current liabilities.

During the nine months ended September 30, 2022, cash provided by operating activities was $65.3 million, attributable to a net income of $75.1 million and non-cash charges of $42.9 million, partially offset by a net change in our net operating assets and liabilities of $52.7 million. Non-cash charges of $42.9 million primarily consisted of $32.2 million in stock-based compensation, $3.3 million in depreciation and amortization, and $2.3 million in non-cash lease expense. The change in our net operating assets and liabilities of $52.7 million was primarily due to a $27.1 million increase in accounts receivable due to an increase in sales, and a $24.4 million increase in inventory driven by an increase in raw materials and finished goods inventory. These changes were partially offset by a $4.4 million increase in accrued and other current liabilities.

Investing activities

During the nine months ended September 30, 2023, cash used in investing activities was $383.5 million, attributable to the Neovasc business combination, net of cash acquired in the amount of $94.5 million, purchases of available-for-sale investments of $398.3 million, and purchases of property and equipment of $22.5 million, partially offset by proceeds from maturities of available-for-sale investments of $131.8 million.

During the nine months ended September 30, 2022, cash used in investing activities was $26.9 million, attributable to purchases of available-for-sale investments of $85.3 million and purchases of property and equipment of $14.0 million, partially offset by proceeds from maturities of available-for-sale investments of $72.4 million.

Financing activities

During the nine months ended September 30, 2023, cash provided by financing activities was $600.6 million, attributable to $730.8 million in proceeds from our convertible debt issuance, net of issuance costs, $80.0 million from a draw under the Credit Agreement, net of issuance costs, proceeds of $6.2 million from the issuance of shares under our employee stock purchase plan and proceeds of $1.2 million from stock option exercises, partially offset by $105.0 million in principal term loan payments under the Credit Agreement, $96.4 million in costs relating to the Capped Call Transactions, and $16.2 million in payment of an assumed warrant liability associated with the acquisition of Neovasc.

During the nine months ended September 30, 2022, cash provided by financing activities was $3.4 million, attributable to proceeds of $4.5 million from the issuance of shares under our employee stock purchase plan and proceeds of $1.7 million from stock option exercises, partially offset by $2.8 million in principal term loan payments under our previous credit agreement with Silicon Valley Bank.

Critical Accounting Policies and Estimates

Management's discussion and analysis of our financial condition and results of operations is based on our condensed consolidated financial statements, which have been prepared in accordance with U.S. generally accepted accounting principles ("GAAP"). The preparation of these condensed consolidated financial statements requires us to make estimates and assumptions for the reported amounts of assets, liabilities, revenue, expenses and related disclosures. Our estimates are based on our historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions and any such differences may be material.

In addition to the critical accounting policies and assumptions disclosed in our 2022 Annual Report in the section titled "Management's Discussion and Analysis of Financial Condition and Results of Operations," we have identified the critical accounting policies and assumptions below as having the greatest potential impact on our consolidated financial statements as a result of our acquisition of Neovasc.

Business combinations

We apply the provisions of ASC 805, *Business Combinations ("ASC 805")*, in accounting for our acquisitions. ASC 805 requires recognition of assets acquired, liabilities assumed, and contingent consideration at their fair value on the acquisition date with subsequent changes recognized in earnings; requires acquisition-related expenses to be recognized separately from the business combination and expensed as incurred; requires in-process research and development to be capitalized at fair value as an indefinite-lived intangible asset until completion or abandonment; and requires that changes in accounting for deferred tax asset valuation allowances and acquired uncertain tax positions after the measurement period be recognized as a component of provision for taxes.

When an integrated set of assets and activities does not meet the practical screen test and otherwise meets the definition of a "business" under ASC 805, we account for such acquisitions as business combinations. The purchase price of an acquisition is allocated to the tangible and identifiable intangible assets acquired and liabilities assumed based on their estimated fair values as of the acquisition date. We base the estimated fair value of identifiable intangible assets acquired in an acquisition on independent third-party valuations that use information and assumptions provided by our management and consider inputs and assumptions that a market participant would use. Any excess purchase price over the estimated fair values of the assets acquired and liabilities assumed is recorded as goodwill. During the measurement period, which may be up to one year from the acquisition date, we may record adjustments to the provisional amounts of assets acquired and liabilities assumed with the corresponding offset to goodwill. Upon the conclusion of the measurement period or final determination of the values of assets acquired or liabilities assumed, whichever comes first, any subsequent adjustments would be recorded in earnings.

In addition, uncertain tax positions and tax related valuation allowances assumed in a business combination are initially estimated as of the acquisition date and therefore also provisional by nature. We reevaluate these items quarterly

based upon facts and circumstances that existed as of the acquisition date with any adjustments to our preliminary estimates being recorded to goodwill if identified within the measurement period.

Goodwill

In accordance with ASC 350, *Intangibles-Goodwill and Other,* our acquired goodwill is not amortized but is tested for impairment on an annual basis or whenever events or changes in circumstances indicate that the carrying amount of these assets may not be recoverable. We perform annual impairment reviews of our goodwill balance during the fourth fiscal quarter or more frequently if business factors indicate. In testing for impairment, we compare the fair value of our reporting unit to its carrying value including the goodwill of that unit. If the carrying value, including goodwill, exceeds the reporting unit's fair value, we will recognize an impairment loss for the amount by which the carrying amount exceeds the reporting unit's fair value. The loss recognized cannot exceed the total amount of goodwill allocated to that reporting unit. We did not incur any goodwill impairment losses during the nine months ended September 30, 2023.

In-process research and development

Intangible assets related to in-process research and development costs are considered indefinite-lived intangible assets until the completion or abandonment of the associated research and development efforts. If and when development is complete, the associated assets would be deemed finite-lived intangible assets and would then be amortized based on their respective estimated useful lives at that point in time. Prior to the completion or abandonment of the associated research and development efforts, the assets are amortized but are tested for impairment on an annual basis and between annual tests if we become aware of any events occurring or changes in circumstances that would indicate a reduction in the fair value of the in-process research and development projects below their respective carrying amounts.

During the fourth quarter and if business factors indicate more frequently, we perform an assessment of the qualitative factors affecting the fair value of our in-process research and development projects. If the fair value exceeds the carrying value, there is no impairment. Impairment losses on indefinite-lived intangible assets are recognized based solely on a comparison of the fair value of an asset to its carrying value, without consideration of any recoverability test.

Intangible assets

Amortizable intangible assets include customer relationships and developed technology acquired as part of our business combination. Customer relationships and developed technology acquired through our business combinations subject to amortization are amortized using the straight-line method over their estimated useful lives ranging from five to 20 years. All intangible assets subject to amortization are reviewed for impairment in accordance with Topic 360, Property, Plant and Equipment.

Contingent Consideration Liabilities Related to Business Combination

At each reporting period, we evaluate the likelihood of any expected future payments and the associated discount rate to determine the fair value of the contingent consideration. We remeasure the fair value of contingent consideration liabilities each reporting period, based on new developments, and record any necessary adjustments as a component of total operating expenses within the condensed consolidated statements of operations until either the contingent consideration obligation is satisfied through payment upon the achievement of, or the obligation no longer exists due to the failure to achieve, the specified milestones. Contingent consideration liabilities are recorded within other liabilities in the condensed consolidated balance sheets.

Convertible Debt

We apply the provisions of Accounting Standards Update ("ASU") *2020-06-Debt-Debt with Conversion and Other Options (Subtopic 470-20)* and *Derivatives and Hedging-Contracts in Entity's Own Equity (Subtopic 815-40)-Accounting For Convertible Instruments and Contracts in an Entity's Own Equity ("ASU 2020-06")* which simplify the accounting related to convertible debt instruments by removing major separation models required under current GAAP.

Accordingly, we do not bifurcate the liability and equity components of the convertible debt on the condensed consolidated balance sheets. Our convertible debt is reflected as a liability on our condensed consolidated balance sheets, with the initial carrying amount equal to the principal amount of the debt, net of issuance costs. The issuance costs are

treated as a debt discount for accounting purposes, which will be amortized into interest expense over the term of the instrument utilizing the effective interest method.

We account for our convertible debt as a single liability with no separate accounting for embedded conversion features. The remaining consideration transferred, after reducing the carrying amount of the convertible debt, is recorded as a reduction to additional paid-in capital on our consolidated balance sheets.

Item 3. Quantitative and Qualitative Disclosures About Market Risk.

There have been no material changes to our quantitative and qualitative disclosures about market risk as compared to the quantitative and qualitative disclosures about market risk described in our 2022 Annual Report.

Item 4. Controls and Procedures.

Evaluation of disclosure controls and procedures

Our management, with the participation and supervision of our Chief Executive Officer and our Chief Financial Officer, have evaluated our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the "Exchange Act")) as of the end of the period covered by this Quarterly Report on Form 10-Q. Based on that evaluation, our Chief Executive Officer and Chief Financial Officer have concluded that, as of the end of the period covered by this Quarterly Report on Form 10-Q, our disclosure controls and procedures are effective to provide reasonable assurance that information we are required to disclose in reports that we file or submit under the Exchange Act is recorded, processed, summarized, and reported within the time periods specified in SEC rules and forms, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure.

Changes in internal control over financial reporting

In May 2023 we completed the implementation of a new enterprise resource planning system. As part of the implementation, we updated and will continue to update our internal control over financial reporting, as necessary, to accommodate modifications to our business processes and accounting procedures. We do not believe this implementation has had or will have in the future a material adverse effect on our internal control over financial reporting. There have not been any additional changes in our internal control over financial reporting identified in connection with the evaluation required by Rule 13a-15(d) and 15d-15(d) of the Exchange Act that occurred during the period covered by this Quarterly Report on Form 10-Q that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Inherent limitation on the effectiveness of internal control

Our management, including our Chief Executive Officer and Chief Financial Officer, does not expect that our disclosure controls or our internal control over financial reporting will prevent all errors and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. Further, the design of a control system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected. These inherent limitations include the realities that judgments in decision-making can be faulty, and that breakdowns can occur because of a simple error or mistake. Additionally, controls can be circumvented by the individual acts of some persons, by collusion of two or more people or by management override of the controls. The design of any system of controls is also based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions; over time, controls may become inadequate because of changes in conditions, or the degree of compliance with policies or procedures may deteriorate. Because of the inherent limitations in a cost-effective control system, misstatements due to error or fraud may occur and not be detected.

PART II—OTHER INFORMATION

Item 1. Legal Proceedings.

A petition for inter partes review ("IPR") of U.S. Pat. No. 8,956,371 (the "'371 patent"), which is one of our issued U.S. patents that relates to our current IVL technology, was filed on December 7, 2018 at the U.S. Patent and Trademark Office's (the "USPTO") Patent Trial and Appeal Board (the "PTAB") by Cardiovascular Systems, Inc. ("CSI"), one of our competitors. The PTAB instituted IPR proceedings for this patent and held oral hearings on April 15, 2020. On July 8, 2020, the PTAB ruled that one claim ("Claim 5") in the '371 patent is valid and ruled that all other claims in the '371 patent are invalid. On August 27, 2020, further briefing by the parties was requested by the PTAB in the '371 patent proceeding to assess whether recent guidance from the USPTO relating to "applicant admitted prior art" impacted the PTAB's decision in the '371 patent proceeding. In addition, the PTAB reset the time for commencement of an appeal in the '371 patent proceeding pending the entry of a final decision after the requested briefing. On March 9, 2022, the PTAB issued an order authorizing us to file a motion for additional discovery. On March 23, 2022, we filed a motion for additional discovery, relating to additional information publicized by CSI after the PTAB's decision on the patents. On February 2, 2023, the PTAB denied the motion for additional discovery and issued a final decision, ruling again that Claim 5 is valid and that all other claims are invalid. On March 3, 2023, we filed a request for rehearing by the Director of the USPTO, which was denied on March 30, 2023. We have filed a notice of appeal of the PTAB rulings to the United States Court of Appeals for the Federal Circuit, and CSI has filed a notice of cross-appeal to challenge the decision that Claim 5 of the '371 patent is valid. Accordingly, Claim 5 and all other claims remain valid and enforceable until all appeals have been exhausted. Upon the conclusion of such appeals, if we are unsuccessful in whole or in part, the '371 patent proceedings could result in the loss or narrowing in scope of the '371 patent, which could further limit our ability to stop others from using or commercializing products and technology similar or identical to ours.

For more information regarding the risks presented by such proceedings, please see the section of our 2022 Annual Report, titled "Risk Factors—Risks Related to Our Intellectual Property."

From time to time, we may become involved in various legal proceedings that arise in the ordinary course of our business. We have received, and may from time to time receive, letters from third parties alleging patent infringement, violation of employment practices or trademark infringement, and we may in the future participate in litigation to defend ourselves. We cannot predict the results of any such disputes, and despite the potential outcomes, the existence thereof may have an adverse material impact on us due to diversion of management time and attention as well as the financial costs related to resolving such disputes.

Item 1A. Risk Factors.

The following risk factors supplement and, to the extent inconsistent, supersede, the risk factors disclosed in Part I, Item 1A. "Risk Factors" of our 2022 Annual Report on Form 10-K for the year ended December 31, 2022 (the "2022 Annual Report"), filed with the Securities and Exchange Commission (the "SEC") on February 27, 2023 and Part II, Item 1A. "Risk Factors" of our Quarterly Report on Form 10-Q for the quarter ended March 31, 2023 filed with the SEC on May 8, 2023 (the "Q1 2023 Quarterly Report"). The risk factors included herein as well as the risk factors described in our 2022 Annual Report and Q1 2023 Quarterly Report, and other information set forth in this Quarterly Report on Form 10-Q, could materially adversely affect our business, financial condition, results of operations and prospects, and should be carefully considered. The risks and uncertainties that we face, however, are not limited to those described herein or in the 2022 Annual Report or Q1 2023 Quarterly Report. Additional risks and uncertainties not presently known to us or that we currently believe to be immaterial may also adversely affect our business and the trading price of our securities.

RISKS RELATED TO OUR CONVERTIBLE DEBT

We face risks related to our debt obligations, including the Notes.

In August 2023, we completed an offering of $750.0 million aggregate principal amount of 1.0% convertible senior notes. Our debt obligations under the Notes could adversely impact us. For example, these obligations could:

- require us to use a substantial portion of our cash flow from operations to pay principal and interest on debt, or to repurchase the Notes when required upon the occurrence of certain events or otherwise pursuant to the terms

thereof, which will reduce the amount of cash flow available to fund working capital, capital expenditures, acquisitions, and other business activities;

- require us to use cash to settle any obligations;
- result in certain of our debt instruments being accelerated or being deemed to be in default if certain terms of default are triggered, such as applicable cross-payment default and/or cross-acceleration provisions;
- adversely impact our credit rating, which could increase future borrowing costs;
- limit our future ability to raise funds for capital expenditures, strategic acquisitions or business opportunities, and other general corporate requirements;
- increase our vulnerability to adverse economic and industry conditions; and
- place us at a competitive disadvantage compared to our less leveraged competitors.

We also have a revolving credit facility in an aggregate principal amount of $175.0 million, which is currently undrawn, under the Credit Agreement. The Credit Agreement includes customary affirmative and restrictive covenants, including covenants relating to the incurrence of additional debt or liens, investments, transactions with affiliates, delivery of financial statements, payment of taxes, maintenance of insurance, dispositions of property, and mergers and acquisitions, among other customary covenants. The Credit Agreement also restricts us from paying dividends or making distributions or payments on our capital stock subject to limited exceptions. The Credit Agreement also includes customary representations and warranties, events of default and termination provisions. Failure to comply with the covenants or other restrictions could result in a default under the Credit Agreement. In addition, the revolving credit facility is secured by substantially all of our assets, excluding intellectual property and certain other assets, and requires us to satisfy certain financial covenants.

Our ability to meet our payment obligations under our debt instruments depends on our ability to generate significant cash flows in the future. This, to some extent, is subject to market, economic, financial, competitive, legislative, and regulatory factors as well as other factors that are beyond our control. There can be no assurance that our business will generate cash flow from operations, or that additional capital will be available to us, in amounts sufficient to enable us to meet our debt payment obligations and to fund other liquidity needs. For example, we may utilize proceeds from the Notes for acquisitions or other investments that do not increase our enterprise value or we may otherwise be unable to generate sufficient cash flows to repay our debt obligations. See Note 9 “Debt” and Note 10 “Convertible Debt” of the Notes to the Condensed Consolidated Financial Statements for more information about the revolving credit facility and the Notes.

Servicing our debt requires a significant amount of cash, and we may not have sufficient cash flow from our business to pay our indebtedness.

Our ability to make scheduled payments of the principal of, to pay interest on or to refinance our indebtedness, including the Notes, or to make cash payments in connection with any conversions of Notes, depends on our future performance, which is subject to economic, financial, competitive and other factors beyond our control. Our business may not generate cash flow from operations in the future sufficient to service our existing indebtedness and any future indebtedness we may incur and make necessary capital expenditures. If we are unable to generate such cash flow, we may be required to adopt one or more alternatives, such as reducing or delaying investments or capital expenditures, selling assets, restructuring debt or obtaining additional debt financing or equity capital on terms that may be onerous or highly dilutive. Our ability to refinance any current or future indebtedness will depend on the capital markets and our financial condition at such time. We may not be able to engage in any of these activities or engage in these activities on desirable terms or at all, which could result in a default on our debt obligations. In addition, any of our future current or future debt agreements may contain restrictive covenants that may prohibit us from adopting any of these alternatives. Our failure to comply with these covenants could result in an event of default which, if not cured or waived, could result in the acceleration of our debt.

We may be unable to raise the funds necessary to repurchase the Notes for cash following a fundamental change (as defined in the Indenture) or to pay any cash amounts due upon conversion, and our other indebtedness limits our ability to repurchase the Notes or pay cash upon their conversion.

Noteholders may require us to repurchase their Notes following a fundamental change at a cash repurchase price generally equal to the principal amount of the Notes to be repurchased, plus accrued and unpaid special interest, if any. In addition, upon conversion, we will satisfy part or all of our conversion obligation in cash up to the aggregate principal amount of the Notes to be converted and in cash, shares of common stock or a combination of cash and shares of common stock, at our election, in respect of the remainder, if any, of our conversion obligation in excess of the aggregate principal amount of the Notes being converted. We may not have enough available cash or be able to obtain financing at the time we are required to repurchase the Notes or pay the cash amounts due upon conversion. In addition, applicable law, regulatory authorities and the agreements governing our other indebtedness may restrict our ability to repurchase the Notes or pay the cash amounts due upon conversion. Our failure to repurchase Notes or to pay the cash amounts due upon conversion when required will constitute a default under the Indenture. A default under the Indenture or a fundamental change itself could also lead to a default under agreements governing our other indebtedness, which may result in that other indebtedness becoming immediately payable in full. We may not have sufficient funds to satisfy all amounts due under the other indebtedness and the Notes.

The conditional conversion feature of the Notes, if triggered, may adversely affect our financial condition and operating results.

In the event the conditional conversion feature of the Notes is triggered, holders will be entitled to convert their Notes at any time during specified periods at their option. If one or more holders elect to convert their Notes, we would be required to settle any converted principal amount of such Notes through the payment of cash, which could adversely affect our liquidity. In addition, even if holders do not elect to convert their Notes, we could be required under applicable accounting rules to reclassify all or a portion of the outstanding principal of the Notes as a current, rather than long-term, liability, which would result in a material reduction of our net working capital.

Conversion of the Notes may dilute the ownership interest of our stockholders or may otherwise depress the price of our common stock.

The conversion of some or all of the Notes may dilute the ownership interests of our stockholders to the extent we deliver shares upon conversion of any of the Notes. Upon conversion of the Notes, we have the option to pay or deliver, as the case may be, cash, shares of our common stock, or a combination of cash and shares of our common stock in respect of the remainder, if any, of our conversion obligation in excess of the aggregate principal amount of the Notes being converted. If we elect to settle the remainder, if any, of our conversion obligation in excess of the aggregate principal amount of the Notes being converted in shares of our common stock or a combination of cash and shares of our common stock, any sales in the public market of our common stock issuable upon such conversion could adversely affect prevailing market prices of our common stock. In addition, the existence of the Notes may encourage short selling by market participants because the conversion of the Notes could be used to satisfy short positions, or anticipated conversion of the Notes into shares of our common stock could depress the price of our common stock.

The Capped Call Transactions may affect the value of the Notes and our common stock.

In connection with the Notes, we entered into Capped Call Transactions with the initial purchasers of the Notes (the “Option Counterparties”). The Capped Call Transactions are expected generally to reduce the potential dilution to our common stock upon any conversion of the Notes and/or offset any potential cash payments we are required to make in excess of the principal amount upon conversion of any Notes, with such reduction and/or offset subject to a cap.

In connection with establishing their initial hedges of the Capped Call Transactions, the Option Counterparties and/or their respective affiliates purchased shares of our common stock and/or entered into various derivative transactions with respect to our common stock. This activity could have increased (or reduced the size of any decrease in) the market price of our common stock or the Notes at that time.

In addition, the Option Counterparties and/or their respective affiliates may modify their hedge positions by entering into or unwinding various derivatives with respect to our common stock and/or purchasing or selling our common stock in secondary market transactions (and are likely to do so following any conversion of Notes, any repurchase of the Notes by

us on any fundamental change repurchase date, any redemption date, or any other date on which the Notes are retired by us). This activity could also cause or avoid an increase or a decrease in the market price of our common stock or the Notes.

The potential effect, if any, of these transactions and activities on the market price of our common stock or the Notes will depend in part on market conditions and cannot be ascertained at this time. Any of these activities could adversely affect the value of our common stock.

We are subject to counterparty risk with respect to the Capped Call Transactions, and the Capped Call Transactions may not operate as planned.

The Option Counterparties are financial institutions, and we will be subject to the risk that they might default under the Capped Call Transactions. Our exposure to the credit risk of the Option Counterparties will not be secured by any collateral. Global economic conditions have from time to time resulted in the actual or perceived failure or financial difficulties of many financial institutions. If an Option Counterparty becomes subject to insolvency proceedings, we will become an unsecured creditor in those proceedings with a claim equal to our exposure at that time under our transactions with that option counterparty. Our exposure will depend on many factors, but, generally, the increase in our exposure will be correlated with increases in the market price or the volatility of our common stock. In addition, upon a default by an option counterparty, we may suffer adverse tax consequences and more dilution than we currently anticipate with respect to our common stock. We can provide no assurances as to the financial stability or viability of any option counterparty.

In addition, the Capped Call Transactions are complex, and they may not operate as planned. For example, the terms of the Capped Call Transactions may be subject to adjustment, modification or, in some cases, renegotiation if certain corporate or other transactions occur. Accordingly, these transactions may not operate as we intend if we are required to adjust their terms as a result of transactions in the future or upon unanticipated developments that may adversely affect the functioning of the Capped Call Transactions.

The accounting method for the Notes could adversely affect our reported financial condition and results.

We have adopted Accounting Standards Update 2020-06 (“ASU 2020-06”) as of January 1, 2022. Accordingly, we do not bifurcate the liability and equity components of the Notes on our balance sheets, and we use the if-converted method of calculating diluted earnings per share. Under the “if-converted” method, diluted earnings per share will generally be calculated assuming that all the Notes were converted solely into shares of common stock at the beginning of the reporting period, unless the result would be anti-dilutive, which could adversely affect our diluted earnings per share. Because the principal amount of the Notes upon conversion is required to be paid in cash, and only the excess is permitted to be settled in shares, the application of the if-converted method will produce a similar result as the treasury stock method prior to the adoption of ASU 2020-06. The effect of the treasury stock method is that the shares issuable upon conversion of such Notes are not included in the calculation of diluted earnings per share except to the extent that the conversion value of such Notes exceeds their principal amount.

In accordance with ASU 2020-06, the Notes are reflected as a liability on our condensed consolidated balance sheets, with the initial carrying amount equal to the principal amount of the Notes, net of issuance costs. The issuance costs will be treated as a debt discount for accounting purposes, which will be amortized into interest expense over the term of the Notes.

As a result of this amortization, the interest expense that we expect to recognize for the Notes for accounting purposes will be greater than the cash interest payments we will pay on the Notes, which will result in lower reported income.

We cannot be sure whether future changes made to the current accounting standards related to the Notes will have a material effect on our reported financial results.

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

On August 15, 2023, we issued, at par value, $750.0 million aggregate principal amount of 1.0% convertible senior notes due 2028 (the “Notes”), in a private placement to qualified institutional buyers pursuant to Rule 144A of the Securities Act of 1933, as amended. The Notes are convertible into shares of our common stock on the terms set forth in the indenture governing the Notes. Information relating to the issuance of the Notes was provided in a Current Report on Form 8-K filed with the Securities and Exchange Commission on August 15, 2023.

Item 3. Defaults Upon Senior Securities.

None.

Item 4. Mine Safety Disclosures.

Not applicable.

Item 5. Other Information.

On August 25, 2023, Isaac Zacharias, the Company's President, Chief Commercial Officer, entered into a pre-arranged written stock sale plan in accordance with Rule 10b5-1 (the "Zacharias 10b5-1 Plan") under the Exchange Act, for the sale of shares of the Company's common stock. The Zacharias 10b5-1 Plan was entered into during an open trading window in accordance with the Company's policies regarding transactions in the Company's securities and is intended to satisfy the affirmative defense of Rule 10b5-1(c) under the Exchange Act. The Zacharias 10b5-1 Plan provides for the potential sale of up to 68,000 shares of the Company's common stock, including upon the exercise of vested stock options for shares of the Company's common stock, so long as the market price of the Company's common stock is higher than certain minimum threshold prices specified in the Zacharias 10b5-1 Plan, between January 26, 2024 and May 30, 2025.

On September 5, 2023, F.T Jay Watkins, a member of the Company's Board of Directors, entered into a pre-arranged written stock sale plan in accordance with Rule 10b5-1 (the "Watkins 10b5-1 Plan") under the Exchange Act, for the sale of shares of the Company's common stock. The Watkins 10b5-1 Plan was entered into during an open trading window in accordance with the Company's policies regarding transactions in the Company's securities and is intended to satisfy the affirmative defense of Rule 10b5-1(c) under the Exchange Act. The Watkins 10b5-1 Plan provides for the potential sale of up to 24,000 shares of the Company's common stock, including upon the exercise of vested stock options for shares of the Company's common stock, so long as the market price of the Company's common stock is higher than certain minimum threshold prices specified in the Watkins 10b5-1 Plan, between January 8, 2024 and December 31, 2024.

On September 7, 2023, Trinh Phung, the Company's Vice President of Finance, entered into a pre-arranged written stock sale plan in accordance with Rule 10b5-1 (the "Phung 10b5-1 Plan") under the Exchange Act, for the sale of shares of the Company's common stock. The Phung 10b5-1 Plan was entered into during an open trading window in accordance with the Company's policies regarding transactions in the Company's securities and is intended to satisfy the affirmative defense of Rule 10b5-1(c) under the Exchange Act. The Phung 10b5-1 Plan provides for the potential sale of up to 15,165 shares of the Company's common stock, including upon the exercise of vested stock options for shares of the Company's common stock, less the number of shares sold to satisfy tax withholding obligations pursuant to the Company's "sell to cover" requirement, so long as the market price of the Company's common stock is higher than certain minimum threshold prices specified in the Phung 10b5-1 Plan, between December 7, 2023 and August 10, 2024. The number of shares to be sold to satisfy the Company's tax withholding obligations under the "sell-to-cover" arrangement is dependent on future events which cannot be known at this time, including the future trading price of the Company's common stock.

On September 8, 2023, Daniel Puckett, the Company's Chief Financial Officer, entered into a pre-arranged written stock sale plan in accordance with Rule 10b5-1 (the "Puckett 10b5-1 Plan") under the Exchange Act, for the sale of shares of the Company's common stock. The Puckett 10b5-1 Plan was entered into during an open trading window in accordance with the Company's policies regarding transactions in the Company's securities and is intended to satisfy the affirmative defense of Rule 10b5-1(c) under the Exchange Act. The Puckett 10b5-1 Plan provides for the potential sale of up to 17,594 shares of the Company's common stock, including upon the exercise of vested stock options for shares of the Company's common stock, less the number of shares sold to satisfy tax withholding obligations pursuant to the Company's "sell to cover" requirement, so long as the market price of the Company's common stock is higher than certain minimum threshold prices specified in the Puckett 10b5-1 Plan, between December 8, 2023 and June 15, 2024. The number of shares to be sold to satisfy the Company's tax withholding obligations under the "sell-to-cover" arrangement is dependent on future events which cannot be known at this time, including the future trading price of the Company's common stock.

Item 6. Exhibits.

Furnish the exhibits required by Item 601 of Regulation S-K (§ 229.601 of this chapter).

Exhibit Number	Description	Form	File No.	Exhibit(s)	Filing Date
4.1	Indenture dated August 15, 2023 between Shockwave Medical, Inc. and U.S. Bank Trust Company, National Association, as trustee (including the form of 1.00% Convertible Senior Notes due 2028).	8-K	001-38829	4.1	`` August 15, 2023
10.1	Form of Capped Call Transaction Confirmation.	8-K	001-38829	99.1	`` August 15, 2023
31.1*	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under 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 Rules 13a-14(a) and 15d-14(a) under 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*	Inline XBRL Instance Document - the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.				
101.SCH*	Inline XBRL Taxonomy Extension Schema Document				
101.CAL*	Inline XBRL Taxonomy Extension Calculation Linkbase Document				
101.DEF*	Inline XBRL Taxonomy Extension Definition Linkbase Document				
101.LAB*	Inline XBRL Taxonomy Extension Label Linkbase Document				
101.PRE*	Inline Taxonomy Extension Presentation Linkbase Document				
104	The cover page from the Company's Quarterly Report on Form 10-Q for the quarter ended September 30, 2023 has been formatted in Inline XBRL and contained in Exhibit 101				

* Filed herewith.

\# This certification is deemed not filed for purposes of Section 18 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), or otherwise subject to the liability of that section, nor shall it be deemed incorporated by reference into any filing under the Securities Act of 1933, as amended, or the Exchange Act.

SIGNATURES

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

Shockwave Medical, Inc.

Date: November 6, 2023 By: /s/ Douglas Godshall

Douglas Godshall
President, Chief Executive Officer and Director
(Principal Executive Officer)

Date: November 6, 2023 By: /s/ Trinh Phung

Trinh Phung
Vice President of Finance
(Principal Accounting Officer)

Exhibit 31.1

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER PURSUANT TO RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934, AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Douglas Godshall, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Shockwave Medical, 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)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) 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) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   (c) 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
   (d) 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: November 6, 2023

By: /s/ Douglas Godshall

Douglas Godshall

President, Chief Executive Officer and Director
(*Principal Executive Officer*)

Exhibit 31.2

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER PURSUANT TO RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934, AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Dan Puckett, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Shockwave Medical, 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)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) 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) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   (c) 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
   (d) 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: November 6, 2023

By: /s/ Daniel K. Puckett

Daniel K. Puckett

Chief Financial Officer
(*Principal Financial Officer*)

Exhibit 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

In connection with the Quarterly Report of Shockwave Medical, Inc. (the "Company") on Form 10-Q for the period ending September 30, 2023 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; 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: November 6, 2023

By: /s/ Douglas Godshall

Douglas Godshall

President, Chief Executive Officer and Director
(*Principal Executive Officer*)

Exhibit 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

In connection with the Quarterly Report of Shockwave Medical, Inc. (the "Company") on Form 10-Q for the period ending September 30, 2023 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; 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: November 6, 2023

By: /s/ Daniel K. Puckett

Daniel K. Puckett

Chief Financial Officer
(*Principal Financial Officer*)