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

FORM 10-K

(Mark One)

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

For the fiscal year ended December 31 , 2023

or

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

For the transition period from _____ to _____

Commission file number: 001-37557

Penumbra, Inc.

(Exact Name of Registrant as Specified in Its Charter)

Delaware	**05-0605598**
(State or Other Jurisdiction of Incorporation or Organization)	(I.R.S. Employer Identification No.)

One Penumbra Place
Alameda , CA 94502
(Address of principal executive offices, including zip code)
(510) 748-3200
(Registrant's telephone number, including area code)

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

Title of each class	**Trading Symbol**	**Name of each exchange on which registered**
Common Stock, Par value $0.001 per share	PEN	The New York Stock Exchange

Securities registered pursuant of Section 12(g) of the Act:

None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes : x No: o

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes: o No : x

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 and posted pursuant to Rule 405 of Regulation S-T (**§** 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes : x No: o

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See 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 has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C.7262(b)) by the registered public accounting firm that prepared or issued its audit report. x

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. o

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b). o

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

As of June 30, 2023, the aggregate market value of the registrant's common stock held by non-affiliates was approximately $ 12.7 billion, based on the closing price as reported on the New York Stock Exchange as of such date.

As of February 8, 2024, the registrant had 38,703,659 shares of common stock, par value $0.001 per share, outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive proxy statement for its 2024 annual meeting of stockholders, which is to be filed not more than 120 days after the registrant's fiscal year ended December 31, 2023, are incorporated by reference into Part III of this Annual Report on Form 10-K.

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FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K (this "Form 10-K") includes forward-looking statements in addition to historical information. These forward-looking statements are included throughout this Form 10-K, including in the sections entitled "Business," "Risk Factors," "Management's Discussion and Analysis of Financial Condition and Results of Operations," and in other sections of this Form 10-K. In some cases, you can identify these statements by forward-looking words such as "may," "might," "will," "should," "expects," "plans," "anticipates," "believes," "estimates," "predicts," "potential," "opportunity" or "continue," the negative of these terms and other comparable terminology, but such words, terms and terminology are not the exclusive means for identifying such statements. These forward-looking statements, which are subject to risks, uncertainties and assumptions about us, may include projections of our future financial performance, our anticipated growth strategies and anticipated trends in our business.

These statements are only predictions based on our current expectations and projections about future events. There are important 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 factors discussed in the section entitled "Risk Factors" in this Form 10-K. You should specifically consider the numerous risks outlined in the section of this Form 10-K entitled "Risk Factors." Although we believe the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, level of activity, performance or achievements. We undertake no obligation to update any forward-looking statements made in this Form 10-K to reflect events or circumstances after the date of this Form 10-K or to reflect new information or the occurrence of unanticipated events, except as required by law.

RISK FACTORS SUMMARY

Our business is subject to numerous risks and uncertainties, including those highlighted in the section entitled “Risk Factors” in Part I, Item IA of this Form 10-K. These risks include, but are not limited to, the following:

- we have a limited operating history in certain markets and may not be able to sustain or grow our profitability or generate positive cash flows from operations in the future;
- our existing products may be rendered obsolete and we may be unable to effectively introduce and market new products or may fail to keep pace with advances in technology;
- delays in product introductions could adversely affect our business, results of operations, financial condition or cash flows;
- we face significant competition, and if we are unable to compete effectively, we may not be able to achieve or maintain significant market penetration or improve our results of operations;
- we may not be able to achieve or maintain satisfactory pricing and margins for our products;
- our future growth depends, in part, on our ability to further penetrate our current customer base and increase the frequency of use of our products by our customers as well as expand our user base to include additional specialist physicians and other healthcare providers in both our existing and future target end markets;
- we may not have the resources to successfully market and sell our products, which would adversely affect our business and results of operations;
- third-party reimbursement may not be available or adequate for the procedures or sessions for which our products are used, and may be subject to change;
- we have generated a significant portion of our revenue and revenue growth from a limited number of product families, and our revenue and business prospects would be adversely affected if sales of any of these product families were to decline;
- if specialist physicians or other healthcare providers do not recommend and endorse, or use, our products or if our relationships with specialist physicians or other healthcare providers deteriorate, our products may not be accepted or maintain acceptance in the marketplace, which would adversely affect our business and results of operations;
- our dependence on key suppliers puts us at risk of interruptions in the availability of our products, which could reduce our revenue and adversely affect our results of operations;
- we cannot be certain that we will be able to manufacture our products in high volumes at commercially reasonable costs;
- we are required to maintain high levels of inventory, which consume a significant amount of our working capital and could lead to permanent write-downs or write-offs of our inventory;
- defects or failures or alleged defects or failures associated with our products could lead to recalls, safety alerts, or product-related or securities litigation, as well as significant costs and negative publicity;
- our products are continually the subject of clinical trials conducted by us, our competitors, or other third parties, the results of which may be unfavorable, or perceived as unfavorable, which could materially adversely affect our business, financial condition and results of operations;
- we are subject to stringent domestic and foreign medical device regulations, which may impede the approval or clearance process for our products, hinder our development activities and manufacturing processes and, in some cases, result in the recall or seizure of previously approved or cleared products;
- we are subject to federal, state and foreign healthcare laws and regulations that could result in significant liability, require us to change our business practices and restrict our operations in the future;
- we rely on a variety of intellectual property rights, and if we are unable to maintain or protect our intellectual property, our business and results of operations will be harmed; and

- we may become involved in lawsuits or other proceedings to protect or enforce our patents or other intellectual property rights or to defend against accusations of infringement, which could be expensive, time consuming and unsuccessful.

The above list represents a summary of the risks that could affect our business, financial condition, results of operations, cash flows and the trading price of our common stock. Additional information regarding such risks may be found in the section of this Form 10-K entitled “Risk Factors,” and you should carefully review and consider such risk factors in addition to the above summary. Additional risks not presently known to us or that we currently deem immaterial may also impair our business operations. Our business, financial condition, results of operations and future prospects could be materially and adversely harmed by any of these risks.

PART I

ITEM 1. BUSINESS.

Overview

References herein to "we," "us," "our," the "Company," and "Penumbra," refer to Penumbra, Inc. and its consolidated subsidiaries unless expressly indicated or the context requires otherwise.

Penumbra is a global healthcare company focused on innovative therapies. We design, develop, manufacture and market novel products and have a broad portfolio that addresses challenging medical conditions in markets with significant unmet need. Our team focuses on developing, manufacturing and marketing novel products for use by specialist physicians and healthcare providers to drive improved clinical and health outcomes. We believe that the cost-effectiveness of our products is attractive to our customers.

Since our founding in 2004, we have had a strong track record of organic product development and commercial expansion that has established the foundation of our global organization. We have successfully developed, obtained regulatory clearance or approval for, and introduced products into the thrombectomy market since 2007, access market since 2008, embolization market since 2011, neurosurgical market since 2014, and immersive healthcare market since 2020.

We expect to continue to develop and build our portfolio of products, including our thrombectomy, embolization, access and immersive healthcare technologies, while iterating on our currently available products. Generally, when we introduce a next generation product or a new product designed to replace a current product, sales of the earlier generation product or the product replaced decline. Our research and development activities are centered around the development of new products and clinical activities designed to support our regulatory submissions and demonstrate the effectiveness of our products.

We attribute our success to our culture built on cooperation, our highly efficient product innovation process, our disciplined approach to product and commercial development, our deep understanding of our target end markets and our relationships with specialist physicians and healthcare providers. We believe these factors have enabled us to rapidly innovate in a highly efficient manner.

We sell our products to healthcare providers primarily through our direct sales organization in the United States, most of Europe, Canada and Australia, as well as through distributors in select international markets. We generated revenue of $1,058.5 million, $847.1 million and $747.6 million for the years ended December 31, 2023, 2022 and 2021, respectively. This represents an annual increase of 25.0% and 13.3%, respectively. We generated income from operations of $73.6 million and $6.1 million for the years ended December 31, 2023 and 2022, and loss from operations of $7.5 million for the year ended December 31, 2021.

Our results for the years ended December 31, 2022 and 2021 were impacted by the COVID-19 pandemic, which impacted the performance of certain elective and semi-elective medical procedures, which were deferred to provide resources to fight the pandemic, as well as impacted global supply chains and labor markets, resulting in cost inflation and raw material supply constraints. While the impact of the pandemic has subsided due to the development and widespread availability of vaccines for COVID-19, we will continue to prioritize the health and safety of our employees and to operate under the protocols mandated by local and state authorities.

Our Markets

We concentrate on improving treatment outcomes for patients with certain forms of vascular disease and strive to improve the long-term quality of life for patients who could benefit from immersive healthcare applications. Vascular disease refers to any condition that affects the circulatory system and typically manifests as a blockage or rupture of an artery or a vein. When the treatment for vascular disease is performed from within a vessel, it is referred to as an endovascular procedure. Previously, we classified our end markets according to the anatomic location of the disorder and divided them into neuro, which included neurovascular and neurosurgical, and vascular, which included peripheral vascular and cardiovascular. To better align with our strategic priorities, beginning with the three months ended December 31, 2023 we began to classify our end markets based on the type of procedure being performed, and therefore divide our markets into thrombectomy, which includes products that treat conditions such as pulmonary embolism, deep vein thrombosis, acute limb ischemia, ischemic stroke and coronary disease, embolization and access, which include products to treat aneurysms and to occlude vessels as well as products to access the vasculature, and immersive healthcare, which includes applications for patients undergoing rehabilitation related to diseases, injuries, or illnesses, as well as applications designed to address mental well-being and cognition.

We generated revenue of $677.3 million, $511.1 million and $437.8 million from our thrombectomy product category for the years ended December 31, 2023, 2022 and 2021, respectively. We generated revenue of $381.2 million, $336.0 million, and $309.8 million from our embolization and access product categories for the years ended December 31, 2023, 2022 and 2021, respectively. The Company designs, develops, manufactures and markets novel products, and operates as one operating segment.

While reliable third-party data is not available for many markets outside the United States, we believe there are substantial additional market opportunities for our thrombectomy, embolization and access, and immersive healthcare products throughout the world.

Thrombectomy Market

The thrombectomy market is comprised of vascular diseases and disorders occurring in vessels throughout the body, including pulmonary embolism, deep vein thrombosis, acute limb ischemia, ischemic stroke, coronary disease and other conditions. Disruption of blood flow to the vasculature can have serious adverse consequences, including death and morbidity, and our solutions address the intervention of these diseases. There are approximately 2.15 million incidences of clot in the vasculature each year in the United States, the vast majority of which do not currently receive mechanical thrombectomy intervention. Studies have shown that patients treated with mechanical thrombectomy had improved functional outcomes compared with treatments such as tissue-type plasminogen activator (tPA) alone.

Some of the more common conditions we focus on are:

- ***Pulmonary Embolism*** (“***PE***”)**:** PE is a condition that occurs when blood clots, which typically travel from the veins in the legs, get caught in the lungs. Approximately 1.2 million PEs occur annually worldwide. In the U.S., there are approximately 350,000 PEs per year causing approximately 50,000 annual deaths according to the Centers for Disease Control and Prevention. High- and intermediate-risk PEs, which are generally eligible for treatment with mechanical or computer-assisted vacuum thrombectomy, represent approximately 44% of such PEs, or approximately 150,000 U.S. patients. We estimate there are approximately 800,000 annual PEs outside the U.S. and approximately 350,000 of them are massive or sub-massive, making them eligible for mechanical thrombectomy.
- ***Deep Vein Thrombosis (“DVT”)*****:** DVT occurs when a clot forms in a deep vein, usually in the leg and sometimes in the arm. Approximately 4 million DVTs occur annually worldwide. In the U.S., there are approximately 550,000 DVTs per year causing approximately 30,000 annual deaths according to the Centers for Disease Control and Prevention. Proximal DVTs, which are generally eligible for treatment with mechanical or computer-assisted vacuum thrombectomy, represent approximately 64% of such DVTs, or approximately 350,000 U.S. patients. We estimate there are approximately 3.5 million annual DVTs outside the U.S. and approximately 2 million of them are proximal, making them eligible for thrombectomy.
- ***Peripheral Arterial Occlusion (“PAO”)*****:** Acute PAO occurs when a blood clot develops in major peripheral arteries. PAO includes Acute Limb Ischemia (“ALI”), which occurs when the leg experiences an occlusion in an artery, which is almost always caused either because a blood clot forms in the artery or because emboli from the heart or other place within the body travel to the leg and causes an occlusion. It is estimated that approximately 2.5 million PAOs occur annually and that there are approximately 16 million PAO survivors worldwide. In the U.S., there are approximately 250,000 PAOs per year, which are generally eligible for treatment with mechanical or computer-assisted vacuum thrombectomy, causing approximately 50,000 annual deaths according to the New England Journal of Medicine. We estimate there are approximately 2 million annual PAOs outside the U.S. that are eligible for thrombectomy.
- ***Ischemic Stroke*****:** A stroke occurs when a blood vessel that carries oxygen and nutrients to the brain is either blocked by a clot or bursts (ruptures). It is estimated that nearly 14 million strokes occur annually and that there are more than 80 million survivors of stroke globally. In the United States, the American Heart Association (“AHA”) and American Stroke Association (“ASA”) estimate that nearly 800,000 strokes occur annually, and lead to approximately 150,000 deaths per year. Ischemic strokes, caused by the blockage of an artery in the brain, represent approximately 87% of strokes, or approximately 700,000 patients annually, in the United States. Of these cases, we estimate that approximately 200,000 are treatable with mechanical thrombectomy, which involves removal of the clot causing the blockage by mechanical means and restoring blood flow to the blocked vessels. Outside of the United States, we estimate, based on published sources, that there are approximately 9.7 million ischemic strokes annually and that 1.9 million of these patients are treatable with mechanical thrombectomy.

- ***Acute Coronary Syndrome ("ACS"):*** ACS includes various conditions associated with sudden, reduced blood flow to the heart. One such condition is a heart attack (acute myocardial infarction or "AMI"), when cell death results in damaged or destroyed heart tissue. Heart attacks can often be associated with high thrombus burden in the coronary arteries. Approximately 8.5 million AMIs occur annually and there are approximately 23.5 million AMI survivors worldwide. In the U.S., there are approximately 500,000 AMIs per year causing approximately 350,000 annual deaths according to the American Heart Association. AMIs involving high thrombus burden, which are generally eligible for treatment with mechanical thrombectomy, represent approximately 60% of U.S. AMIs, or approximately 300,000 U.S. patients. We estimate there are approximately 8 million annual AMIs outside the U.S. eligible for thrombectomy.
- ***Clot associated with Arteriovenous Graft or Fistula*:** Arteriovenous grafts or fistulas are created for access to dialyze the blood of patients with end-stage renal disease. It is common for clots to form within these access vessels when patients undergo dialysis long-term.

Embolization and Access Markets

The embolization and access markets are comprised of various diseases and conditions throughout the body, such as aneurysm, hemorrhagic stroke, vessel malformations, bleeding, endoleaks, ovarian veins, varicoceles, and hematomas, as well as products that provide access to the diseased area. These conditions include:

- ***Aneurysm*:** An aneurysm is a weak area in a blood vessel that usually enlarges and is often described as a "ballooning" of the blood vessel. Approximately 2% of the general population has or will develop an aneurysm and approximately 9 million people in the United States may currently have an aneurysm. If a patient has had an aneurysm, there is a 20% likelihood that the patient will have one or more additional aneurysms. The primary endovascular procedure for treating unruptured aneurysms uses a repair technique called embolization, in which the aneurysm is packed with coils in a minimally invasive procedure.
- ***Hemorrhagic Stroke*:** Hemorrhagic strokes, caused by the sudden rupture of a brain artery that leads to bleeding into or around the brain, represent approximately 13% of strokes in the United States. Brain aneurysms and arteriovenous malformations ("AVM") can both cause hemorrhagic stroke. According to independent sources, every year 0.5% to 3.0% of people with a brain aneurysm and 1.0% to 3.0% of people with an AVM may suffer from bleeding. According to the AHA and ASA, once a brain aneurysm or an AVM bleeds, the chance of death is 30% to 40% and 10% to 15%, respectively. Intracerebral hemorrhage, a type of hemorrhagic stroke, occurs when a vessel within the brain bursts, allowing blood to leak inside the brain.

Most endovascular procedures require access to the diseased area using guidewires and catheters. Accessing the brain through the tortuous neurovasculature has been a substantial challenge for physicians treating vascular disorders in the brain. Companies that developed catheters and other products for neurovascular applications historically leveraged technologies developed for use in coronary or peripheral vascular interventions. This approach created challenges given the vastly different anatomy, structure and sizing of the neurovascular vessels.

Immersive Healthcare Market

Immersive healthcare is the use of immersive 3D computer-based technologies to support patient care across a broad spectrum of conditions, including patients recovering from or undergoing physical rehabilitation, and patients with mental well-being and cognition related challenges. Physical rehabilitation can include patients recovering from a range of neuro conditions, including stroke and traumatic brain injury, trauma, sports medicine and other orthopedic conditions. In the case of mental well-being and cognition, patients with a variety of conditions can benefit from distraction, reminiscence, and other therapies to manage symptoms including pain, anxious and depressed moods, age-related challenges, fatigue, and loneliness in a wide range of healthcare settings such as in-hospital settings, skilled nursing facilities, outpatient facilities, senior living facilities and other specialty settings. We estimate there are more than 50 million patients in the United States each year who can benefit from our immersive healthcare products.

Our Product Portfolio

Since our founding in 2004 we have developed a product portfolio that includes 7 product families within our major markets. The following table summarizes our product offerings.

Product Families		Key Product Brands
THROMBECTOMY	Peripheral	Indigo System Lightning Bolt CAT RX
	Neuro	Penumbra System Penumbra RED, JET, ACE, MAX catheters 3D Revascularization Device Penumbra ENGINE and other components and accessories
EMBOLIZATION & ACCESS	Peripheral Embolization	Ruby Coil Ruby LP LANTERN POD (Penumbra Occlusion Device) Packing Coil Packing Coil LP
	Neuro Embolization	Penumbra Coil 400 POD400 PAC400 Penumbra SMART COIL
	Access	Neuron Neuron MAX Select BENCHMARK BMX96 BMX81 DDC PX SLIM SENDit
	Neurosurgical Tools	Artemis Neuro Evacuation Device
IMMERSIVE HEALTHCARE	Immersive 3D Computer-based Technology Platform	Real Immersive System

Thrombectomy Products

Our thrombectomy products fall into the following broad product families:

Peripheral Thrombectomy Products

Indigo System

The Indigo System was designed for continuous, power aspiration of thrombus in the body, leveraging the success of the Penumbra System in ischemic stroke. Computer-assisted vacuum thrombectomy leverages the power of continuous aspiration to augment the safety, speed and simplicity of thrombus removal, and is suited to a wide range of clot morphology in the peripheral arterial, peripheral venous, pulmonary arteries and coronary vasculature. The Indigo System is comprised of four principal components:

- *Continuous Aspiration Mechanical Thrombectomy Catheters* are robust, durable, trackable and suited for the peripheral and coronary anatomy. We have introduced multiple sizes of catheters for use in both the peripheral and coronary vasculature. CAT Catheters are available in a wide range of sizes and lengths to address a wide range of vessel sizes and clot locations.
- *Computer-Assisted Vacuum Thrombectomy (CAVT) Technology* combines our CAT Catheters with microprocessor-controlled software algorithms that orchestrate the interaction of our pump and catheters, enabling physicians to focus on optimizing thrombus removal while helping to mitigate blood loss for arterial and venous applications including the treatment of pulmonary embolism.

- *Indigo Separators* are advanced and retracted through the aspiration catheter at the proximal margin of the primary occlusion to facilitate clearing of the thrombus from the catheter tip. In the peripheral vasculature, clots often form in long segments and are more resistant to traditional aspiration techniques. The Indigo System with the Separator enables a practitioner to remove a wide range of clot morphology from both peripheral and coronary vasculature.
- *Penumbra ENGINE* or *Penumbra Pump MAX* is connected to our CAT catheters and CAVT technology, where applicable, and provides the needed aspiration suction force. We developed our proprietary aspiration source as a fully-integrated system specifically for mechanical thrombectomy by vacuum aspiration.

In 2023, we launched Lightning Flash, an advanced mechanical thrombectomy system to address venous and pulmonary thrombus using CAVT technology, and Lightning Bolt 7, an advanced arterial thrombectomy system that uses CAVT technology, including modulated aspiration, to address conditions such as ALI, hibernating thrombus and visceral occlusions.

Neuro Thrombectomy Products

Our Penumbra System brand of products offers a form of mechanical thrombectomy used by specialist physicians to revascularize blood vessels that are blocked by clots in the intracranial vasculature. These products are aspiration-based. The Penumbra System is a fully integrated mechanical thrombectomy system consisting of reperfusion catheters and separators, the 3D Revascularization Device, aspiration tubing, and aspiration pump.

Penumbra System Reperfusion Catheters are the cornerstone of the Penumbra System and are manufactured using a variety of proprietary processes and materials science innovations for use in revascularization of patients with acute ischemic stroke.

The Penumbra System Reperfusion Catheters, powered by Penumbra ENGINE or Penumbra Pump MAX, are designed for trackability and to maximize thrombus removal force. We believe these design features contribute to improved clinical outcomes and reduced procedure times. Penumbra System Reperfusion Catheters include the Penumbra RED family, JET family, ACE family and MAX families of catheters, designed to address a broad range of occlusions.

In 2021, we launched our RED family of catheters, which are designed with the latest innovations in tracking and aspiration technology to navigate complex distal vessel anatomy and deliver powerful aspiration, together with Penumbra ENGINE, for the removal of blood clots in acute ischemic stroke patients with large vessel occlusions. In 2022, we initiated the THUNDER Study, which is an Investigational Device Exemption (“IDE”) designed to evaluate the safety and effectiveness of CAVT technology for neurovascular applications. In 2023, we added to the RED family by launching the RED 43 catheter and RED 72 catheter with SENDit Technology.

Designed specifically for use with aspiration technology, the 3D Revascularization Device is a component of the Penumbra System that offers a technologically-advanced structure designed to treat large vessel occlusion in combination with Penumbra RED, JET 7, ACE, and MAX Reperfusion Catheters.

Either *Penumbra ENGINE* or *Penumbra Pump MAX* is connected to our reperfusion catheters and provides the aspiration suction force. We developed our proprietary aspiration source as a fully-integrated system specifically for mechanical thrombectomy by aspiration.

Embolization and Access Products

Peripheral Embolization Products

Ruby Coil System

The Ruby Coil System consists of detachable coils that are specifically designed for peripheral applications. Ruby Coils have a controlled mechanical detachment mechanism that permits the physician to deliver and reposition the coil until the final satisfactory position is reached before detachment.

The Ruby Coil System is used in a variety of clinical applications, including, but not limited to:

- active extravasations, or the escape of blood into surrounding tissue;
- selective embolization in patients with visceral aneurysms;
- exclusion of branches prior to chemoembolization and radioembolization;
- embolization in patients with gastrointestinal bleeding;

- embolization of branches prior to stent graft procedures;
- procedures after stent grafting in patients with persistent type II endoleaks and sac enlargement;
- treatment of patients with varicocele and pelvic congestion syndrome;
- high-flow arterial venous malformations;
- post trans intrahepatic shunt placement;
- balloon retrograde transvenous obliteration; and
- exclusion of hepatic branches prior to liver resection.

LANTERN

The Penumbra LANTERN Delivery Microcatheter is a low-profile microcatheter with a high-flow lumen that enables large-volume coil delivery. LANTERN features a radiopaque distal shaft for enhanced visibility and dual distal marker bands for precise coil deployment in tortuous anatomy.

POD (Penumbra Occlusion Device) System

POD addresses a specific need in the peripheral embolization market to rapidly and precisely occlude a target vessel, including in high-flow situations. Our POD device utilizes technology that delivers both variable sizing and variable softness to provide a single device solution for rapid and precise embolization of the target vessel. The technology achieves this range of features through the design of a distal anchoring segment, thereby immediately anchoring the device in a range of vessel diameters. The proximal segment of the POD achieves dense occlusion by packing a softer, smaller diameter segment tightly behind the anchored portion.

The Packing Coil is a complementary device for use with our other peripheral embolization products. It is uniquely designed to pack densely behind Ruby Coils and POD to occlude arteries and veins throughout the peripheral vasculature including aneurysms. Both POD and Packing Coil are detached instantly with a sterile detachment handle.

Neuro Embolization Products

Penumbra Coil 400 is a family of detachable coils developed to offer an improved alternative for the treatment of small to large aneurysms and other larger, more complex lesions. We implemented several proprietary design innovations to enable the coil to maintain shape while achieving biomechanically stable occlusion. Given the size and handling of Penumbra Coil 400, it is able to achieve higher packing density with fewer coils compared to competitive coiling systems.

Penumbra SMART COIL is a family of detachable coils, designed to treat patients with a wide range of neurovascular lesions, including the small and medium sized aneurysms that comprise the majority of the neurovascular coiling market. The design of Penumbra SMART COIL allows the level of softness to be determined not only by the diameter of the platinum filament, but also by a structural component inside the coil itself. This development enables Penumbra SMART COIL to become progressively softer within the span of an individual coil.

Access Products

The Neuron family of guide catheters and the Penumbra distal delivery catheters (“DDC”) enable many endovascular procedures in the tortuous anatomy of the neurovasculature. The Neuron delivery catheter is a variable stiffness guide catheter with increased support in the aortic arch, easier access, and trackability into the intracranial vasculature. The design of Neuron enables physicians to position the catheter much higher in the anatomy than conventional guide catheters.

The BENCHMARK catheter features additional improvements in aortic arch support, ease-of-use, and trackability. In addition to improved proximal support in the arch through multi-geometry metal reinforcement, the distal tip is softer and more trackable, while maintaining distal shaft radiopacity for improved visualization. The BENCHMARK also is available pre-packaged with a Select catheter to obviate the need for a neurovascular guide catheter exchange, which may reduce the number of devices needed per procedure and shorten procedure times.

The BENCHMARK family includes our BENCHMARK BMX 96 and BMX 81 Access Systems. BMX 96 provides a larger internal diameter without increasing the outer diameter of the delivery catheter, enabling more working room for all neurovascular procedures while maintaining the same size access site as our Neuron MAX. BMX 81 utilizes the same technology as BMX 96 but has a smaller diameter and is designed for both radial and femoral access.

Neurosurgical Tools

Artemis Neuro Evacuation Device leverages our expertise in thrombectomy and access to offer a minimally invasive approach to surgical removal of fluid and tissue from the ventricles and cerebrum. The Artemis Neuro Evacuation Device works with a neuroendoscope through a sheath to access hematomas. Together with the Penumbra Pump MAX aspiration source, Artemis offers powerful and controlled hematoma evacuation.

Immersive Healthcare Products

The REAL Immersive System is a proprietary, immersive 3D computer-based technology platform that has the potential to benefit patients over a broad range of healthcare applications, including rehabilitation, mental well-being and cognition. This technology builds on our experience with neuro and vascular medical device innovation and was initially commercialized for conducting upper body rehabilitation in a clinical setting. Studies have shown that adding virtual reality therapy to conventional therapy is effective in improving patient engagement and outcomes, particularly with systems that are fully immersive, customized for the healthcare setting, and fun and engaging for patients. Our REAL Immersive System products include the REAL i-Series, which features a virtual reality-enabled headset with intuitive gaze navigation and exclusive experiences and activities designed to address mental well-being and cognition, and the REAL y-Series, which includes upgraded hardware and sensor technology as well as an expanded content library to include activities that address motor skills, cognition, core and balance, functional tasks, activities of daily living, vision and wellness. In the fourth quarter of 2022, we introduced the first full body, non-tethered immersive healthcare offering for rehabilitation, which uses upper and lower body sensors that allow clinicians to track full body movement and progress in real time and to support a broad range of physical, cognitive and mental well-being for patients undergoing physical or occupational therapy. We intend to continue to pursue healthcare applications where our immersive 3D computer-based technology platform can improve the quality of life of patients with a variety of conditions.

Research and Development

Our research and development team has a track record of product innovation and significant product improvements. Since inception, we have introduced multiple brands in either the United States, international markets, or both.

We believe our ability to rapidly develop innovative products is in large part attributable to the fully integrated product innovation process that we have implemented, and the management philosophy behind that process. In addition, we have recruited and retained engineers with a variety of backgrounds and experience to support the development of innovative therapies. Substantially all of our research and development efforts are based at our campus in Alameda, California.

Manufacturing

We currently maintain our manufacturing facilities in Alameda and Roseville, California and currently produce substantially all of our products in-house. Our manufacturing facilities are International Organization for Standardization (“ISO”) 13485 compliant. We received ISO 13485:2016 certification of our Alameda facility in 2018 and successfully completed our most recent surveillance audit in 2023. We received ISO 13485:2016 certification of our Roseville facility in 2020 and successfully completed our most recent surveillance audit in 2023. In 2007, our Quality Management System was first audited to the European Union’s Medical Device Directive in support of product CE marking, and we successfully completed our most recent surveillance audit in 2023. We participate in the Medical Device Single Audit Program (“MDSAP”) which allows for certification and review of compliance to standards and regulations required in the United States, Canada, Brazil, Australia, and Japan by a single auditing organization. We received our first MDSAP certification in 2018 and successfully completed our most recent surveillance audit in 2023.

We use annual internal audits to ensure strong quality control practices. An internal, on-going staff training and education program contributes to our quality assurance program; training is documented and considered part of the employee evaluation process.

We believe we have adequate supplies or sources of availability of raw materials necessary to meet our needs. However, there are risks and uncertainties with respect to the supply of raw materials, particularly where provided by a single supplier, which could impact availability in sufficient quantities to meet our needs. In an effort to manage risk associated with raw materials supply, we work closely with suppliers to help ensure availability and continuity of supply while maintaining high quality and reliability. We also utilize long-term supply contracts with some suppliers to help maintain continuity of supply and manage the risk of price increases. Where possible, we seek second source suppliers or suppliers that have alternate manufacturing sites at which they could manufacture our parts.

Sales and Marketing

We sell our products directly in the United States, most of Europe, Canada and Australia, subject to required regulatory clearances and approvals. We have complemented our direct sales organization with distributors in most international markets.

We currently sell our products in the United States through our dedicated salesforce. Our sales representatives and sales managers generally have substantial medical device experience and market our products directly to a variety of specialist physicians engaged in the treatment of vascular disorders and healthcare providers who manage patients addressing motor function, cognition and mental well-being, who are the end users of our products and significantly influence buying decisions in hospitals and other healthcare settings relating to medical devices and other healthcare products. We are focused on developing strong relationships with specialist physicians and other healthcare providers and devote significant resources to training and educating physicians and other healthcare providers in the use and benefits of our products. The principal specialist physicians and other healthcare providers in our target end markets include:

- ***Thrombectomy*:** Interventional radiologists, interventional neuroradiologists, vascular surgeons, neurosurgeons, interventional cardiologists and interventional neurologists.
- ***Embolization and Access*:** Neurosurgeons, interventional neuroradiologists, interventional neurologists, interventional radiologists, vascular surgeons and pediatric interventional cardiologists.
- ***Immersive Healthcare:*** Occupational therapists, physical therapists, nurses, mental health professionals and other healthcare providers.

In addition to our direct sales organizations, we work with distributors in certain geographic areas where we have determined that selling through distributors is likely to be more effective.

We have continued licensing the technology to certain of our products to our existing distribution partner in China pursuant to a series of licensing arrangements entered into in December 2020, February 2022 and September 2023, which permit our partner to manufacture and commercialize such products in China in exchange for fixed payments upon the transfer of the licensed technology and upon the provision of related regulatory support, as well as royalty payments on downstream sales of the licensed products. We believe these arrangements will allow us to monetize our technology while helping us to mitigate market risk.

Our direct sales have been, and we anticipate will continue to represent, a majority of our revenues. In 2023, direct sales accounted for approximately 83% of our revenue, with the balance generated by independent distributors that sell our products outside of the United States and by the arrangements with our partner in China, which include licensing royalty and distribution revenue.

Backlog

We typically accept and ship orders on the day purchase orders are received or the next business day. Furthermore, if requested, we generally permit customers to cancel or reschedule without penalty. As a result, we do not believe that our backlog at any particular time is material, nor is it a reliable indication of future revenue.

Reimbursement

In the United States, hospitals are the primary purchasers of our products. Hospitals in turn bill various third-party payors, such as Medicare, Medicaid and private health insurance plans, for the total healthcare services required to treat the patient. Government agencies and some other payors determine whether to provide coverage for a particular procedure and to reimburse hospitals for inpatient treatment at a fixed rate based on the Medicare severity diagnosis-related group (“MS-DRG”) as determined by the U.S. Centers for Medicare and Medicaid Services (“CMS”). The fixed rate of reimbursement is generally based on the patients’ diagnosis and the procedure performed, and is unrelated to the specific medical device used in that procedure. Medicare rates for the same or similar procedures vary due to geographic location, nature of facility in which the procedure is performed (i.e., teaching or community hospital) and other factors. Private payors vary in their coverage and payment policies. While some may look to coverage and payment by Medicare as a guide, most formulate their own coverage and payment policies.

Some payors may deny reimbursement if they determine that the device used in a treatment was unnecessary, not cost-effective, or used for a non-approved indication. We cannot assure you that government or private third-party payors will cover and reimburse the procedures performed using our products in whole or in part in the future, that payment rates will be adequate, or that reimbursement rates will not change in the future.

Outside the United States, market acceptance of medical devices depends partly upon the availability of reimbursement within the prevailing healthcare payment system. Reimbursement levels vary significantly by country, and by region within some countries. Reimbursement is obtained from a variety of sources, including government-sponsored and private health insurance plans, and combinations of both. A small number of countries may require us to gather additional clinical data before or after recognizing coverage and reimbursement for our products. It is our intent to complete the requisite clinical studies and obtain coverage and reimbursement approval in countries where it makes economic sense to do so.

The increased emphasis on managed healthcare in the United States and on country and regional pricing and reimbursement controls in international markets will put additional pressure on product pricing, reimbursement and usage, which may adversely affect our product sales and results of operations. These pressures can arise from rules and practices of insurers and managed care organizations, judicial decisions and governmental laws and regulations related to Medicare, Medicaid and healthcare reform, medical device reimbursement policies and pricing in general. Our ability to achieve market acceptance or significant sales volume will depend in large part on the availability of coverage and the level of reimbursement for procedures performed using our products under healthcare payment systems in such markets.

All third-party reimbursement programs, whether government funded or insured commercially, whether in the United States or internationally, are developing increasingly sophisticated methods of controlling health care costs through prospective reimbursement and capitation programs, group purchasing, redesign of benefits, second opinions required prior to major surgery, review and analysis of claims, encouragement of and incentives for maintaining healthier lifestyles, and exploration of more cost-effective methods of delivering health care. These types of programs and legislative or regulatory changes to reimbursement policies could potentially limit the amount which healthcare providers may be willing to pay for medical devices.

Competition

The medical device industry is intensely competitive, subject to rapid change and significantly affected by new product introductions and other market activities of industry participants. We compete with a number of manufacturers and distributors of neuro and vascular medical devices. Our most notable competitors are Boston Scientific, Inari, Medtronic, Stryker, Terumo and several private companies. Most of these competitors are large, well-capitalized companies with longer operating histories and greater resources than we have. As a consequence, they are able to spend more on product acquisition, development, marketing, sales and other product initiatives than we can. We also compete with a number of smaller medical device companies that have single products or a limited range of products. Some of our competitors have:

- significantly greater name recognition;
- broader or deeper relations with healthcare professionals, customers, group purchasing organizations, and third-party payors;
- more established distribution networks;
- additional lines of products and the ability to offer rebates or bundle products to offer greater discounts or other incentives to gain a competitive advantage;
- greater experience in conducting research and development, manufacturing, clinical trials, marketing and obtaining regulatory clearance or approval for products; and
- greater financial and human resources for product development, sales and marketing and patent litigation.

We compete primarily on the basis that our products are able to treat patients with neuro and vascular diseases and disorders and other health conditions safely and effectively. Our continued success depends on our ability to:

- develop innovative, proprietary products that can cost-effectively address significant clinical needs;
- continue to innovate and develop scientifically advanced technology;
- obtain and maintain regulatory clearances or approvals;
- demonstrate safety and efficacy in Penumbra-sponsored and third-party clinical trials and studies;
- apply technology across product lines and markets;
- attract and retain skilled research and development and sales personnel; and

- cost-effectively manufacture and successfully market and sell products.

The immersive healthcare market is an emerging field within healthcare which is gaining increasing attention. There are a number of other companies that are also pursuing virtual reality-based healthcare solutions which have engaging therapeutic content activities. We believe that market success for us or any of our competitors in the immersive healthcare industry will be determined by virtual reality-based healthcare solutions becoming more widely accepted in the marketplace and the ability to design purpose-built virtual reality hardware and software specifically for use in healthcare.

Intellectual Property

Our success depends in part on our ability to protect our proprietary technology and intellectual property and operate without infringing the patents and other proprietary rights of third parties. We rely on a combination of patent, trademark, trade secret, copyright and other intellectual property rights and measures to protect our intellectual property rights that we consider important to our business. We also rely on know-how and continuing technological innovation to develop and maintain our competitive position. We do not have any material licenses to any technology or intellectual property rights.

As of December 31, 2023, we owned and/or had rights to 117 issued patents globally, of which 57 were U.S. patents. As of December 31, 2023, we owned and/or had rights to 68 pending patent applications, of which 32 were patent applications pending in the United States. Subject to payment of required maintenance fees, annuities and other charges, 16 of our issued patents are currently expected to expire between 2025 and 2026; 13 of these patents relate to components of the Penumbra System and the Indigo System. Thirty-seven of our issued patents, which relate to components of the Penumbra Coil 400, Ruby Coil System and Smart Coil System, are currently expected to expire between 2029 and 2037. Eighteen patents pertaining to the 3D Revascularization Device are projected to expire between 2032 and 2034. Twenty-one patents related to our REAL Immersive System are expected to expire between 2032 and 2042. Some of our pending patent applications pertain to components and methods of use associated with currently commercialized products. Our pending patent applications may not result in issued patents and we can give no assurance that any patents that have issued or might issue in the future will protect our current or future products or provide us with any competitive advantage. See the section titled “Risk Factors-Risks Related to Our Intellectual Property” in this Form 10-K for additional information.

Additionally, we own or have rights to trademarks or trade names that are used in our business and in conjunction with the sale of our products, including 43 U.S. trademark registrations and 214 foreign trademark registrations as of December 31, 2023. Included in the registered trademarks is a mark with our company name and logo.

We also seek to protect our proprietary rights through a variety of other methods, including confidentiality agreements and proprietary information agreements with suppliers, employees, consultants and others who may have access to our proprietary information.

Government Regulation

Our products are subject to extensive and ongoing regulation by the United States Food and Drug Administration (“FDA”) under the Federal Food, Drug, and Cosmetic Act (the “FD&C Act”) and its implementing regulations, as well as other federal and state regulatory bodies in the United States and comparable authorities in other countries under other statutes and regulations. The laws and regulations govern, among other things, product design and development, pre-clinical and clinical testing, manufacturing, packaging, labeling, storage, record keeping and reporting, handling of patient data and information clearance or approval, marketing, distribution, promotion, import and export, pricing and discounts, post-marketing surveillance and interactions with healthcare professionals. Failure to comply with applicable requirements may subject a device and/or its manufacturer to a variety of administrative sanctions, such as issuance of warning letters, import detentions, civil monetary penalties, and/or judicial sanctions, such as product seizures, injunctions and criminal prosecution.

United States

FDA’s Premarket Clearance and Approval Requirements

Each medical device we seek to commercially distribute in the United States will require either a prior premarket notification (or 510(k)) clearance, unless it is exempt, or a premarket approval (“PMA”) from FDA. Medical devices are classified into three classes—Class I, Class II or Class III—depending on the degree of risk associated with each medical device and the extent of control needed to provide reasonable assurance of safety and effectiveness. Class I devices are deemed to be low risk and are subject to the general controls of the FD&C Act, such as provisions that relate to adulteration; misbranding; registration and listing; notification, including repair, replacement, or refund; records and reports; and good manufacturing practices. Most Class I devices are classified as exempt from premarket notification under Section 510(k) of the FD&C Act, and therefore may be commercially distributed without obtaining 510(k) clearance from FDA. Class II devices are subject to

both general controls and special controls to provide reasonable assurance of safety and effectiveness. Special controls include performance standards, postmarket surveillance, patient registries, and guidance documents. A manufacturer may be required to submit to FDA a premarket notification requesting clearance to commercially distribute some Class II devices. Medical devices which pose the greatest risk, such as life-sustaining or life-supporting devices, or devices deemed not substantially equivalent to a previously cleared 510(k) device, are Class III devices. For Class III devices, a PMA application will be required unless the device was on the market prior to the passage of the medical device amendments in 1976, or substantially equivalent to such a device, and PMAs have not been called for. In that case, the manufacturer must submit a premarket notification and obtain 510(k) clearance in order to commercially distribute the device. FDA can also impose sales, marketing or other restrictions on devices in order to assure that they are used in a safe and effective manner.

510(k) Clearance Pathway

When a 510(k) clearance is required, a premarket notification must be submitted to FDA demonstrating that the proposed device is substantially equivalent to a predicate device, which is a previously cleared and legally marketed 510(k) device or a device that was in commercial distribution before May 28, 1976. By regulation, a premarket notification must be submitted and receive 510(k) clearance from FDA before the device can be marketed in the United States. The Medical Device User Fee Amendments (“MDUFA”) performance goal for a traditional 510(k) clearance is 90 calendar days. As a practical matter, however, clearance often takes longer, because the review clock can be paused by FDA to allow time to resolve questions on the 510(k) file. To demonstrate substantial equivalence, the manufacturer must show that the proposed device has the same intended use as the predicate device, and it either has the same technological characteristics, or different technological characteristics and the information in the premarket notification demonstrates that the device does not raise new questions of safety and effectiveness. FDA may require further information, including clinical data, to make a determination of substantial equivalence. If FDA determines the device, or its intended use, is not substantially equivalent to a previously cleared device or intended use, FDA will place the device into Class III, subject to the applicant’s option to submit a De Novo request for FDA to make a risk-based classification of the device into Class I or II.

There are three types of 510(k)s: traditional, special and abbreviated. Special 510(k)s are appropriate for certain technological, design, and labeling changes to a device which necessitates a new 510(k) but where the method(s) to evaluate the change(s) are well-established, and whether the results can be sufficiently reviewed in a summary or risk analysis format. Abbreviated 510(k)s are for devices that conform to a recognized standard. The special and abbreviated 510(k)s are intended to streamline review, and FDA intends to process special 510(k)s within 30 days of receipt.

Premarket Approval Pathway

A PMA application under section 515 of the FD&C Act must be submitted to FDA for Class III devices that support or sustain human life, are of substantial importance in preventing impairment of human health, or which present a potential, unreasonable risk of illness or injury. The PMA application process is much longer and more involved than the 510(k) premarket notification process. A PMA is based on a determination by FDA that the PMA application contains sufficient valid scientific evidence to assure that the device is safe and effective for its intended use(s).

After a PMA application is submitted, FDA has 45 days to determine whether the application is sufficiently complete to permit a substantive review and thus whether FDA will file the application for review. FDA has 180 days to review a PMA application, although the review of an application generally occurs over a significantly longer period of time and can take up to several years. During this review period, FDA may request additional information or clarification of the information provided. Also, an advisory panel of experts from outside FDA may be convened to review and evaluate the application and provide recommendations to the FDA as to the approvability of the device. Although FDA is not bound by the advisory panel decision, the panel’s recommendations are important to FDA’s overall decision making process. In addition, FDA may conduct a preapproval inspection of the manufacturing facility to ensure compliance with the Quality System Regulation (“QSR”). FDA also may inspect one or more clinical sites to assure compliance with FDA’s regulations.

Upon completion of the PMA application review, FDA may: (i) approve the PMA which authorizes commercial marketing with specific prescribing information for one or more indications, which can be more limited than those originally sought; (ii) issue an approvable letter which indicates FDA’s belief that the PMA application is approvable and states what additional information FDA requires, or the post-approval commitments that must be agreed to prior to approval; (iii) issue a not approvable letter which outlines steps required for approval, but which are typically more onerous than those in an approvable letter, and may require additional clinical trials that are often expensive and time consuming and can delay approval for months or even years; or (iv) deny the PMA application. If FDA issues an approvable or not approvable letter, the applicant has 180 days to respond, after which FDA’s review clock is reset.

Clinical Trials

Clinical trials are almost always required to support a PMA and are less often required for 510(k) clearance. In the United States, for significant risk devices, these trials require submission of an application for an IDE to FDA. The IDE application must be supported by appropriate data, such as animal and laboratory testing results, showing it is safe to test the device in humans and that the testing protocol is scientifically sound. The IDE must be approved in advance by FDA for a specific number of patients at specified study sites. During the trial, the sponsor must comply with FDA's IDE requirements for investigator selection, trial monitoring, reporting, and recordkeeping. The investigators must obtain patient informed consent, rigorously follow the investigational plan and study protocol, control the disposition of investigational devices, and comply with all reporting and recordkeeping requirements. Clinical trials for significant risk devices may not begin until the IDE application is approved by FDA and the appropriate institutional review boards ("IRBs"), at the clinical trial sites. An IRB is an appropriately constituted group that has been formally designated to review and monitor medical research involving subjects and which has the authority to approve, require modifications in, or disapprove research to protect the rights, safety and welfare of human research subjects. A nonsignificant risk device does not require FDA approval of an IDE; however, the clinical trial must still be conducted in compliance with various requirements of FDA's IDE regulations and be approved by an IRB at the clinical trials sites. The sponsor, FDA or the IRB at each site at which a clinical trial is being performed may withdraw approval of a clinical trial at any time for various reasons, including a belief that the risks to study subjects outweigh the benefits or a failure to comply with FDA or IRB requirements. Even if a trial is completed, the results of clinical testing may not demonstrate the safety and effectiveness of the device, may be equivocal or may otherwise not be sufficient to obtain approval or clearance of the product.

Sponsors of clinical trials of devices are required to register with clinicaltrials.gov, a public database of clinical trial information. Information related to the device, patient population, phase of investigation, study sites and investigators, and other aspects of the clinical trial is made public as part of the registration.

Ongoing Regulation by FDA

Along with the requirement for device clearance or approval by FDA, there are additional obligations and regulations that must be followed. These include:

- establishment registration and device listing;
- QSR per 21 CFR Part 820 of U.S. Code of Federal Regulations ("CFR"), which requires manufacturers, including third-party manufacturers, to follow design, testing, control, documentation, and other quality assurance procedures during all aspects of the manufacturing process;
- labeling regulations and prohibitions against product adulteration and misbranding (e.g., the promotion of products that do not have the appropriate market clearance or promotion for "off-label" uses), and other requirements related to promotional activities;
- medical device reporting regulations, which require that manufacturers report to FDA if their device may have caused or contributed to a death or serious injury or if their device malfunctioned and the device or a similar device marketed by the manufacturer would be likely to cause or contribute to a death or serious injury if the malfunction were to recur;
- corrections and removal reporting regulations, which require that manufacturers report to FDA field corrections or removals if undertaken to reduce a risk to health posed by a device or to remedy a violation of the FD&C Act that may present a risk to health; and
- post-market surveillance regulations, which apply to certain Class II or Class III devices when necessary to protect the public health or to provide additional safety and effectiveness data for the device.

After a device receives 510(k) clearance, any modification that could significantly affect its safety or effectiveness, or that would constitute a major change in its intended use, may require a new 510(k) or possibly a PMA. FDA requires each manufacturer to make this determination initially, but the FDA can review any such decision and may disagree with a manufacturer's determination. If FDA disagrees with the determination to not seek a new 510(k) clearance, FDA may retroactively require a 510(k) clearance or possibly a PMA. FDA could also require the manufacturer to cease marketing and distribution and/or recall the modified device until 510(k) clearance or a PMA approval is obtained. Also, in these circumstances, there may be significant regulatory fines and penalties.

Changes to an approved PMA device, including changes in indications, labeling, or manufacturing processes or facilities, require submission and FDA approval of a new PMA application or PMA supplement, as appropriate, before the change can be implemented. Supplements to a PMA often require the submission of the same type of information required for an original PMA application, with the exception that the supplement is generally limited to the information needed to support the proposed change from the device covered by the original PMA.

FDA regulations require the registration of manufacturing facilities for medical device manufacturers. Additionally, the California Department of Health Services ("CDHS") requires registration as a medical device manufacturer within the state. Therefore, FDA and the CDHS may inspect the registered facilities on a routine basis for compliance with the QSR. These regulations include requirements for the manufacturing of products and maintaining of related documentation with respect to manufacturing, testing, maintenance and control activities. Manufacturers are subject to regular QSR inspections in connection with the manufacture of medical devices at registered facilities. Further, FDA requires compliance with various labeling regulations. Failure by manufacturers or by their suppliers to comply with applicable regulatory requirements can result in enforcement action by FDA or state authorities, which may include any of the following sanctions:

- warning or untitled letters, fines, injunctions, consent decrees and civil penalties;
- customer notifications, voluntary or mandatory recall or seizure of our products;
- operating restrictions, partial suspension or total shutdown of production;
- delay in processing submissions or applications for new products or modifications to existing products;
- withdrawing approvals that have already been granted; and
- criminal prosecution.

The Medical Device Reporting laws and regulations require us to provide information to FDA when we receive or otherwise become aware of information that reasonably suggests our device may have caused or contributed to a death or serious injury as well as a device malfunction that likely would cause or contribute to death or serious injury if the malfunction were to recur. Our approach has been to file such reports with FDA even in cases where reporting might not otherwise be required out of an abundance of caution. In addition, FDA prohibits an approved device from being marketed for off-label use. FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses, and a company that is found to have improperly promoted off-label uses may be subject to significant liability, including substantial monetary penalties and criminal prosecution.

Newly discovered or developed safety or effectiveness data may require changes to a product's labeling, including addition of new warnings and contraindications, and also may require the implementation of other risk management measures. Also, new government requirements, including those resulting from new legislation, may be established, or FDA's policies may change, which could delay or prevent regulatory clearance or approval of our products under development.

We are also subject to other federal, state and local laws, and regulations relating to safe working conditions, laboratory, and manufacturing practices.

Regulatory Inspections

We are subject to periodic inspections by FDA and other regulatory entities, such as a European Notified Body, related to the regulatory requirements that apply to medical devices designed and manufactured, and clinical trials sponsored, by us. When FDA conducts an inspection, the inspectors will identify any deficiencies in the form of a notice of inspectional observations, or FDA Form 483. If a notice of inspectional observations or deficiencies is received from FDA following an inspection, we would be required to respond in writing, and would be required to undertake corrective and/or preventive or other actions in order to address FDA's or other regulators' concerns. Failure to address FDA's concerns may result in the issuance of a warning letter or other enforcement or administrative actions.

European Union

Our medical devices are regulated in the European Union as medical devices per the European Medical Devices Regulation 2017/745, as amended by Regulation 2023/607 ("EU MDR"). An authorized third party, also called a Notified Body, must approve products for CE marking, other than those which are categorized as class I self-certified. The CE mark is contingent upon continued compliance to the applicable regulations, harmonized standards and the quality system requirements of the EU MDR and the ISO 13485 standard.

Our medical devices were previously regulated per the European Union Directive (93/42/EEC), also known as the Medical Device Directive (the "MDD"). In May 2017, the EU MDR was published to replace the MDD and came into effect on May 26, 2021. We have updated our quality management system processes to meet the new EU MDR requirements, which were successfully audited most recently in September 2023 by a Notified Body. We have also submitted technical documentation supporting all of the device families we intend to CE Mark under MDR to our Notified body and obtained CE Mark approvals for many of our products. Due to the extension of the transitional period and removal of the "sell-off" periods under EU MDR pursuant to amendments enacted in March 2023, the transition dates for our devices holding CE certificates under MDD have been extended beyond the original expiration dates: Class IIb and III devices will be valid until December 31, 2027, and Class I and IIa devices will be valid until December 31, 2028. We expect to transition the remaining device families for CE marking under EU MDR prior to such deadlines, thereby allowing us to continue to supply our products to the market in the region covered by the EU MDR.

Other Regions

Most major markets have different levels of regulatory requirements for medical devices. Modifications to the cleared or approved products may require a new regulatory submission in all major markets. The regulatory requirements, and the review time, vary significantly from country to country.

Fraud and Abuse and Other Healthcare Regulation

Anti-Kickback Statute

We are subject to various federal and state healthcare laws, including, but not limited to, anti-kickback laws. In particular, the federal Anti-Kickback Statute prohibits persons or entities from knowingly and willfully soliciting, offering, receiving or paying any remuneration, directly or indirectly, overtly or covertly, in cash or in kind, in exchange for or to induce either the referral of an individual for the furnishing or arranging for a good or service, or for the purchasing, leasing, ordering, or arranging for or recommending any good, facility, service or item for which payment may be made in whole or in part under federal healthcare programs, such as the Medicare and Medicaid programs. The federal Anti-Kickback Statute is broad and prohibits many arrangements and practices that are lawful in businesses outside of the healthcare industry. The term "remuneration" expressly includes kickbacks, bribes, or rebates and also has been broadly interpreted to include anything of value, including, for example, gifts, discounts, the furnishing of supplies or equipment, credit arrangements, payments of cash, waivers of payments, ownership interests and providing anything at less than its fair market value.

There are a number of statutory exceptions and regulatory safe harbors protecting certain business arrangements from prosecution under the federal Anti-Kickback Statute. These statutory exceptions and safe harbors set forth provisions that, if all their applicable requirements are met, will assure healthcare providers and other parties that they may not be prosecuted under the federal Anti-Kickback Statute. The failure of a transaction or arrangement to fit precisely within one or more applicable statutory exceptions or safe harbors does not necessarily mean that it is illegal or that prosecution will be pursued. However, conduct and business arrangements that do not fully satisfy all requirements of an applicable safe harbor may result in increased scrutiny by government enforcement authorities and will be evaluated on a case-by-case basis based on a cumulative review of all of its facts and circumstances. Additionally, the intent standard under the federal Anti-Kickback Statute was amended under the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act of 2010 ("Affordable Care Act"), to a stricter standard such that a person or entity no longer needs to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation. The Affordable Care Act provides that the government may assert that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the federal civil False Claims Act which is discussed below. Penalties for violations of the anti-kickback statute include, but are not limited to, criminal, civil and/or administrative penalties, damages, fines, disgorgement, individual imprisonment, possible exclusion from Medicare, Medicaid and other federal healthcare programs, and the curtailment or restructuring of operations. Various states have adopted laws similar to the federal Anti-Kickback Statute, and some of these state laws may be broader in scope in that some of these state laws extend to all payors and may not contain safe harbors. In addition, many foreign jurisdictions in which we operate have similar laws and regulations.

Federal Civil False Claims Act . The federal civil False Claims Act prohibits, among other things, persons or entities from knowingly presenting or causing to be presented a false or fraudulent claim to, or the knowing use of false statements to obtain payment from or approval by, the federal government. Suits filed under the federal civil False Claims Act, known as "qui tam" actions, can be brought by any individual on behalf of the government. These individuals, sometimes known as "relators" or, more commonly, as "whistleblowers," may share in any amounts paid by the entity to the government in fines or settlement. As a result, qui tam actions continue to cause healthcare companies to have to defend cases brought under the federal civil False Claims Act. If an entity is determined to have violated the federal civil False Claims Act, it may be required to pay up to three times the actual damages sustained by the government, plus civil penalties for each separate false claim. Various states have

adopted laws similar to the federal civil False Claims Act, and many of these state laws are broader in scope and apply to all payors, and therefore, are not limited to only those claims submitted to the federal government.

Federal Civil Monetary Penalties Statute. The federal Civil Monetary Penalties Statute, among other things, imposes fines against any person who is determined to have presented, or caused to be presented, claims to a federal healthcare program that the person knows, or should know, is for an item or service that was not provided as claimed or is false or fraudulent.

Sunshine Act. The Affordable Care Act also included a provision, commonly referred to as the Sunshine Act, that requires any manufacturer of a covered device that provides payments or other transfers of value to a physician or teaching hospital, or to a third party at the request of a physician or teaching hospital, to submit to CMS on an annual basis information about the payments or other transfers of value, with the reported information to be made public on a searchable website. This reporting requirement was expanded by the SUPPORT for Patients and Communities Act, which required manufacturers, beginning January 1, 2021, to report payments or other transfers of value to physician assistants, nurse practitioners, clinical nurse specialists, certified registered nurse anesthetists, and certified nurse midwives in addition to physicians and teaching hospitals. Similar laws have been enacted at the state level and in foreign jurisdictions, including France.

Foreign Corrupt Practices Act and Anti-Bribery Laws. The Foreign Corrupt Practices Act ("FCPA") prohibits U.S. companies and their representatives from offering or making payments to foreign officials for the purpose of securing a business advantage. In many countries, the healthcare professionals we regularly interact with may meet the definition of a foreign government official for purposes of the FCPA. Similar anti-bribery laws are in effect in many of the countries in which we operate.

Health Insurance Portability and Accountability Act of 1996 . The federal Health Insurance Portability and Accountability Act of 1996, as amended ("HIPAA") created several new federal crimes, including healthcare fraud and false statements relating to healthcare matters. The healthcare fraud statute prohibits knowingly and willfully executing a scheme to defraud any healthcare benefit program, including private third-party payors. The false statements statute prohibits knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items or services. In addition, HIPAA and its implementing regulations established uniform standards for certain covered entities, which are healthcare providers, health plans and healthcare clearinghouses, as well as their business associates, governing the conduct of specified electronic healthcare transactions and protecting the security and privacy of protected health information.

The American Recovery and Reinvestment Act of 2009, commonly referred to as the economic stimulus package, included an expansion of HIPAA's privacy and security standards called the Health Information Technology for Economic and Clinical Health Act ("HITECH"). Among other things, HITECH created four tiers of civil monetary penalties and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorneys' fees and costs associated with pursuing federal civil actions.

Human Capital Resources

As of December 31, 2023, we had approximately 4,200 employees worldwide. None of our U.S. employees are represented by a collective bargaining agreement. Some of our employees outside of the United States are subject to mandatory, industry-specific collective bargaining agreements or the protections of statutory works councils as required by local law. We have never experienced a work stoppage. We believe our employee relations are good.

In managing our business, we focus on a number of measures and objectives with respect to the attraction, development and retention of our employees that we believe are important to our business, including diversity, communication, compensation, professional development, and health, well-being and safety:

- We are proud to be an equal opportunity employer and to have a diverse employee population and leadership team: for example, as of December 31, 2023, approximately 50% of our employees are female, more than half of our senior management team are female, and approximately 75% of our employee population in the United States are from a minority background. We seek to attract a diverse slate of candidates, including from historically underrepresented groups. We believe that diversity and inclusion in the workplace enhance employee engagement and stimulate innovation, and that people in diverse groups work better, share information more broadly and consider a wider range of views. We pride ourselves on our diverse workforce, which we believe has been and will continue to be a major contributor to our growth and innovation, and intend to continue to make diversity and inclusion a cornerstone of our efforts regarding our workforce.
- We aim to maintain an "open door" culture, and encourage employees to voice their concerns, questions, suggestions and comments. We strive to foster an atmosphere where employees openly share ideas and where people are treated

with dignity and respect. Our goal is to provide a productive working environment based on mutual respect and the highest level of ethical and lawful conduct. We have also established a hotline for employees to report suspected violations of law and concerns related to accounting, auditing and ethical violations.

- We provide our employees a competitive wage that is aimed to allow them to meet the standard cost of living in their region. We evaluate our compensation programs to ensure that our employees are paid fairly for the valuable work they are doing, and we are rewarding outstanding performance. We are also committed to achieving internal pay equity. We offer our employees competitive benefits that follow local country standards.
- We aim to foster a culture where learning is continuous, and we strive to promote from within. We believe in our people and their ability to accept new responsibilities and challenges and to grow with us to contribute to our success. Growth is fostered through professional development and learning programs as well as practical experience leading projects or teams. Employees receive regular performance reviews to support their progress and development.
- We recognize the benefits of a healthy workforce. We provide employees at our Alameda campus with on-site restaurants that offer fresh food at discounted pricing for employees, and we maintain on-site fitness centers for employees at our Alameda and Roseville campuses. Employees in the United States are also eligible for a gym discount at a local commercial fitness chain. We also support the mental health of our employees by offering an employee assistance program for employees and their families that provides free counseling sessions and offers other resources for employees.
- We prioritize the health and safety of our employees. Guided by a strategic plan that is regularly reviewed, we have a dedicated Employee Health and Safety team, who seek to prevent and reduce workplace risks and injuries through various programs, projects, services, and assistance, such as ergonomic evaluation, hazard reporting, risk assessment, and first aid training. Employee safety is also supported by an access control system at all facilities and a dedicated 24/7 Security team on the Alameda and Roseville campuses. We require all work-related injuries or illnesses to be reported. This information is reviewed monthly by our Safety Committee for analysis and trending.

Facilities

We maintain approximately 610,000 square feet of office, research and development, manufacturing and administrative facilities in nine buildings at our campus in Alameda, California as of December 31, 2023. The leases for these nine buildings expire at various times in 2036, subject to our option to renew certain leases for an additional five to fifteen years. We also lease approximately 210,000 square feet of office and manufacturing facilities in two buildings in Roseville, California. The leases for these two buildings expire in 2035, subject to our option to renew the leases for an additional five to ten years. An additional approximately 50,000 square feet of space in one of the buildings, located at 620 Roseville Parkway, will be added to the lease upon the earlier of completion of certain improvements to the premises, which is not expected to occur in 2024, and June 1, 2025. In addition, we lease approximately 70,000 square feet of warehouse space in Livermore, California, and approximately 100,000 square feet of warehouse space in Salt Lake City, Utah. The leases for the Livermore warehouse spaces expire at various times in 2025 to 2028. The lease for the Salt Lake City warehouse expires in 2027, subject to our option to renew the lease for an additional five years.

We also lease office and/or warehouse space in Germany, Italy, Brazil, Australia, Singapore, Japan and Taiwan as of December 31, 2023. The offices in Germany support our direct sales operations in Europe as well as distributor relationships in Europe and the Middle East; the offices in Brazil, Australia, Singapore, Japan and Taiwan support our sales and marketing efforts, including through our distribution partners, in Latin America, Australia and Southeast Asia, respectively; and the offices in Italy support the operations of Crossmed S.p.A., our wholly-owned subsidiary in Italy, including supporting our direct sales operations in Italy, San Marino, Vatican City, and Switzerland. We also warehouse and distribute finished products to our international customers utilizing third-party logistics providers in the Netherlands and Australia.

Legal Proceedings

From time to time, we are subject to claims and assessments in the ordinary course of business. For more information regarding our current legal proceedings, please refer to the section entitled “Legal Proceedings” in Part I, Item 3 of this Form 10-K. Such matters are subject to many uncertainties and there can be no assurance that legal proceedings arising in the ordinary course of business or otherwise will not have a material adverse effect on our business, financial condition, results of operations or cash flows.

Available Information

We make our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to those reports available free of charge at our website as soon as reasonably practicable after they have been filed with the SEC. Our website address is www.penumbrainc.com. Information contained in or accessible through our website is not part of this report. The SEC maintains a website that contains the materials we file with the SEC at www.sec.gov.

ITEM 1A. RISK FACTORS.

This Form 10-K contains forward-looking information based on our current expectations. Because our business is subject to many risks and our actual results may differ materially from any forward-looking statements made by or on behalf of us, this section includes a discussion of important factors that could affect our business, operating results, financial condition and the trading price of our common stock. You should carefully consider these risk factors, together with all of the other information included in this Form 10-K as well as our other publicly available filings with the SEC. If any of the following risks actually occurs, our business, financial condition, results of operations and future prospects could be materially and adversely harmed.

Business Risks

We have a limited operating history in certain markets and may not be able to sustain or grow our profitability or generate positive cash flows from operations in the future.

We were founded in 2004 and did not generate any revenue until 2007. Moreover, while we have successfully developed, obtained regulatory clearance or approval for, and introduced a number of products in our target markets, in certain markets we have a limited operating history upon which investors can evaluate our business and prospects, and this limited operating history may not be indicative of our future results. We incurred operating losses in 2021. We can give no assurance that we will be profitable or cash flow positive in the future.

Our sales, general and administrative expenses have increased, and we expect that they will continue to increase, to support our past and anticipated future growth. We have also expended significant amounts on research and development to develop our products, and we expect to continue to do so. We also expend significant amounts on maintaining inventory levels of raw materials, components and finished products to meet anticipated customer demand. In addition, our coil products are sold on a consignment basis, which requires us to expend significant amounts on inventory that is placed at many customer locations. Our ability to sustain our growth and profitability and generate positive operating cash flow in the future may be influenced by many factors, including:

- our ability to achieve and maintain market acceptance of our products;
- unanticipated problems and additional costs relating to the development and testing of new products;
- our ability to introduce, manufacture at scale, build new inventory and commercialize new products;
- our ability to produce sufficient quantities of our products to meet demand;
- the impact of competition;
- the timing and impact of market, reimbursement and regulatory developments;
- our ability to expand into new markets;
- pricing pressure from competitors;
- the availability and adequacy of third-party reimbursement for procedures in which our products are used; and
- our ability to obtain and maintain adequate intellectual property protection for our products and technologies.

If we encounter difficulties with any of the foregoing or unexpected expenses, it could materially adversely affect our business, results of operations, financial condition or cash flows.

Our existing products may be rendered obsolete and we may be unable to effectively introduce and market new products or may fail to keep pace with advances in technology.

The medical device market is characterized by rapidly advancing technology. Our success and growth depends, in part, on our ability to anticipate technological advancements and competitive innovations and introduce new products to adapt to these advancements and innovations. To compete in the marketplace, we have made, and we must continue to make, substantial investments in new product development, whether internally through research and development or externally through licensing or acquisitions. We can give no assurance that we will be successful in identifying, developing or acquiring, and marketing new products or enhancing our existing products. In addition, we can give no assurance that new products or alternative treatment techniques developed by competitors will not render our current or future products obsolete or inferior, technologically or economically.

The success of any new products that we develop or acquire depends on achieving and maintaining market acceptance. Market acceptance for our current and new products could be affected by a number of factors, including:

- our ability to market and distribute our products effectively;
- the availability, perceived efficacy and pricing of alternative products from our competitors;
- the development of new products or alternative treatments by others that render our products and technologies obsolete;
- the price, quality, effectiveness and reliability of our products;
- our customer service and reputation;
- our ability to convince specialist physicians and other healthcare providers to use our products on their patients; and
- the timing of market entry of new products or alternative treatments.

For example, treatment protocols for ischemic stroke patients vary according to the particular hospital, often resulting in significant delays and gaps in patients being assessed for and receiving interventional treatment. We believe that the stroke care system in the United States has not been historically geared towards interventional treatment of stroke due to the absence of clinical evidence that interventional techniques were effective. Specialist physician societies and we and our competitors are making efforts to alter the existing stroke care pathway, but we anticipate that these efforts will take years to be fully successful. The success of these efforts may depend on whether we and our competitors can effectively use substantial clinical data - demonstrating that intervention yields superior clinical results relative to cases where intervention is not used - to convince specialist physicians to use interventional techniques to treat ischemic stroke patients. Even if these efforts are successful, it may be years before existing systems and care pathways are changed.

Our inability to maintain or grow the market acceptance of our existing products, or to develop and market new products, could result in write-offs of our inventory and otherwise have a material and adverse effect on our business, results of operations, financial condition or cash flows.

Delays in product introductions could adversely affect our business, results of operations, financial condition or cash flows.

The medical device market is highly competitive and designs change often to adjust to shifting market preferences and other factors. Therefore, product life cycles are relatively short. As a result, any delays in our product launches may significantly impede our ability to enter or compete in a given market and may reduce the sales that we are able to generate from these products. We may experience delays in any phase of a product launch, including during research and development, clinical trials, regulatory review, manufacturing and marketing.

In addition, our competition may respond more quickly to new or emerging technologies or a changing clinical landscape, undertake more extensive marketing campaigns, have greater financial, marketing and other resources than us or be more successful in attracting potential customers and strategic partners. Given these factors, we cannot assure you that we will be able to continue or increase our level of success. If we are unable to introduce new and innovative products, or if there are delays in product introductions, our business, results of operations, financial condition or cash flows could be materially adversely affected.

We face significant competition, and if we are unable to compete effectively, we may not be able to achieve or maintain significant market penetration or improve our results of operations.

The medical device industry is intensely competitive, subject to rapid change and significantly affected by new product introductions and other market activities of industry participants. We compete with a number of manufacturers and distributors of neuro and vascular devices. Our most notable competitors are Boston Scientific, Inari, Medtronic, Stryker, Terumo and several private companies. Most of these competitors are large, well-capitalized companies with longer operating histories and greater resources than us. We also compete with a number of smaller medical device companies that have a single product or a limited range of products. Our competitors may be able to spend more on product acquisition, development, marketing, sales and other product initiatives, or be more focused in their spending and activities, than we can. Some of our competitors have:

- significantly greater name recognition;

- broader or deeper relations with healthcare professionals, customers, group purchasing organizations and third-party payors;
- more established distribution networks;
- additional lines of products and the ability to offer rebates or bundle products to offer greater discounts or other incentives to gain a competitive advantage;
- greater experience in conducting research and development, manufacturing, clinical trials, marketing and obtaining regulatory clearance or approval for products; and
- greater financial and human resources for product development, sales and marketing and patent litigation.

We compete primarily on the basis that our products are able to treat patients with neuro and vascular diseases and disorders and other health conditions safely and effectively, with improved outcomes and procedural cost savings. Our continued success depends on our ability to:

- develop innovative, proprietary products that can cost-effectively address significant clinical needs;
- continue to innovate and develop scientifically advanced technology;
- obtain and maintain regulatory clearances or approvals;
- demonstrate efficacy in Penumbra-sponsored and third-party clinical trials and studies;
- apply technology across product lines and markets;
- attract and retain skilled research and development and sales personnel; and
- cost-effectively manufacture and successfully market and sell products.

We cannot assure you that we will be able to compete effectively on the basis of these factors. Additionally, our competitors with greater financial resources could acquire or develop new technologies or products that effectively compete with our existing or future products. If we are unable to effectively compete, it would materially adversely affect our business, results of operations, financial condition and cash flows.

We may not be able to achieve or maintain satisfactory pricing and margins for our products.

Manufacturers of medical devices have a history of price competition, and we can give no assurance that we will be able to achieve satisfactory prices for our products or maintain prices at the levels we have historically achieved. If we are unable to achieve or maintain our prices, or if our costs increase and we are unable to offset such increase with an increase in our prices, our margins could erode and we may be unable to achieve or maintain profitable operations in the future. Events beyond our control, such as the COVID-19 pandemic, can impact global supply chains, resulting in an increase in the cost of certain raw materials and components used in our products. While we have taken steps to reduce our manufacturing costs and to increase efficiencies, there can be no assurance that such measures will be successful or will reduce our costs commensurate with the increase in the cost of raw materials and components. If we are unable to increase our pricing or reduce our manufacturing costs in response to increases in the cost of raw materials and components used in our products, our business, results of operations, financial condition and cash flows may be materially adversely affected.

Our future growth depends, in part, on our ability to further penetrate our current customer base and increase the frequency of use of our products by our customers as well as expand our user base to include additional specialist physicians and other healthcare providers in both our existing and future target end markets.

Currently, the primary users of our products are specialist physicians, including interventional neuroradiologists, neurosurgeons, interventional neurologists, interventional radiologists, interventional cardiologists and vascular surgeons. Our future growth will require us to continue to make our current specialist physician and other healthcare provider customers aware of the benefits of our products to generate increased demand and frequency of use, and thus increase sales to such customers.

Our future growth will also depend on our ability to expand our customer base, which will require us to convince specialist physicians and other healthcare providers in our existing and future target end markets that are not current customers of our products' efficacy, to educate them in the proper use of our products and to sell our products to their affiliated hospitals or other organizations. Convincing such specialist physicians and other healthcare providers to use new products and to dedicate the

time and energy necessary for adequate education in the use of our products is challenging, especially in new markets where treatments or therapies using our products are not established.

Although we are attempting to increase the number of patients treated with our products through our established relationships and focused sales efforts, we cannot provide assurance that our efforts will increase the use of our products by our existing customers. In addition, expanding our customer base in existing and new target end markets may require, among other things, additional clinical evidence supporting patient benefits, training in a manner to which we are not accustomed, or other resources that we do not readily have available or are not cost effective for us to provide. If we are unable to increase the frequency of use of our products by our existing customers and expand our customer base to include additional specialist physicians and other healthcare providers in both our existing and future target end markets, our sales growth will be limited, which could materially adversely affect our business, results of operations, financial condition or cash flows.

We may not have the resources to successfully market and sell our products, which would adversely affect our business and results of operations.

The marketing and sales of our products requires us to invest in training and education and employ a salesforce that is large enough to interact with the specialist physicians and other healthcare providers who use our products. Entering new markets also requires a significant amount of time and expense in order to identify and establish relationships with key opinion leaders among the specialist physicians and other healthcare providers who may use our products in those markets. We may not have adequate resources to market and sell our products successfully against larger competitors. If we cannot market and sell our products successfully, our business, results of operations, financial condition and cash flows could be materially adversely affected.

Third-party reimbursement may not be available or adequate for the procedures or sessions for which our products are used, and may be subject to change.

Our ability to commercialize new products successfully in both the United States and international markets depends in part on the availability of, and hospitals' and other customers' ability to obtain, adequate levels of third-party reimbursement for the procedures or sessions in which our products are used. In the United States, the cost of medical care is funded, in substantial part, by government insurance programs, such as Medicare and Medicaid, and private and corporate health insurance plans. Third-party payors may deny reimbursement if they determine that a device used in a procedure has not received appropriate FDA or other governmental regulatory clearances or approvals, is not used in accordance with cost-effective treatment methods as determined by the payor, or is experimental, unnecessary or inappropriate. Our ability to commercialize our products successfully will depend, in large part, on the extent to which adequate reimbursement levels for the cost of their use are obtained from government authorities, private health insurers and other organizations, such as health maintenance organizations. Further, healthcare in the United States and international markets is also being affected by economic pressure to contain reimbursement levels and costs, and various healthcare reform proposals have emerged and may continue to emerge at the U.S. state and federal level. Changing reimbursement models and the impact of healthcare reform laws, either domestically or internationally, could materially adversely affect our business, results of operations, financial condition or cash flows.

We have generated a significant portion of our revenue and revenue growth from a limited number of product families, and our revenue and business prospects would be adversely affected if sales of any of these product families were to decline.

We have generated most of our revenue and revenue growth from a limited number of product families. If any one or more of these product families were adversely affected because of regulatory, third-party reimbursement or intellectual property issues or any other reason, or if one of our competitors introduced one or more products that specialist physicians or other healthcare providers believe are superior to our products, our revenue from one of these product families could decline. A significant decline in our sales of any of these product families could also negatively impact our financial condition and our ability to conduct product development activities, and therefore negatively impact our business prospects.

If specialist physicians or other healthcare providers do not recommend and endorse, or use, our products or if our relationships with specialist physicians or other healthcare providers deteriorate, our products may not be accepted or maintain acceptance in the marketplace, which would adversely affect our business and results of operations.

Our products are sold primarily to hospitals for use by specialist physicians and other healthcare providers practicing at their facilities. In order for us to sell our products, specialist physicians and other healthcare providers must recommend and endorse them for the hospital to purchase them, and must use them in treating their patients to generate follow-on sales. We may not obtain the necessary recommendations or endorsements for new products from specialist physicians and other healthcare providers, our products may not receive approval from the relevant hospital's value analysis committee, or we may not be able to maintain the current or future level of acceptance and usage of our products. Acceptance of our products depends

on educating the medical community as to the distinctive characteristics, perceived benefits, safety, clinical efficacy and cost-effectiveness of our products compared to products of our competitors or treatments that do not use our products, and on training specialist physicians and other healthcare providers in the proper application and use of our products. We invest in significant training and education of our sales representatives, specialist physicians and other healthcare providers to achieve market acceptance of our products, with no assurance of success. If we are not successful in obtaining and maintaining the recommendations or endorsements of specialist physicians and other healthcare providers for our products, if specialist physicians and other healthcare providers prefer our competitors' products or other alternative treatments that do not use our products, if our products do not receive approval from relevant hospitals' value analysis committees, or if our products otherwise do not gain or maintain market acceptance, our business could be adversely affected.

In addition, the research, development, marketing and sales of our products are dependent, in part, upon our working relationships with specialist physicians and other healthcare providers. We rely on them to provide us with knowledge and feedback regarding our products and the marketing of our products. If we are unable to develop or maintain strong relationships with specialist physicians and other healthcare providers and receive their advice and input, the development and marketing of our products could suffer, which could materially adversely affect our business, results of operations, financial condition or cash flows.

Our dependence on key suppliers puts us at risk of interruptions in the availability of our products, which could reduce our revenue and adversely affect our results of operations.

We require the timely delivery of sufficient amounts of components and materials to manufacture our products. For reasons of quality assurance, cost effectiveness or availability, we typically procure certain raw materials and components from a single or limited number of suppliers. We generally acquire such raw materials and components through purchase orders placed in the ordinary course of business, and as a result we may not have a significant inventory of these materials and components and generally do not have any guaranteed or contractual supply arrangements with many of these suppliers. Our reliance on these suppliers subjects us to risks that could harm our business, including, but not limited to, difficulty locating and qualifying alternative suppliers. For example, FDA and regulators outside of the United States may require additional testing of any raw materials or components from new suppliers prior to our use of these materials or components. In the case of a device with clearance under Section 510(k) of the FD&C Act, referred to as a 510(k), we may be required to submit a new 510(k) if a change in a raw material or component supplier results in a change in a material or component supplied that is not within the 510(k) cleared device specifications. If we need to establish additional or replacement suppliers for some of these materials or components, our access to the materials or components might be delayed while we qualify such suppliers and obtain any necessary FDA approvals or clearances. Our suppliers may also be subject to regulatory inspection and scrutiny. Any adverse regulatory finding or action against those suppliers could impact their ability to supply us with raw materials and components for our products. We may also face delays, yield issues and quality control problems if we are required to locate and secure new sources of materials or components.

Our dependence on third-party suppliers involves several other risks, including limited control over pricing, availability, quality and delivery schedules. Suppliers of raw materials and components may decide, or be required, for reasons beyond our control, to cease supplying raw materials and components to us or to raise their prices. Shortages of raw materials, quality control problems, or production capacity constraints or delays by our suppliers could negatively affect our ability to meet our production requirements and result in increased prices for affected materials or components. Any material shortage, constraint or delay may result in delays in shipments of our products, which could materially adversely affect our results of operations.

Finally, some of our products are sterilized prior to use at a third-party sterilizer in the United States using ethylene oxide. The U.S. Environmental Protection Agency has proposed regulations aimed at reducing hazardous air pollutants, including emissions of ethylene oxide, and any future regulatory action that requires sterilization facilities to modify their sterilization processes to limit the use of ethylene oxide could impact the supply of sterilization services as well as the cost for such services. In addition, certain sterilization facilities in the United States have undergone temporary closures mandated by state agencies in recent years due to concerns over the impact of emissions of ethylene oxide from such facilities, and any future closures could lead to increased demand for sterilization services at the facilities we currently use to sterilize our products, which could prevent us from being able to sterilize our products at a pace sufficient to meet product demand and/or result in an increase in the cost of sterilization services. While we continue to work to improve our capacity and flexibility in connection with the sterilization of our products, any regulations that limit the use of ethylene oxide at, or any temporary or permanent closures of, sterilization facilities, including the facilities we currently use, could, due to the limited number of sterilization facilities and the time required to approve and license, and gain regulatory approval for us to use, a sterilization facility, impact our ability to obtain sterilization services on a timely basis, which could materially adversely affect our results of operations.

We cannot be certain that we will be able to manufacture our products in high volumes at commercially reasonable costs.

We currently maintain our primary manufacturing operations at our facilities in Alameda and Roseville, California. We currently produce substantially all of our products at these facilities, and we can give no assurance that these facilities will be adequate for our future needs. We may need to expend significant capital resources and further increase the size of our manufacturing capabilities as we grow our business. We could, however, encounter problems related to:

- capacity constraints;
- production yields;
- quality control;
- equipment availability; and
- shortages of qualified personnel.

Our continuous product innovation may limit our ability to identify and implement manufacturing efficiencies. Failure to do so may reduce our ability to manufacture our products at commercially reasonable costs. If we are unable to manufacture our products in high volumes at commercially reasonable costs, it could materially affect our ability to adequately increase production of our products and fulfill customer orders on a timely basis, which could have a material adverse effect on our business, results of operations, financial condition or cash flows.

We are required to maintain high levels of inventory, which consume a significant amount of our working capital and could lead to permanent write-downs or write-offs of our inventory.

We maintain a significant inventory of raw materials, components and finished goods, which subjects us to a number of risks and challenges. Our hospital customers typically maintain only small quantities of our products at their facilities, so as products are used, they order replacements that typically require prompt delivery. As a result, we must maintain sufficient levels of finished goods to permit rapid shipment of products following receipt of a customer order. In turn, we must also maintain a sufficient supply of raw materials and components inventory to permit rapid manufacturing and re-stocking of finished goods. Furthermore, our coil inventory is supplied to hospital customers on a consignment basis, which means that it is classified as part of our inventory for financial reporting purposes but is maintained at the hospital location until it is used. We have built, and will continue to build, a significant inventory of coils in order to support the introduction of and to provide adequate consignment stock for our new and existing coil products.

Maintaining a significant inventory of raw materials, components and finished goods, including coils, consumes a significant amount of our working capital. This working capital could be used for other purposes, such as research and development or sales and marketing activities. As we grow our business, we may need substantial additional capital to fund higher levels of inventory, which may materially adversely affect our liquidity or result in dilution to our stockholders if we sell additional equity securities or leverage if we raise debt capital to finance our working capital requirements.

Maintaining a significant inventory of raw materials, components and finished goods, including coils, also subjects us to the risk of inventory excess and obsolescence, which may lead to a permanent write-down or write-off of our inventory. While in inventory, our components and finished goods may become obsolete, and we may over-estimate the amount of inventory needed, which may lead to excessive inventory. In these circumstances we would write-down or write-off our inventory and may be required to expend additional resources or be constrained in the amount of end product that we can produce. Furthermore, our products have a limited shelf life due to sterilization requirements, and part or all of a given product or component may expire, resulting in a decrease in value and potentially a permanent write-down of our inventory. In addition, maintaining a significant inventory of raw materials, components and finished goods at our facilities requires us to invest resources to safeguard such inventory and presents risk of misappropriation. In the event that a substantial portion of our inventory becomes excess or obsolete, or is otherwise damaged, misappropriated or destroyed, it could materially adversely affect our results of operations.

Defects or failures or alleged defects or failures associated with our products could lead to recalls, safety alerts, or product-related or securities litigation, as well as significant costs and negative publicity.

Manufacturing flaws, component failures, design defects, off-label uses or inadequate disclosure of product-related information could result in an unsafe condition or the injury or death of a patient. These problems could lead to a recall of, or issuance of a safety alert relating to, our products and result in significant costs, negative publicity and adverse competitive pressure. While we have had product recalls, they have all been voluntary. The circumstances giving rise to recalls are,

however, unpredictable, and any recalls of existing or future products could materially adversely affect our business, results of operations, financial condition or cash flows.

The medical device industry has historically been subject to extensive litigation over product liability claims. There are high rates of mortality and other complications associated with some of the medical conditions suffered by the patients whom specialist physicians use our devices to treat, and we may be subject to product liability claims if our products cause, or merely appear to have caused, an injury or death. In addition, an injury or death that is caused by the activities of our suppliers, such as those that provide us with components and raw materials, or by an aspect of a treatment used in combination with our products, such as a complementary drug or anesthesia, may be the basis for a claim against us by patients, hospitals, healthcare providers or others purchasing or using our products, even if our products were not the actual cause of such injury or death. An adverse outcome involving one of our products could result in reduced market acceptance and demand for all of our products, and could harm our reputation and our ability to market our products in the future. In some circumstances, adverse events arising from or associated with the design, manufacture or marketing of our products could result in the suspension or delay of regulatory reviews of our premarket notifications or applications for marketing. Any of the foregoing problems could disrupt our business and have a material adverse effect on our business, results of operation, financial condition or cash flows.

Although we carry product liability insurance in the United States and in other countries in which we conduct business, including for clinical trials and product marketing, we can give no assurance that such coverage will be available or adequate to satisfy any claims. Product liability insurance is expensive, subject to significant deductibles and exclusions, and may not be available on acceptable terms, if at all. If we are unable to obtain or maintain insurance at an acceptable cost or on acceptable terms with adequate coverage or otherwise protect against potential product liability claims, we could be exposed to significant liabilities. A product liability claim, recall or other claim with respect to uninsured liabilities or for amounts in excess of insured liabilities could materially adversely affect our business, financial condition and results of operations. Defending a product liability suit, regardless of its merit or eventual outcome, could be costly, could divert management's attention from our business and might result in adverse publicity, which could result in reduced acceptance of our products in the market, product recalls or market withdrawals.

In addition, the occurrence of an adverse event relating to our products, a product recall or a product liability claim against us may cause our stock price to decline, which could result in securities class action litigation claims against us. We were involved in one such lawsuit in 2021, which was voluntary dismissed without prejudice in March 2021, and we may be the target of this type of litigation in the future. Any such litigation could result in substantial costs and a diversion of our management's attention and resources.

Our products are continually the subject of clinical trials conducted by us, our competitors, or other third parties, the results of which may be unfavorable, or perceived as unfavorable, which could materially adversely affect our business, financial condition and results of operations.

As a part of the regulatory process of obtaining marketing clearance or approval for new products and new indications for existing products, as well as to provide specialist physicians and other healthcare providers with ongoing information regarding the efficacy of our products, we conduct and participate in numerous clinical trials with a variety of study designs, patient populations and trial endpoints. Our competitors and third parties also conduct clinical trials of our products without our participation. Unfavorable or inconsistent clinical data from existing or future clinical trials conducted by us, our competitors or third parties, or the market's or regulators' perception of clinical data, may reduce adoption of our products, which could materially adversely affect our business, results of operations, financial condition or cash flows.

Negative publicity regarding our products or marketing tactics by competitors or other third parties could reduce demand for our products, which would adversely affect sales and our financial performance.

We may experience, from time to time, negative exposure in clinical publications or in marketing campaigns of our competitors. Such publications or campaigns may present negative individual physician experience regarding the safety or effectiveness of our products or may suggest our competitors' products are superior to ours, based on studies or clinical trials conducted or funded by competitors or that involved competitive products.

Our reputation and competitive position may also be harmed by other publicly available information suggesting that our products are not safe. For example, we file adverse event reports under Medical Device Reporting ("MDR") obligations with the FDA that are publicly available on the FDA's website. We are required to file MDRs if our products may have caused or contributed to a serious injury or death or malfunctioned in a way that could likely cause or contribute to a serious injury or death if it were to recur. Our approach has been to file MDRs even in cases where reporting might not otherwise be required out of an abundance of caution. Any such negative publicity could harm our reputation and future sales.

We face risks related to our investment in our immersive healthcare platform, including our inexperience with virtual reality and full body tracking technology, and we may be unsuccessful in developing and commercializing products using virtual reality and full body tracking technology.

Since 2017, we have invested significant financial resources to develop and commercialize immersive healthcare products, including an acquisition paid in the form of shares of Penumbra common stock and options to purchase Penumbra common stock.

Our company is experienced in and has a strong history of bringing technology to healthcare markets. While we are familiar with the healthcare markets that we plan to target initially, we do not have extensive experience with virtual reality technology and are relying on new hires and consultants with expertise in the field. Apart from funds we have invested to date, we continue to invest substantial additional funds for research and development, to establish manufacturing operations, to hire dedicated sales and marketing personnel and to commercialize immersive healthcare products.

We can give no assurance that we will be successful in developing and commercializing products using virtual reality and full body tracking technology. We have not yet determined the most appropriate business model to bring this technology to the healthcare field, and accordingly, our ability to successfully commercialize healthcare applications using virtual reality and full body tracking technology may be influenced by many factors, including:

- unanticipated problems and additional costs relating to the development and testing of new products;
- our ability to install, set up and service new customers;
- our ability to achieve and maintain market acceptance and expand into new markets;
- our possible reliance on a limited number of suppliers for key components of the products we develop;
- maintaining an appropriate program for compliance with regulations related to the privacy and security of individually-identifiable patient information, including but not limited to HIPAA;
- the impact of competition, including with respect to the hardware and software underlying our immersive healthcare platform;
- the timing and impact of market, reimbursement and regulatory developments, including our ability to obtain any required regulatory approvals or clearances both inside and outside the United States; and
- our ability to obtain and maintain adequate intellectual property protection for our products and technologies.

If we are unsuccessful in developing and commercializing immersive healthcare products, our business, financial conditions and results of operations could be materially and adversely affected.

Our corporate culture has contributed to our success, and if we cannot maintain this culture as we grow, we could lose the innovative approach, creativity, and teamwork fostered by our culture, and our business may be harmed.

We believe that a critical contributor to our success has been our corporate culture, which we believe fosters innovation, teamwork, and a focus on execution, as well as facilitates critical knowledge transfer and knowledge sharing. As we grow, we may find it difficult to maintain these important aspects of our corporate culture, which could limit our ability to innovate and operate effectively. Any failure to preserve our culture could also negatively affect our ability to retain and recruit personnel or execute on our business strategy.

To successfully market and sell our products internationally, we must address a number of unique challenges applicable to international markets.

For the years ended December 31, 2023, 2022 and 2021, we derived 28.5%, 30.2% and 29.4%, respectively, of our revenue from international sales. To accommodate our international sales, we have invested significant financial and management resources to develop an international infrastructure that will meet the needs of our customers. We anticipate that a significant portion of our revenue will continue to be derived from sales of our products in foreign markets and that the percentage of our overall revenue that is derived from these markets may increase in the future. This revenue and related operations will continue to be subject to the risks and challenges associated with international operations, including:

- reliance on distributors;
- varying coverage and reimbursement policies, processes and procedures;

- difficulties in staffing and managing international operations from which sales are conducted;
- difficulties in penetrating markets in which our competitors' products or alternative procedures that do not use our products are more established;
- reduced protection for intellectual property rights in some countries;
- export licensing requirements or restrictions, trade regulations and foreign tax laws;
- fluctuating foreign currency exchange rates;
- foreign certification, regulatory requirements and legal requirements;
- lengthy payment cycles and difficulty in collecting accounts receivable;
- customs clearance and shipping delays;
- reliance on third-party logistics providers who warehouse and distribute finished products to our international customers;
- pricing pressure in international markets;
- political and economic instability;
- preference for locally produced products;
- higher incidence of corruption or unethical business practices; and
- events resulting in negative impacts to, or uncertainty regarding, global trade, such as the reversal or renegotiation of international trade agreements and partnerships or the imposition of tariffs.

If we are unable to successfully address these challenges, we may not be able to grow our international sales and our results of operations may suffer as a result. For example, certain unique macroeconomic and geopolitical factors, including those as a result of the COVID-19 pandemic, the Russian invasion of Ukraine or conditions in the Middle East as a result of the Israel-Hamas conflict, may cause instability and volatility in the global financial markets and disruptions within the healthcare industry that may negatively impact our business. In addition, the United States federal government has imposed tariffs on goods imported from China and certain other countries, which has resulted in retaliatory tariffs by China and other countries. Additional tariffs imposed by the United States on a broader range of imports, or further retaliatory trade measures taken by China or other countries in response, could result in an increase in supply chain costs or other pricing pressures that we may not be able to offset or may otherwise adversely impact our business and results of operations.

Over the long term, we intend to grow our business internationally and to do so, we will need to spend substantial sums to expand or develop direct sales capabilities in existing and new geographic areas, generate additional sales through existing distributors or attract additional distributors, or enter into other arrangements with third parties in international markets to commercialize our products in such markets. In December 2020, we agreed to license the technology for certain of our products to our existing distribution partner in China to permit our partner to manufacture and commercialize such products in China, in exchange for fixed payments upon the transfer of the licensed technology and upon the provision of related regulatory support, as well as royalty payments on downstream sales of the licensed products, which we expanded to include additional products in February 2022 and September 2023. We can provide no assurance that this arrangement, which is novel for us, will be successful, or that we will benefit commercially from licensing our technology to a third party in exchange for fixed payments as opposed to selling our products through a distributor. In addition, transferring a portion of our technology to a partner based in China carries risks relating to the intellectual property being transferred. Historically, China has not protected intellectual property rights to the same extent as the United States, and infringement of intellectual property rights continues to pose a serious risk in doing business in China. Monitoring and preventing unauthorized use is difficult, and the measures we may take to protect our intellectual property rights may not be adequate to prevent misappropriation.

As a result of our international operations, we are required to comply with tax requirements in multiple jurisdictions, the scope and impact of which may be unclear. Moreover, tax authorities in jurisdictions in which we do business could disagree with tax positions that we take, including, for example, our inter-company pricing policies, or could assert that we owe more taxes than we currently pay due to the level and nature of our activities in such jurisdictions.

We rely on our distributors to market and sell our products in certain international markets.

We have established a direct sales capability in the United States, most of Europe, Canada and Australia, which we have complemented with distributors in certain other international markets. Sales to distributors represented 16.7%, 18.7% and 16.6% of our revenue in 2023, 2022 and 2021, respectively. Our success outside of the United States, most of Europe, Canada and Australia depends largely upon marketing arrangements with distributors, in particular their sales expertise and their relationships with specialist physicians and affiliated hospitals in their geographic areas. Distributors may terminate their relationship with us, sell competitive products or devote insufficient sales efforts or other resources to our products. We do not control our distributors, and they may not be successful in implementing our marketing plans. In addition, many of our distributors initially obtain and maintain foreign regulatory approval for the sale of our products in their respective countries, and their efforts in obtaining and maintaining regulatory approval may not be as robust as we desire or expect. As our business grows, we may seek to expand or otherwise modify our arrangements with our existing distributors and/or retain the services of additional distributors. For example, in December 2020, we entered into an agreement to license the technology for certain of our products to our existing distribution partner in China to permit our partner to manufacture and commercialize such products in China, in exchange for fixed payments upon the transfer of the licensed technology and upon the provision of related regulatory support, as well as royalty payments on downstream sales of the licensed products, which we expanded to include additional products in February 2022 and September 2023. However, there can be no assurances that this arrangement, which is novel for us, or other similar arrangements that we may enter into in the future, will be successful. Our failure to maintain our relationships with our existing distributors or our partner in China, or our failure to recruit and retain additional skilled distributors in existing or new international markets, could have an adverse effect on our operations. If current or future distributors or our partner in China do not perform adequately, or if we lose a significant distributor or our partner in China, we may not be able to maintain existing levels of international revenue or realize expected long term international revenue growth. We have in the past experienced turnover with some of our distributors that has adversely affected sales in the countries in which those distributors operate. Similar occurrences could happen in the future.

Most of our customer relationships outside of the United States are with governmental entities, and we could be materially adversely affected by violations of the U.S. Foreign Corrupt Practices Act and similar anti-bribery laws in non-U.S. jurisdictions.

The FCPA, the United Kingdom Bribery Act, the Chinese Anti-Unfair Competition Law, and similar anti-bribery laws in other non-U.S. jurisdictions generally prohibit companies and their intermediaries from making improper payments to foreign officials for the purpose of obtaining or retaining business. Because of the predominance of government-sponsored healthcare systems around the world, most of our customer relationships outside of the United States are with governmental entities, and physicians practicing in those systems are considered “government officials.” Therefore, our sales to these entities are subject to such anti-bribery laws. Our policies mandate compliance with these anti-bribery laws. We operate in many parts of the world that have experienced governmental corruption, and we have operations in certain countries, including working with a distributor in Russia and a local partner in China, where strict compliance with anti-bribery laws may be at variance with local customs and practices. Despite our training and compliance programs, our internal control policies and procedures may not always protect us from reckless or criminal acts committed by our employees, distributors or agents. Violations of the FCPA or other anti-bribery laws, or allegations of such violations, could disrupt our business and materially adversely affect our business, results of operations, financial condition or cash flows.

Foreign currency exchange rates may adversely affect our results.

We are exposed to the effects of changes in foreign currency exchange rates, and we have not historically hedged our foreign currency exposure. Approximately 28.5%, 30.2%, and 29.4% of our revenue for the years ended December 31, 2023, 2022 and 2021, respectively, were derived from sales in non-U.S. markets, and we expect sales in non-U.S. markets to continue to represent a significant portion of our revenue. For direct sales in our international markets, we are paid by our customers in their local currency, which is primarily euros. For sales to distributors in our international markets, we are paid principally in either U.S. dollars or euros, with some sales being denominated in other currencies. Therefore, when the U.S. dollar strengthens relative to the euro or other local currency, our U.S. dollar reported revenue from non-U.S. dollar denominated sales will decrease, or we will need to increase our non-U.S. dollar denominated prices, which may not be commercially practical. Conversely, when the U.S. dollar weakens relative to the euro or other local currency, our U.S. dollar reported expenses from non-U.S. dollar denominated operating costs will increase. Changes in the relative values of currencies occur regularly and, in some instances, could materially adversely affect our business, results of operations, financial condition or cash flows. For example, during 2022 the U.S. dollar strengthened relative to many local currencies in the non-U.S. markets where we do business, which adversely affected our U.S. dollar reported revenue.

We have experienced rapid growth in recent periods, and if we fail to manage our growth effectively, our business and results of operations may suffer.

We have significantly expanded our overall business, research and development, customer base, product portfolio, employee headcount and operations in recent periods. We have also established new operations in other countries. Our expansion has placed, and our expected future growth will continue to place, a significant strain on our managerial, operational, product development, sales and marketing, administrative, financial and other resources.

We plan to continue to increase our salesforce. Our experience has been that it takes at least six months, and often longer, before new sales personnel generate enough sales to cover their costs, resulting in increased costs without offsetting revenue during periods in which we are increasing the size of our salesforce.

More systems, facilities, processes and management employees are needed to allow us to continue to grow successfully. We are expanding and renovating our existing facilities around the world but particularly in Alameda, California, driven by our need to expand the space available for our product development and test capacities, as well as our need for additional information technology and office space. The expansion and renovation of our facilities entail risks that could cause disruption in the operations of our business. Such risks include potential interruption in data flow; unforeseen construction, scheduling, engineering, environmental, or geological problems; and unanticipated cost increases. To meet anticipated demand for our products, we will also have to continue to buy additional equipment and hire additional research and development and manufacturing employees, including quality control personnel and other personnel involved in the production process. This expansion could result in operating difficulties including, but not limited to, difficulties in hiring the appropriate number of research and development and manufacturing employees, training and managing an increasing number of employees, delays in production and shipments, manufacturing inefficiencies and employees not working at capacity. In addition, at certain times we may need to rely on third party consultants, which may cost more than employees and may create operating inefficiencies and difficulties. If we do not adapt to meet these evolving challenges and if we are unable to manage our growth successfully, it could have a material and adverse effect on our business, results of operations, financial condition or cash flows.

We depend on key personnel to operate our business and develop our products, and if we are unable to retain, attract and integrate qualified personnel, our ability to develop and successfully grow our business could be harmed.

We believe that our future success is highly dependent on the contributions of our executive officers, particularly Adam Elsesser, our chief executive officer and president, as well as our ability to attract and retain highly skilled and experienced sales and marketing, technical and other personnel in the United States and in international markets. Each of these persons' efforts will be critical to us as we continue to develop our products and business. If we were to lose one or more of our key employees, including to competitors, we may experience difficulties in competing effectively, developing our products and implementing our business strategies.

Our research and development and sales and marketing programs depend on our ability to attract and retain highly skilled technicians, engineers and salespeople. In general, we may not be able to attract or retain qualified employees in the future due to the intense competition for qualified personnel among life science businesses, particularly in the San Francisco Bay Area, where our corporate headquarters, research and development and primary manufacturing facility is located. In addition to the competition for personnel, the San Francisco Bay Area in particular is characterized by a high cost of living. Although we historically have not had any material difficulty attracting qualified experienced personnel to our company, we could in the future have such difficulties and may be required to expend significant financial resources in our employee recruitment and retention efforts. If we are not able to identify, recruit and retain highly qualified personnel, we may experience constraints that will adversely affect our ability to support our research, development, manufacturing and sales programs, and ultimately our ability to compete. If we are unable to identify, recruit and retain qualified salespeople, there could be a delay or decline in the adoption of our products. If key personnel were to leave Penumbra, either to join our competitors or otherwise, we may not be able to attract and retain equally qualified personnel to replace them, which could harm our ability to develop and successfully grow our business.

We depend on information technology systems to operate our business, and issues with maintaining, upgrading or implementing these systems, could have a material adverse effect on our business.

We rely on the efficient and uninterrupted operation of information technology systems to process, transmit and store electronic information in our day-to-day operations. All information technology systems are vulnerable to damage or interruption from a variety of sources. Our business has grown in size and complexity; this has placed, and will continue to place, significant demands on our information technology systems. To effectively manage this growth, our information systems and applications require an ongoing commitment of significant resources to maintain, protect, enhance and upgrade existing systems and develop and implement new systems to keep pace with changing technology and our business needs. In 2023, we

completed implementation of a new enterprise resource planning ("ERP") software system implementation which replaced certain existing business, operational, and financial processes and systems. This ERP implementation project will continue to require investment of capital and human resources, the re-engineering of business processes, and the attention of many employees who would otherwise be focused on other areas of our business. This system change entails certain risks, including difficulties with changes in business processes that could disrupt our operations, such as our ability to track orders and timely ship products, manage our supply chain and aggregate financial and operational data. In addition, the implementation of the new system may not achieve the anticipated benefits and may divert management's attention from other operational activities, negatively affect employee morale, or have other unintended consequences. Delays in integration or disruptions to our business from implementation of new or upgraded systems could have a material adverse impact on our financial condition and operating results. Additionally, if we are not able to accurately forecast expenses and capitalized costs related to system upgrades and changes, this may have an adverse impact on our financial condition and operating results.

If we fail to maintain or are unable to assert that our internal control over financial reporting is effective under the new ERP system, we could adversely affect our ability to accurately report our financial condition, operating results or cash flows. If we have a material weakness in our internal control over financial reporting, investors may lose confidence in the accuracy and completeness of our financial reports and the market price of our common stock could be adversely affected, and we could become subject to investigations by the stock exchange on which our securities are listed, the SEC, or other regulatory authorities, which could require additional financial and management resources.

If the information we rely upon to run our businesses were to be found to be inaccurate or unreliable, if we fail to maintain or protect our information technology systems and data integrity effectively, if we fail to develop and implement new or upgraded systems to meet our business needs in a timely manner, or if we fail to anticipate, plan for or manage significant disruptions to these systems, our competitive position could be harmed, we could have operational disruptions, we could lose existing customers, have difficulty preventing, detecting, and controlling fraud, have disputes with customers, specialist physicians and other health-care providers, have regulatory sanctions or penalties imposed or other legal problems, incur increased operating and administrative expenses, lose revenues as a result of a data privacy breach or theft of intellectual property or suffer other adverse consequences, any of which could have a material adverse effect on our business, results of operations, financial condition or cash flows.

Cost-containment efforts of our customers, purchasing groups and governmental organizations could have a material adverse effect on our sales and ability to achieve or maintain profitability.

In an effort to reduce costs, many hospitals within the United States are members of Group Purchasing Organizations ("GPOs") and Integrated Delivery Networks ("IDNs"). GPOs and IDNs negotiate pricing arrangements with medical device companies and distributors and offer the negotiated prices to affiliated hospitals and other members. GPOs and IDNs typically award contracts on a category-by-category basis through a competitive bidding process. Bids are generally solicited from multiple providers with the intention of driving down pricing or reducing the number of vendors. Due to the highly competitive nature of the GPO and IDN contracting processes, we may not be able to obtain or maintain contract positions with major GPOs and IDNs. Furthermore, the increasing leverage of organized buying groups may reduce market prices for our products, thereby reducing our profitability.

While having a contract with a GPO or IDN for a given product category can facilitate sales to members of that GPO or IDN, such contract positions can offer no assurance that any level of sales will be achieved, as sales are typically made pursuant to purchase orders. Even when a provider is the sole contracted supplier of a GPO or IDN for a certain product category, members of the GPO or IDN generally are free to purchase a certain percentage of such products from other suppliers. Furthermore, GPO and IDN contracts typically are terminable without cause by the GPO or IDN upon 60 to 90 days' notice. Accordingly, although we have multiple contracts with many major GPOs and IDNs, the members of such groups may choose to purchase from our competitors due to the price or quality offered by such competitors, which could result in a decline in our sales and profitability.

If we are unable to educate specialist physicians or other healthcare providers in the proper use of our products, which may be more complex than competitive products or alternative treatments that do not use our products, our business may be material adversely affected and we may experience a high risk of product liability.

The successful use of our products depends, in part, on our ability to educate specialist physicians or other healthcare providers in the proper use of our products, which may be more complex than competitive products or alternative treatments that do not use our products. We educate specialist physicians or other healthcare providers on the proper techniques in using our products to achieve the intended outcome. However, our products may be more complicated to operate than competitive products or alternative treatments that do not use our products. In the event that specialist physicians or other healthcare providers perceive that our products are complex relative to alternative products or established treatments that do not use our

products, we may have difficulty gaining or increasing adoption of our products. Further, we may be unable to provide adequate education on the use of our products to specialist physicians or other healthcare providers, and some specialist physicians or other healthcare providers may not be willing to invest the time required to become properly educated on the use of our products. If we are unable to educate specialist physicians or other healthcare providers to properly use our products, this may lead to inadequate demand for our products and materially adversely affect our business, results of operations, financial condition or cash flows.

In addition, if we do not adequately educate specialist physicians or other healthcare providers on the use of our products, and our products are used incorrectly during procedures, we may be subject to claims against us by such specialist physicians or other healthcare providers, their hospitals or their patients. Our business, including our reputation, may consequently be adversely affected by any litigation that may occur based on error in the use of our products, and such litigation could also materially adversely affect our results of operations, financial condition or cash flows.

Regulatory Risks

We are subject to stringent domestic and foreign medical device regulations, which may impede the approval or clearance process for our products, hinder our development activities and manufacturing processes and, in some cases, result in the recall or seizure of previously approved or cleared products.

Our products, development activities and manufacturing processes are subject to extensive and rigorous regulation by FDA and by comparable regulatory authorities in foreign countries and by other regulatory agencies and governing bodies. Manufacturers of medical devices must comply with certain regulations that cover the composition, labeling, testing, clinical study, manufacturing, packaging and distribution of medical devices. In addition, most medical devices (Class II & III) must receive FDA clearance or approval before they can be commercially marketed in the United States. FDA may require testing and surveillance programs to monitor the effects of cleared or approved products that have been commercialized and can prevent or limit further marketing of a product based on the results of these post-marketing programs. Furthermore, most major markets for medical devices outside the United States require clearance, approval or compliance with certain standards and requirements before a medical device can be commercially marketed. The process of obtaining marketing approval or clearance from the FDA and foreign regulatory authorities for new products could take a significant period of time, require the expenditure of substantial resources, involve rigorous pre-clinical and clinical testing, require changes to our products and result in limitations on the indicated uses of our products. We cannot provide assurance that we will receive the required approval or clearance from FDA and foreign regulatory authorities for future products on a timely basis. Results from pre-clinical studies and early clinical trials may not allow us to predict results in later-stage testing. We cannot be certain that our future clinical trials will demonstrate the safety and effectiveness of any of our future products or will result in clearance or approval to market any of these products. In addition, our development activities could be harmed or delayed by a shutdown of the U.S. government, including FDA. The failure to receive approval or clearance for significant new products on a timely basis could have a material adverse effect on our business, results of operation, financial condition or cash flows.

FDA and other foreign regulatory authorities worldwide also conduct periodic inspections of our facilities to determine compliance with FDA's QSR requirements, MDR regulations and all comparable foreign regulations. Product approvals or clearances by FDA can be withdrawn, and new product approvals or clearances by FDA and foreign regulatory bodies can be delayed, due to failure to comply with regulatory requirements or the occurrence of unforeseen problems following initial approval or clearance of a product. In addition, state or federal legislation or regulations may impact key manufacturing processes, such as sterilization, which could require expensive and time-consuming changes to our manufacturing processes as well as the need for additional regulatory clearances or approvals. Failure to comply with regulatory requirements or the discovery of previously unknown problems with a product or manufacturer could result in fines, delays or suspensions of regulatory approvals or clearances, seizures or recalls of products (with the attendant expenses and adverse competitive impact), the banning of a particular device, an order to replace or refund the cost of any device previously manufactured or distributed, operating restrictions and criminal prosecution, as well as decreased sales as a result of negative publicity and product liability claims, all of which could have a material adverse effect on our business, results of operation, financial condition or cash flows.

If we modify our FDA cleared products, we may need to seek and obtain new clearances, which, if not granted, would prevent us from selling our modified products or require us to redesign our products.

A component of our strategy is to continue to modify and upgrade our medical devices that have been cleared by FDA. FDA requires device manufacturers to make a determination of whether a modification requires a clearance; however, FDA can review a manufacturer's decision not to submit for additional clearances. Any modifications to an FDA cleared device that would significantly affect its safety or effectiveness or that would constitute a major change in its intended use may require a new 510(k) clearance or possibly a PMA. We may not be able to obtain additional 510(k) clearances or PMAs for new products or for modifications to, or additional indications for, our existing products in a timely manner, or at all. There can be no

assurance that FDA will agree with our decisions not to seek clearances for particular device modifications. Delays in obtaining future clearances would adversely affect our ability to introduce new or enhanced products in a timely manner, which in turn would harm our revenue and future profitability. We have made minor modifications to our medical devices in the past and may make additional minor modifications in the future that we believe do not or will not require additional clearances and are well documented within our design control procedure. If FDA requires new clearances or approvals for any modifications, and we fail to obtain such approvals or clearances or fail to secure approvals or clearances in a timely manner, we may be required to recall and to stop the manufacturing and marketing of the modified device until we obtain FDA approval or clearance, and we may be subject to significant regulatory fines or penalties, all of which could harm our results of operations and require us to redesign our products.

We may not receive necessary foreign regulatory approvals or clearances or otherwise comply with foreign regulations.

For the years ended December 31, 2023, 2022 and 2021, sales outside the United States accounted for approximately 28.5%, 30.2%, and 29.4%, respectively, of our total sales, and we expect sales in non-U.S. markets to continue to represent a significant portion of our revenue. Foreign regulatory bodies have established varying regulations. Specifically, the European Union has promulgated rules that require that medical device products receive the right to affix the CE mark, an international symbol of adherence to quality assurance standards and compliance with applicable European medical device directives. Although we have received CE markings for all of the medical devices we currently sell in the European Union, we can give no assurance that we will be able to obtain European Union approval for any of our future products. Our inability or failure, or the inability or failure of our international distributors, to comply with varying foreign regulations or the imposition of new regulations could restrict or, in certain countries, result in the prohibition of the sale of our products, and thereby adversely affect our business, financial condition and results of operations.

Our global regulatory environment is becoming increasingly stringent and unpredictable, which could increase the time, cost and complexity of obtaining regulatory approvals for our products, as well as the clinical and regulatory costs of supporting those approvals. Many countries that did not have regulatory requirements for medical devices have established such requirements in recent years and other countries have expanded existing regulations. Certain regulators are exhibiting less flexibility by requiring, for example, the collection of local preclinical and/or clinical data prior to approval. While harmonization of global regulations has been pursued, requirements continue to differ significantly among countries. We expect the global regulatory environment to continue to evolve, which could impact our ability to obtain future approvals for our products and increase the cost and time to obtain such approvals. By way of example, the European Union regulatory bodies have instituted EU MDR, which changed many aspects of the existing regulatory framework, such as clinical data requirements, and introduced new ones, such as Unique Device Identification. EU MDR imposes increased compliance obligations for many parts of our business in order to access the EU market. The notified bodies that oversee compliance with EU MDR face uncertainties as EU MDR is enforced, creating risks in several areas, including the CE Marking process, data transparency and application review timetables.

We may not be able to meet regulatory quality requirements applicable to our manufacturing process.

We are required to register with FDA as a device manufacturer and as a result, we are subject to periodic inspection by FDA for compliance with FDA's QSR requirements, which requires manufacturers of medical devices to adhere to certain requirements, including testing, quality control and documentation procedures. In addition, the federal MDR regulations require us to provide information to FDA whenever there is evidence that reasonably suggests that a device may have caused or contributed to a death or serious injury, or has malfunctioned, and if the malfunction were to recur, it would be likely to cause or contribute to a death or serious injury. Compliance with applicable regulatory requirements is subject to continual review and is rigorously monitored through periodic inspections by FDA. In the European Community, we are required to maintain certain ISO certifications in order to sell products and we undergo periodic inspections by notified bodies to obtain and maintain these certifications. On March 1, 2016, the ISO issued a new Quality Management System standard for medical device manufacturers, ISO 13485:2016. We received certification to ISO 13485:2016 in 2018 and successfully completed our most recent surveillance audit in 2023. Compliance with this standard is subject to continual review and is monitored through periodic inspections by our notified body. Some foreign countries, most notably Japan and Brazil, have similar requirements or may require inspections of our manufacturing facilities before approving a product for sale in their country. We participate in the Medical Device Single Audit Program ("MDSAP") which allows for certification and review of compliance to standards and regulations required in the United States, Canada, Brazil, Australia, and Japan. We received our first MDSAP certification in 2018 and successfully completed our most recent surveillance audit in 2023. Some of our suppliers are subject to the same or similar scrutiny. If we or our suppliers fail to adhere to QSR, ISO or other regulatory requirements, this could delay production of our products and lead to fines, difficulties in obtaining regulatory clearances or approvals, recalls or other consequences, which could in turn have a material adverse effect on our business, results of operation, financial condition or cash flows.

Notices of inspectional observations or deficiencies from FDA or other regulatory bodies could require us to undertake corrective and preventive actions or other actions in order to address FDA's or other regulatory body's concerns, which could be expensive and time-consuming to complete and could impose additional burdens and expenses.

We are subject to periodic inspections by FDA and other regulatory bodies related to regulatory requirements that apply to medical devices designed and manufactured, and clinical trials sponsored, by us. If we receive a notice of inspectional observations or deficiencies from FDA following an inspection, we may be required to undertake corrective and preventive actions or other actions in order to address FDA's concerns, which could be expensive and time-consuming to complete and could impose additional burdens and expenses. We have previously received and could in the future receive notices of inspectional observations or deficiencies from FDA. Failure to adequately address FDA's concerns could expose us to enforcement and administrative actions.

We are subject to federal, state and foreign healthcare laws and regulations that could result in significant liability, require us to change our business practices and restrict our operations in the future.

We are subject to various federal, state and foreign healthcare fraud and abuse laws and regulations, which could significantly impact our business. The laws that may affect our ability to operate include, but are not limited to:

- the federal Anti-Kickback Statute, which prohibits, among other things, persons and entities from knowingly and willfully soliciting, receiving, offering, or paying remuneration, directly or indirectly, in cash or in kind, in exchange for or to induce either the referral of an individual for, or the purchase, lease, order or recommendation of, any good, facility, item or service for which payment may be made, in whole or in part, under federal healthcare programs such as Medicare and Medicaid. A person or entity does not need to have actual knowledge of this statute or specific intent to violate it;
- federal civil and criminal false claims laws and civil monetary penalty laws, including civil whistleblower or qui tam actions, that prohibit, among other things, knowingly presenting, or causing to be presented, claims for payment or approval to the federal government that are false or fraudulent, knowingly making a false statement material to an obligation to pay or transmit money or property to the federal government or knowingly concealing or knowingly and improperly avoiding or decreasing an obligation to pay or transmit money or property to the federal government;
- HIPAA, which created federal criminal laws that prohibit executing a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters. A person or entity does not need to have actual knowledge of these statutes or specific intent to violate them;
- HIPAA, as amended by HITECH, and their respective implementing regulations, which impose requirements on certain covered healthcare providers, health plans and healthcare clearinghouses as well as their business associates that perform services for them that involve individually identifiable health information, relating to the privacy, security and transmission of individually identifiable health information without appropriate authorization, including mandatory contractual terms as well as directly applicable privacy and security standards and requirements;
- the federal physician sunshine requirements under the Affordable Care Act, which require certain manufacturers of drugs, devices, biologics, and medical supplies to report annually to CMS information related to payments and other transfers of value to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors), teaching hospitals, physician assistants, nurse practitioners, clinical nurse specialists, certified registered nurse anesthetists, and certified nurse midwives, and ownership and investment interests held by physicians and their immediate family members; and
- state and foreign law equivalents of each of the above federal laws, such as foreign and state anti-kickback, anti-benefit and false claims laws, as well as state and foreign laws and regulations governing interactions with healthcare professionals and requiring disclosure of payments and interactions with healthcare professionals and state and foreign laws governing the privacy and security of health information in certain circumstances.

The scope and enforcement of each of these laws is uncertain and subject to rapid change, which may make it challenging to maintain compliance with such laws. In addition, federal and state enforcement bodies continue to closely scrutinize interactions between healthcare companies and healthcare providers, which may lead to an increased number of investigations, prosecutions, convictions and settlements in the healthcare industry. Responding to investigations can be time- and resource-consuming and can divert management's attention from the business. Additionally, as a result of these investigations, healthcare providers and entities may have to agree to additional onerous compliance and reporting requirements as part of a consent

decree or corporate integrity agreement. Any such investigation or settlement could increase our costs or otherwise have an adverse effect on our business.

If our operations are found to be in violation of any of the laws described above or any other governmental regulations that apply to us now or in the future, we may be subject to penalties, including civil and criminal penalties, damages, fines, disgorgement, exclusion from governmental health-care programs, and the curtailment or restructuring of our operations, any of which could have a material adverse effect on our business, results of operation, financial condition or cash flows.

If we are found to have improperly promoted our products for off-label uses, we may become subject to significant fines and other liability.

FDA and other regulatory agencies strictly regulate the promotional claims that may be made about medical devices. For example, devices cleared under section 510(k) cannot be marketed for any intended use that is outside of FDA's substantial equivalence determination for such devices. Physicians nevertheless may use our products on their patients in a manner that is inconsistent with the intended use cleared by FDA. If we are found to have promoted such "off-label" uses, we may become subject to significant government fines and other related liability. The federal government has levied large civil and criminal fines against companies for alleged improper promotion and has enjoined several companies from engaging in off-label promotion. FDA has also requested that companies enter into consent decrees or permanent injunctions under which specified promotional conduct is changed or curtailed.

Risks Related to Our Intellectual Property

We rely on a variety of intellectual property rights, and if we are unable to maintain or protect our intellectual property, our business and results of operations will be harmed.

Our commercial success will depend, in part, on our ability to obtain and maintain intellectual property protection for our products and related technologies both in the United States and elsewhere, successfully defend our intellectual property rights against third-party challenges and successfully enforce our intellectual property rights to prevent third-party infringement. While we rely primarily upon a combination of patents, trademarks and trade secret protection, as well as nondisclosure, confidentiality and other contractual agreements to protect the intellectual property related to our brands, products and other proprietary technologies, protection derived from patents is relatively limited.

The process of obtaining patent protection is expensive and time-consuming, and we may not be able to prosecute all necessary or desirable patent applications at a reasonable cost or in a timely manner. We may choose not to seek patent protection for certain innovations or products and may choose not to pursue patent protection in certain jurisdictions, and under the laws of certain jurisdictions, patents or other intellectual property rights may be unavailable or limited in scope and, in any event, any patent protection we obtain may be limited. As a result, some of our products are not, and in the future may not be, protected by patents. We generally apply for patents in those countries where we intend to make, have made, use or sell products and where we assess the risk of infringement to justify the cost of seeking patent protection. However, we do not seek protection in all countries where we sell products and we may not accurately predict all the countries where patent protection would ultimately be desirable. If we fail to timely file a patent application in any such country or major market, we may be precluded from doing so at a later date. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and, further, may export otherwise infringing products to territories in which we have patent protection that may not be sufficient to terminate infringing activities.

Furthermore, we cannot guarantee that any patents will be issued from any pending or future owned or licensed patent applications, or if any current or future patents will provide us with any meaningful protection or competitive advantage. Even if issued, existing or future patents may be challenged, including with respect to ownership, narrowed, invalidated, held unenforceable or circumvented, any of which could limit our ability to prevent competitors and other third parties from developing and marketing similar products or limit the length of terms of patent protection we may have for our products and technologies. Other companies may also design around technologies we have patented, licensed or developed. In addition, the issuance of a patent does not give us the right to practice the patented invention. Third parties may have blocking patents that could prevent us from marketing our products or practicing our own patented technology.

The patent positions of medical device companies can be highly uncertain and involve complex legal, scientific and factual questions for which important legal principles remain unresolved. The standards that the U.S. Patent and Trademark Office ("USPTO") and its foreign counterparts use to grant patents are not always applied predictably or uniformly. Changes in either the patent laws, implementing regulations or the interpretation of patent laws may diminish the value of our rights. The legal systems of certain countries do not protect intellectual property rights to the same extent as the laws of the United States, and many companies have encountered significant problems in protecting and defending such rights in foreign jurisdictions.

Because patent applications in the United States, Europe and many other jurisdictions are typically not published until 18 months after filing, or in some cases not at all, and because publications of discoveries in scientific literature lag behind actual discoveries, we cannot be certain that we were the first to make the inventions claimed in our issued patents or pending patent applications, or that we were the first to file for protection of the inventions set forth in our patents or applications. We can give no assurance that all of the potentially relevant art relating to our patents and patent applications has been found; overlooked prior art could be used by a third party to challenge the validity, enforceability and scope of our patents or prevent a patent from issuing from a pending patent application. As a result, we may not be able to obtain or maintain protection for certain inventions. Therefore, the validity, enforceability and scope of our patents in the United States, Europe and in other countries cannot be predicted with certainty and, as a result, any patents that we own or license may not provide sufficient protection against our competitors.

Third parties may challenge any existing patent or future patent we own or license through adversarial proceedings in the issuing offices or in court proceedings, including as a response to any assertion of our patents against them. In any of these proceedings, a court or agency with jurisdiction may find our patents invalid and/or unenforceable, or even if valid and enforceable, insufficient to provide protection against competing products and services sufficient to achieve our business objectives. We may be subject to a third-party pre-issuance submission of prior art to the USPTO, or reexamination by the USPTO if a third party asserts a substantial question of patentability against any claim of a U.S. patent we own or license. The adoption of the Leahy-Smith America Invents Act ("Leahy-Smith Act") in September 2011 established additional opportunities for third parties to invalidate U.S. patent claims, including inter partes review and post-grant review proceedings. Outside of the United States, patents we own or license may become subject to patent opposition or similar proceedings, which may result in loss of scope of some claims or the entire patent. In addition, such proceedings are very complex and expensive, and may divert our management's attention from our core business. If any of our patents are challenged, invalidated, circumvented by third parties or otherwise limited or expire prior to the commercialization of our product candidates, and if we do not own or have exclusive rights to other enforceable patents protecting our products or other technologies, competitors and other third parties could market products and use processes that are substantially similar to, or superior to, ours and our business would suffer.

The degree of future protection for our proprietary rights is uncertain because legal means afford only limited protection and may not adequately protect our rights or permit us to gain or keep a competitive advantage. For example:

- others may be able to develop products that are similar to, or better than, ours in a way that is not covered by the claims of our patents;
- we might not have been the first to make the inventions covered by our patents or pending patent applications;
- we might not have been the first to file patent applications for these inventions;
- any patents that we obtain may not provide us with any competitive advantages or may ultimately be found invalid or unenforceable; or
- we may not develop additional proprietary technologies that are patentable.

We may file lawsuits or initiate other proceedings to protect or enforce our patents or other intellectual property rights, which could be expensive, time consuming and unsuccessful.

Competitors may infringe our issued patents or other intellectual property. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time-consuming. Any claims we assert against perceived infringers could provoke these parties to assert counterclaims against us alleging that we infringe their intellectual property. In addition, in a patent infringement proceeding, a court may decide that a patent of ours is invalid or unenforceable, in whole or in part, construe the patent's claims narrowly or refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. An adverse result in any litigation proceeding could put one or more of our patents at risk of being invalidated or interpreted narrowly, which could adversely affect our competitive business position, business prospects and financial condition.

Our commercial success depends significantly on our ability to operate without infringing upon the intellectual property rights of third parties.

The medical device industry is subject to rapid technological change and substantial litigation regarding patent and other intellectual property rights. Our competitors in both the United States and abroad, many of which have substantially greater resources and have made substantial investments in patent portfolios and competing technologies, may have applied for or obtained or may in the future apply for and obtain, patents that will prevent, limit or otherwise interfere with our ability to make, use and sell our products. Numerous third-party patents exist in the fields relating to our products, and it is difficult for

industry participants, including us, to identify all third-party patent rights relevant to our products and technologies. Moreover, because some patent applications are maintained as confidential for a certain period of time, we cannot be certain that third parties have not filed patent applications that cover our products and technologies.

Patents could be issued to third parties that we may ultimately be found to infringe. Third parties may also have or obtain valid and enforceable patents or proprietary rights that could block us from developing product candidates using our technology. Our failure to obtain or maintain a license to any technology that we require may materially harm our business, financial condition and results of operations. Furthermore, we would be exposed to a threat of litigation.

From time to time, we may be party to, or threatened with, litigation or other proceedings with third parties, including non-practicing entities, who allege that our products, components of our products and/or proprietary technologies infringe, misappropriate or otherwise violate their intellectual property rights. The types of situations in which we may become a party to such litigation or proceedings include:

- we or our collaborators may initiate litigation or other proceedings against third parties seeking to invalidate the patents held by those third parties or to obtain a judgment that our products or processes do not infringe those third parties' patents;
- we or our collaborators may participate at substantial cost in International Trade Commission proceedings to abate importation of products that would compete unfairly with our products;
- if our competitors file patent applications that claim technology also claimed by us or our licensors, we or our licensors may be required to participate in interference, derivation or opposition proceedings to determine the priority of invention, which could jeopardize our patent rights and potentially provide a third party with a dominant patent position;
- if third parties initiate litigation claiming that our processes or products infringe their patent or other intellectual property rights, we and our collaborators will need to defend against such proceedings;
- if third parties initiate litigation or other proceedings seeking to invalidate patents owned by or licensed to us or to obtain a declaratory judgment that their product or technology does not infringe our patents or patents licensed to us, we will need to defend against such proceedings;
- we may be subject to ownership disputes relating to intellectual property, including disputes arising from conflicting obligations of consultants or others who are involved in developing our products; and
- if a license to necessary technology is terminated, the licensor may initiate litigation claiming that our processes or products infringe or misappropriate their patent or other intellectual property rights and/or that we breached our obligations under the license agreement, and we and our collaborators would need to defend against such proceedings.

These lawsuits and proceedings, regardless of merit, are time-consuming and expensive to initiate, maintain, defend or settle, and could divert the time and attention of managerial and technical personnel, which could materially adversely affect our business. Any such claim could also force use to do one or more of the following:

- incur substantial monetary liability for infringement or other violations of intellectual property rights, which we may have to pay if a court decides that the product or technology at issue infringes or violates the third party's rights, and if the court finds that the infringement was willful, we could be ordered to pay treble damages and the third party's attorneys' fees;
- pay substantial damages to our customers or end users to discontinue use or replace infringing technology with non-infringing technology;
- stop manufacturing, selling, using, exporting or licensing the product or technology incorporating the allegedly infringing technology or stop incorporating the allegedly infringing technology into such product or technology;
- obtain from the owner of the infringed intellectual property right a license, which may require us to pay substantial upfront fees or royalties to sell or use the relevant technology and which may not be available on commercially reasonable terms, or at all;
- redesign our products and technology so they do not infringe or violate the third party's intellectual property rights, which may not be possible or may require substantial monetary expenditures and time;

- enter into cross-licenses with our competitors, which could weaken our overall intellectual property position;
- lose the opportunity to license our technology to others or to collect royalty payments based upon successful protection and assertion of our intellectual property against others;
- find alternative suppliers for non-infringing products and technologies, which could be costly and create significant delay; or
- relinquish rights associated with one or more of our patent claims, if our claims are held invalid or otherwise unenforceable.

Some of our competitors may be able to sustain the costs of complex intellectual property litigation more effectively than we can because they have substantially greater resources. In addition, intellectual property litigation, regardless of its outcome, may cause negative publicity, adversely impact prospective customers, cause product shipment delays, or prohibit us from manufacturing, marketing or otherwise commercializing our products and technology. Any uncertainties resulting from the initiation and continuation of any litigation could have a material adverse effect on our ability to raise additional funds or otherwise have a material adverse effect on our business, results of operation, financial condition or cash flows.

In addition, we may indemnify our customers and distributors against claims relating to the infringement of intellectual property rights of third parties related to our products. Third parties may assert infringement claims against our customers or distributors. These claims may require us to initiate or defend protracted and costly litigation on behalf of our customers or distributors, regardless of the merits of these claims. If any of these claims succeed, we may be forced to pay damages on behalf of our customers, suppliers or distributors, or may be required to obtain licenses for the products they use. If we cannot obtain all necessary licenses on commercially reasonable terms, our customers may be forced to stop using our products.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. There could also be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a material adverse effect on the price of our common stock. The occurrence of any of these events may have a material adverse effect on our business, results of operation, financial condition or cash flows.

Changes in patent law could diminish the value of patents in general, thereby impairing our ability to protect our existing and future products.

Patent reform legislation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents. For example, the Leahy-Smith Act included a number of significant changes to U.S. patent law. These include provisions that affect the way patent applications are prosecuted, redefine prior art, and may also affect patent litigation. The USPTO developed new regulations and procedures to govern administration of the Leahy-Smith Act, including switching the U.S. patent system from a “first-to-invent” system to a “first-to-file” system. Under a “first-to-file” system, assuming the other requirements for patentability are met, the first inventor to file a patent application generally will be entitled to the patent on an invention regardless of whether another inventor had made the invention earlier. The Leahy-Smith Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could have a material adverse effect on our business, results of operation, financial condition or cash flows.

In addition, patent reform legislation may pass in the future that could lead to additional uncertainties and increased costs surrounding the prosecution, enforcement and defense of our patents and applications. Furthermore, the U.S. Supreme Court and the U.S. Court of Appeals for the Federal Circuit have made, and will likely continue to make, changes in how the patent laws of the United States are interpreted. Similarly, foreign courts have made, and will likely continue to make, changes in how the patent laws in their respective jurisdictions are interpreted. We cannot predict future changes in the interpretation of patent laws or changes to patent laws that might be enacted into law by U.S. and foreign legislative bodies. Those changes may materially affect our patents or patent applications and our ability to obtain additional patent protection in the future.

Obtaining and maintaining patent protection depends on compliance with various procedural, document submission, fee payment and other requirements imposed by governmental patent agencies, and our patent protection could be reduced or eliminated for non-compliance with these requirements.

The USPTO and various foreign patent offices require compliance with a number of procedural, documentary, fee payment and other similar provisions. In addition, periodic maintenance fees on our owned and in-licensed patents are due to be paid to governmental patent agencies over the lifetime of the patents. Future maintenance fees will also need to be paid on other patents

that may be issued to us. We have systems in place to remind us to pay these fees, and we employ outside firms to remind us or our licensor to pay annuity fees due to patent agencies on our patents and pending patent applications. In certain cases, an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with the applicable rules. However, there are situations in which noncompliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, our competitors might be able to enter the market and this circumstance would have a material adverse effect on our business, results of operation, financial condition or cash flows.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

We own 43 trademarks, related to our company name, logo, products and technology, that are registered with the USPTO as well as 214 trademarks registered outside of the United States as of December 31, 2023. Our registered or unregistered trademarks or trade names may be challenged, infringed, circumvented, declared generic or determined to be infringing on other marks or names. We may not be able to protect our rights in these trademarks and trade names, which we need in order to build name recognition with potential customers in our markets of interest. There is no guarantee we will be able to secure registration for any of our pending trademark applications with the USPTO or comparable foreign authorities. In addition, third parties have registered trademarks similar or identical to our trademarks, and may in the future file for registration of such trademarks. If they succeed in registering or developing common law rights in such trademarks, and if we are not successful in challenging such third-party rights, we may not be able to use these trademarks to market our products in those countries where such third parties have registered such trademarks or obtained such common law rights. In any case, if we are unable to establish name recognition based on our trademarks and trade names, then we may not be able to compete effectively and our business may be adversely affected.

In addition, we may be involved in litigation or other proceedings to protect our trademark rights associated with our company name or the names used with our products. Any objections we receive from the USPTO, foreign trademark authorities or third parties relating to our pending applications could require us to incur significant expense in defending the objections or establishing alternative names. Names used with our products may be claimed to infringe names held by others or to be ineligible for proprietary protection. If we have to change the name of our company or any product, we may experience a loss in goodwill associated with our brand name, customer confusion or a loss of sales.

If we are unable to protect the confidentiality of our trade secrets and other proprietary information, our business and competitive position may be harmed.

In addition to patent protection, we also rely on confidential proprietary information, including trade secrets and know-how, to develop and maintain our competitive position. We seek to protect our confidential proprietary information, in part, by entering into confidentiality agreements with our employees, consultants, collaborators, strategic partners and others upon the commencement of their relationships with us. These agreements require that all confidential information developed by the individual or made known to the individual by us during the course of the individual's relationship with us be kept confidential. Our agreements with employees and our personnel policies also provide that any inventions conceived by the individual in the course of rendering services to us shall be our exclusive property. However, we may not obtain these agreements in all circumstances, and individuals with whom we have these agreements may not comply with their terms. Thus, despite such agreements, such inventions may become assigned to third parties. Monitoring unauthorized uses and disclosures of our intellectual property is difficult, and we do not know whether the steps we have taken to protect our intellectual property will be effective. In the event of unauthorized use or disclosure of our trade secrets or proprietary information, these agreements, even if obtained, may not provide meaningful protection, particularly for our trade secrets or other confidential information. To the extent that our employees, consultants or contractors use technology or know-how owned by third parties in their work for us, disputes may arise between us and those third parties as to the rights in related inventions. To the extent that an individual who is not obligated to assign rights in intellectual property to us is rightfully an inventor of intellectual property, we may need to obtain an assignment or a license to that intellectual property from that individual, or a third party or from that individual's assignee. Such assignment or license may not be available on commercially reasonable terms or at all.

Adequate remedies may not exist in the event of unauthorized use or disclosure of our proprietary information. The disclosure of our trade secrets would impair our competitive position and may materially harm our business, financial condition and results of operations. Costly and time consuming litigation could be necessary to enforce and determine the scope of our proprietary rights, and failure to maintain trade secret protection could adversely affect our competitive business position. In addition, others may independently discover or develop our trade secrets and proprietary information, and the existence of our own trade secrets affords no protection against such independent discovery.

We may also employ individuals who were previously or concurrently employed at research institutions and/or other medical device companies, including our competitors or potential competitors. We may be subject to claims that these employees, or we, have inadvertently or otherwise used or disclosed trade secrets or other proprietary information of their former employers, or that patents and applications we have filed to protect inventions of these employees, even those related to one or more of our products, are rightfully owned by their former or concurrent employer. Litigation may be necessary to defend against these claims. Even if we are successful in defending against these claims, litigation could result in substantial costs and be a distraction to management.

Risks Related to Our Finances and Capital Requirements

We may require additional financing in the future and may not be able to obtain such financing on favorable terms, if at all, which could force us to delay, reduce or eliminate our research and development activities or otherwise harm our business.

Since our initial public offering in September 2015, we have financed our business primarily through our operations and sales of our equity securities. We are unable to predict the extent of any future operating cash flows or whether we will be able to achieve, maintain or grow our profitability in the future. If we require additional financing to continue or expand our operations, for research and development, for acquisitions or for other purposes, we may determine to engage in equity or debt financings or incur other indebtedness. We may not be able to timely secure additional debt or equity financing on favorable terms, or at all. If we raise additional funds through the issuance of equity or convertible debt or other equity-linked securities, our existing stockholders could suffer significant dilution. Any debt financing obtained by us in the future could involve restrictive covenants relating to our capital raising activities and other financial and operational matters, which may make it more difficult for us to obtain additional capital and to pursue business opportunities, including potential acquisitions. If needed funds are not available in adequate amounts or on acceptable terms from additional financing sources, our business will be materially adversely affected.

By engaging in acquisitions and other business development arrangements, we will incur a variety of costs and may potentially face numerous risks that could adversely affect our business and operations.

We have in the past, and expect in the future, to seek to acquire additional businesses, assets, technologies or products to enhance our business if appropriate opportunities become available. In connection with any acquisitions, we could issue additional equity securities or convertible debt or equity-linked securities, which would dilute our stockholders, cause us to incur substantial debt to fund the acquisitions, or assume significant liabilities. For example, in October 2021 and September 2023, we completed acquisitions that were paid in the form of shares of our common stock and/or options to purchase our common stock.

Acquisitions involve numerous risks, including problems integrating the purchased operations, technologies or products, unanticipated costs and other liabilities, diversion of management's attention from our core businesses, adverse effects on existing business relationships with current and/or prospective customers and/or suppliers, risks associated with entering markets in which we have no or limited prior experience and potential loss of key employees. Acquisitions may also require us to record goodwill and non-amortizable intangible assets that will be subject to impairment testing on a regular basis and potential periodic impairment charges, incur amortization expenses related to certain intangible assets, and incur write-offs and restructuring and other related expenses, any of which could harm our results of operations and financial condition. If we fail in our integration efforts with respect to any of our acquisitions and are unable to efficiently operate as a combined organization, our business and financial condition may be adversely affected.

Fluctuations in our effective tax rate and changes to tax laws may adversely affect us.

As an international company, we are subject to taxation in numerous countries, states and other jurisdictions. Our effective tax rate is derived from a combination of statutory tax rates in the various jurisdictions in which we operate. In preparing our financial statements, our effective tax rate is based on estimates of the amount of tax that will become payable in each of these jurisdictions. Our effective tax rate may, however, differ from estimates due to numerous factors, including a change in the mix of our profitability from country to country and changes in tax laws. The fluctuations in our effective tax rate could have an adverse effect on our business, financial condition and results of operations and cash flows.

Our excess tax benefits and deficiencies are required to be recorded in the income statement when stock awards vest or are settled and as discrete items on the tax rate in the period in which they occur. The amount of excess tax benefits and deficiencies can fluctuate from period to period based on the price of our stock, the volume of share-based grants settled or vested, and the fair value assigned to equity awards under U.S. GAAP. For interim reporting purposes, we are required to exclude the excess tax benefits and deficiencies from the annual estimated tax rate and not to forecast the potential impact to

our rate. As a result, we could experience an effective tax rate significantly different from previous periods or from our expectations.

In addition, changes in tax law or declines in our underlying profitability may negatively or positively impact our financial outlook of operations, which could lead to a corresponding charge or benefit to income taxes attributable to adjustments to the valuation allowance recorded against our deferred tax assets ("DTAs") on our consolidated balance sheets. The tax charge or benefit resulting from such change in valuation allowance could result in fluctuations in our effective tax rate and have a material negative impact on our financial condition and results of operations.

Risks Relating to Securities Markets and Investment in Our Common Stock

The price of our common stock may be volatile, and you could lose all or part of your investment.

The trading price of our common stock has been and is likely to continue to be volatile. From January 1, 2023 through December 31, 2023, our closing stock price as reported on The New York Stock Exchange ("NYSE") has ranged from 181.44 to 344.06. Stock markets have experienced extreme volatility that has often been unrelated to the operating performance of particular companies. These broad market fluctuations may adversely affect the trading price of our common stock. In addition, limited trading volume of our stock may contribute to its future volatility. Price declines in our common stock could result from general market and economic conditions, some of which are beyond our control, and a variety of other factors, including any of the risk factors described in this Form 10-K or those that we have not anticipated. These broad market and industry factors may harm the market price of our common stock, regardless of our operating performance, and could cause you to lose all or part of your investment in our common stock since you might be unable to sell your shares at or above the price you paid for such shares. Factors that could cause fluctuations in the market price of our common stock include the following:

- price and volume fluctuations in the overall stock market from time to time;
- volatility in the market prices and trading volumes of medical device company stocks;
- changes in operating performance and stock market valuations of other medical device companies generally, or those in our industry in particular;
- sales of shares of our common stock by us or our stockholders;
- failure of securities analysts to maintain coverage of us, changes in financial estimates by securities analysts who follow our company, or our failure to meet these estimates or the expectations of investors;
- the financial projections we may provide to the public, any changes in those projections or our failure to meet those projections;
- announcements by us or our competitors of new products or services;
- the public's reaction to our press releases, other public announcements and filings with the SEC;
- rumors and market speculation involving us or other companies in our industry;
- actual or anticipated changes in our results of operations or fluctuations in our results of operations;
- actual or anticipated developments in our business, our competitors' businesses or the competitive landscape generally;
- litigation involving us, our industry or both, or investigations by regulators into our operations or those of our competitors;
- developments or disputes concerning our intellectual property or other proprietary rights;
- announced or completed acquisitions of businesses or technologies by us or our competitors;
- new laws or regulations or new interpretations of existing laws or regulations applicable to our business;
- changes in accounting standards, policies, guidelines, interpretations or principles;
- any significant change in our management; and
- general economic conditions and slow or negative growth of our markets.

In addition, in the past, following periods of volatility in the overall market and the market price of a particular company's securities, securities class action litigation has often been instituted against these companies. We were involved in one such lawsuit in 2021, which was voluntary dismissed without prejudice in March 2021, and we may be the target of this type of litigation in the future. This litigation could result in substantial costs and a diversion of our management's attention and resources.

If our executive officers, directors and largest stockholders choose to act together, they may be able to significantly influence our management and operations, acting in their own best interests and not necessarily those of other stockholders.

As of December 31, 2023, our executive officers, directors and holders of 5% or more of our outstanding stock and their affiliates beneficially owned approximately 54.1% of our voting stock in the aggregate. These stockholders, acting together, would be able to significantly influence all matters requiring approval by our stockholders, including the election of directors and the approval of mergers or other business combination transactions. The interests of this group of stockholders may not always coincide with the interests of other stockholders, and they may act in a manner that advances their best interests and not necessarily those of other stockholders. This concentration of ownership may have the effect of delaying, preventing or deterring a change in control of our company, could deprive our stockholders of an opportunity to receive a premium for their common stock as part of a sale of our company and might ultimately affect the market price of our common stock.

A sale of a substantial number of shares of our common stock in the public market could cause the market price of our common stock to drop significantly, even if our business is doing well.

Sales of a substantial number of shares of our common stock could occur at any time. These sales, or the perception in the market that the holders of a large number of shares of common stock intend to sell shares, could reduce the market price of our common stock. As of December 31, 2023, our directors, executive officers and holders of 5% or more of our outstanding stock beneficially owned approximately 54.1% of our outstanding stock in the aggregate. If one or more of them were to sell a substantial portion of the shares they hold, it could cause our stock price to decline.

We have also registered the offer and sale of all shares of common stock that we may issue under our equity compensation plans. As of December 31, 2023, approximately 7,700,000 shares of common stock that are either subject to outstanding options or other equity awards or reserved for future issuance under our equity incentive plans have been registered on Form S-8 registration statements and may be freely sold in the public market upon issuance, except for shares held by affiliates who have certain restrictions on their ability to sell. If these additional shares of common stock are sold, or if it is perceived that they will be sold, in the public market, the trading price of our common stock could decline.

Techniques employed by short sellers have in the past and may in the future drive down the market price of our common stock.

Short selling is the practice of selling securities that the seller does not own but rather has borrowed from a third-party with the intention of buying identical securities back at a later date to return to the lender. The short seller hopes to profit from a decline in the value of the securities between the sale of the borrowed securities and the purchase of the replacement shares, as the short seller expects to pay less in that purchase than it received in the sale. As it is in the short seller's best interests for the price of the stock to decline, many short sellers publish, or arrange for the publication of, negative opinions regarding the relevant issuer and its business prospects in order to create negative market momentum and generate profits for themselves after selling a stock short. These short attacks have led to selling of shares in the market. We have been in the past, and may be in the future, subject to such attacks by short sellers. If we are the subject of unfavorable allegations, we may have to expend a significant amount of resources to investigate such allegations and/or defend ourselves. While we would strongly defend against any such short seller attacks, we may be constrained in the manner in which we can proceed against the relevant short seller by applicable state law or issues of commercial confidentiality. Such a situation could be costly and time-consuming, and could be distracting for our management team.

Our restated certificate of incorporation, our second amended and restated bylaws and Delaware law contain provisions that could discourage another company from acquiring us and may prevent attempts by our stockholders to replace or remove our current management.

Provisions of Delaware law (where we are incorporated), our restated certificate of incorporation and our second amended and restated bylaws may discourage, delay or prevent a merger or acquisition that stockholders may consider favorable, including transactions in which you might otherwise receive a premium for your shares. In addition, these provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace or remove our board of directors. These provisions include:

- authorizing the issuance of "blank check" preferred stock without any need for action by stockholders;

- requiring supermajority stockholder voting to effect certain amendments to our restated certificate of incorporation and second amended and restated bylaws;
- eliminating the ability of stockholders to call and bring business before special meetings of stockholders;
- prohibiting stockholder action by written consent;
- establishing advance notice requirements for nominations for election to the board of directors or for proposing matters that can be acted on by stockholders at stockholder meetings;
- dividing our board of directors into three classes so that only one third of our directors will be up for election in any given year; and
- providing that our directors may be removed by our stockholders only for cause.

In addition, we are subject to Section 203 of the Delaware General Corporation Law, which may have an anti-takeover effect with respect to transactions not approved in advance by our board of directors, including discouraging takeover attempts that could have resulted in a premium over the market price for shares of our common stock.

These provisions apply even if a takeover offer may be considered beneficial by some stockholders and could delay or prevent an acquisition that our board of directors determines is not in our and our stockholders' best interests and could also affect the price that some investors are willing to pay for our common stock.

Our second amended and restated bylaws designate the state courts located within the state of Delaware (or if no state court located within Delaware has jurisdiction, the federal district court for the District of Delaware) as the exclusive forum for certain disputes between us and our stockholders, which could limit our stockholders' ability to access a favorable judicial forum for disputes with us or our directors, officers or employees.

Our second amended and restated bylaws designate the state courts located within the state of Delaware (or if no state court located within Delaware has jurisdiction, the federal district court for the District of Delaware), in all cases subject to the court's having personal jurisdiction over the indispensable parties named as defendants, as the exclusive forum for any derivative action or proceeding brought on our behalf; any action asserting a claim of a breach of fiduciary duty; any action asserting a claim against us arising pursuant to the Delaware General Corporation Law, our restated certificate of incorporation or our second amended and restated bylaws; or any action asserting a claim against us that is governed by the internal affairs doctrine. This forum selection provision will not apply to any causes of action arising under the Securities Act of 1933, as amended (the "Securities Act"), or the Securities Exchange Act of 1934, as amended (the "Exchange Act") or, in each case, the rules and regulations thereunder, or for any other claim for which the U.S. federal courts have exclusive jurisdiction. The choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers and other employees. In addition, if a court were to find the choice of forum provision contained in our second amended and restated bylaws to be inapplicable or unenforceable in an action, we may incur additional costs associated with resolving such action in other jurisdictions, which could harm our business and financial condition.

We do not anticipate paying cash dividends, and accordingly, stockholders must rely on stock appreciation for any return on their investment.

We do not anticipate paying cash dividends in the future. As a result, only appreciation of the price of our common stock, which may never occur, would provide a return to stockholders. Investors seeking cash dividends should not invest in our common stock.

An additional valuation allowance against our deferred tax assets could require a charge to earnings, which could result in a negative impact on our results of operations.

Primarily as a result of net operating losses, stock-based compensation, various accruals and reserves, and tax credits, we maintain foreign and domestic DTAs. DTAs reflect an expected benefit to be realized in the future that may be used to reduce the amount of tax that we would otherwise be required to pay in future periods. DTAs are reduced by a valuation allowance when it is more likely than not that the future realization of all or some of the DTAs will not be achieved. Valuation allowances related to DTAs can be affected by changes to tax laws, statutory tax rates, future taxable income levels and input from our tax advisors or regulatory authorities. At this time, we consider it more likely than not that we will have sufficient taxable income in the future that will allow us to realize the benefits of the domestic DTAs we maintain as of December 31, 2023, exclusive of our California tax credit DTAs. However, it is possible that some of our foreign or domestic DTAs could ultimately expire

unused, or future DTAs could be created, due to vesting or settlement of stock awards or other book to tax differences, for which we will not have sufficient taxable income in the future to fully utilize. In such case, a valuation allowance to reduce our DTAs may be required, which would materially increase our tax expense in the period the valuation allowance is recorded and could have a material adverse impact on our financial condition and results of operations.

General Risk Factors

It is difficult to forecast future performance, which may cause our financial results to fluctuate unpredictably.

A number of factors over which we have limited or no control may contribute to fluctuations in our financial results, such as:

- variations in revenue due to the unavailability of specialist physicians who use our products during certain times of the year, such as those periods when there are major conferences on conditions they treat or those periods when high volume users of our products take time off of work;
- positive or negative media coverage of our products or the procedures or products of our competitors or our industry;
- publication of clinical trial results or studies by us or our competitors;
- changes in our sales process due to industry changes, such as changes in the stroke care pathway;
- delays in receipt of anticipated purchase orders;
- delays in customers receiving products;
- performance of our independent distributors;
- our ability to obtain further regulatory clearances or approvals;
- the timing of product development and clinical trial activities, including the pace of enrollment;
- delays in, or failure of, product and component deliveries by our suppliers;
- changes in reimbursement policies or levels;
- the number of procedures performed in any given period using our products, which can sometimes vary significantly between periods;
- customer response to the introduction of new products or alternative treatments, and the degree to we which we are effective in transitioning customers to our products; and
- fluctuations in foreign currency.

In the event our actual revenue and results of operations do not meet our or others' forecasts for a particular period, the market price of our common stock may decline substantially.

Natural disasters and other events beyond our control could harm our business.

Natural disasters or other catastrophic events, such as earthquakes, flooding, wildfires, power shortages, pandemics, terrorism, political unrest, telecommunications failure, vandalism, cyber-attacks, geopolitical instability, war, drought, sea level rise and other events beyond our control may cause damage or disruption to our operations, the operations of our suppliers and service providers, international commerce and the global economy, and could seriously harm our revenue and financial condition and increase our costs and expenses. For example, impacts from the COVID-19 pandemic and measures taken in response thereto, such as constraints in the capacities of hospitals and other healthcare providers to perform non-COVID related procedures, changes to our on-site operations, delays in product development efforts and related clinical trials and regulatory clearances and approvals, and disruptions to global supply chains and labor markets, resulting in cost inflation and raw material supply constraints, adversely affected our business and there can be no assurance that similar events will not occur in the future. In addition, the geographic location of our Alameda, California headquarters and Alameda and Roseville, California production facilities, as well as the facilities of certain of our key suppliers and service providers, subject them to earthquake and wildfire

risks. Should one or more of our facilities be significantly damaged or destroyed by natural or man-made disasters, such as earthquakes, fires or other events, our existing inventory of raw materials, components and finished goods may be damaged or destroyed and it could take months to relocate or rebuild, during which time our employees may seek other positions, our research, development and manufacturing would cease or be delayed and our products may be unavailable. Moreover, in the event we are required to obtain additional production capacity due to one or more of our facilities being damaged or destroyed, because of the time required to approve and license a manufacturing facility under FDA and non-U.S. regulatory requirements, we may not be able to resume production on a timely basis even if we are able to obtain replacement production capacity. While we maintain property and business interruption insurance, such insurance has limits and would only cover the cost of rebuilding and relocating and lost profits, but not losses we may suffer due to our products being replaced by competitors' products. The inability to perform our research, development and certain of our manufacturing activities, combined with our limited inventory of raw materials and components and manufactured products, may cause specialist physicians or other healthcare providers to discontinue using our products or harm our reputation, and we may be unable to reestablish relationships with those specialist physicians or other healthcare providers in the future. .Furthermore, other parties in our supply chain are similarly vulnerable to natural disasters or other sudden, unforeseen, and severe adverse events. A natural disaster or other catastrophic event in any of our major markets could have a material adverse impact on our business, financial condition, results of operations, or cash flows.

Failure to protect our information technology infrastructure against cyber-based attacks, network security breaches, service interruptions, or data corruption could significantly disrupt our operations and adversely affect our business and operating results.

We rely on information technology, telephone networks and systems, including the internet, to process and transmit sensitive electronic information and to manage or support a variety of business processes and activities, including sales, billing, marketing, procurement and supply chain, manufacturing, and distribution. We use enterprise information technology systems to record, process, and summarize financial information and results of operations for internal reporting purposes and to comply with regulatory, financial reporting, legal, and tax requirements. Our information technology systems are vulnerable to a cyber-attack, malicious intrusion, breakdown, destruction, loss of data privacy or other significant disruption. Any such successful attacks could result in the theft of intellectual property or other misappropriation of assets, data breach, or otherwise compromise our confidential or proprietary information and disrupt our operations. Cyber-attacks are becoming more sophisticated and frequent, and our systems could be the target of malware and other cyber-attacks. We have invested in our systems and the protection of our data to reduce the risk of an intrusion or interruption, and we monitor our systems on an ongoing basis for any current or potential threats. However, we can give no assurances that these measures and efforts will prevent interruptions or breakdowns. If we are unable to detect or prevent a security breach or cyber-attack or other disruption from occurring, then we could incur losses or damage to our data, or inappropriate disclosure of our confidential information or that of others; and we could sustain damage to our reputation and customer and employee relationships, suffer disruptions to our business and incur increased operating costs including costs to mitigate any damage caused and protect against future damage, and be exposed to additional regulatory scrutiny or penalties and to civil litigation and possible financial liability, any of which could have a material adverse effect on our business, financial condition, results of operations or cash flows. In addition, our information technology may be susceptible to damage, disruptions or shutdowns due to power outages, user errors, implementation of new operational systems or software or upgrades to existing systems and software, or catastrophes or other unforeseen events. Such events could result in the disruption of business processes, network degradation and system downtime, along with the potential that a third party will exploit our critical assets such as intellectual property, proprietary business information and data related to our customers, suppliers and business partners. To the extent that such disruptions occur, our customers and partners may lose confidence in our solutions and we may lose business or brand reputation, resulting in a material and adverse effect on our business, financial condition, results of operations or cash flows.

Our operations are subject to environmental, health and safety, and data privacy laws and regulations, compliance with which may be costly.

Our business is subject to federal, state, and local laws and regulations relating to the protection of the environment, worker health and safety and the use, management, storage, and disposal of hazardous substances and wastes. Failure to comply with these laws and regulations may result in substantial fines, penalties or other sanctions. In addition, environmental laws and regulations could require us to pay for environmental remediation and response costs, or subject us to third-party claims for personal injury, natural resource or property damage, relating to environmental contamination. Liability may be imposed whether or not we knew of, or were responsible for, such environmental contamination. The cost of defending against environmental claims, of compliance with environmental, health and safety regulatory requirements or of remediating contamination could materially adversely affect our business, results of operations, financial condition or cash flows.

Additionally, we are subject to laws and regulations with respect to the collection, use, disclosure, transfer and storage of personal data that we may collect from our employees, customers, third parties that we do business with, or patients or in conjunction with clinical trials, or that we may receive in connection with the use of our products, including our immersive healthcare products. The legislative and regulatory landscape for privacy and data protection continues to evolve, and there has been an increasing amount of focus on privacy and data protection issues that may affect our business. Several privacy laws have recently been adopted in domestic and foreign jurisdictions where we do business that include enhanced data protection requirements as well as substantial fines for breaches of personal data. We have modified and will continue to modify our practices in order to comply with these and other requirements, which requires us to incur costs and expenses, and we may face difficulties in complying with all privacy and data protection legal requirements that apply to us now or in the future, as well as financial penalties and liabilities if we are unable to do so.

We incur significant costs and devote substantial management time as a result of operating as a public company.

As a public company, we incur significant legal, accounting and other expenses as we devote resources to comply with the Exchange Act, the Sarbanes-Oxley Act of 2002 ("Sarbanes-Oxley Act"), and the Dodd-Frank Wall Street Reform and Consumer Protection Act ("Dodd-Frank Act"), as well as rules and regulations subsequently implemented by the SEC and the NYSE, including the establishment and maintenance of effective disclosure and financial controls and changes in corporate governance practices. We expect that compliance with these requirements will increase our legal and financial compliance costs and will make some activities more time consuming and costly. For example, the Dodd-Frank Act imposes disclosure requirements regarding the use in components of our products of "conflict minerals" mined from the Democratic Republic of Congo and adjoining countries, which requires us to devote resources to comply with such disclosure requirements, including due diligence to determine the source of any conflict minerals used in our products, and could affect the pricing, sourcing and availability of minerals used in the manufacture of components we use in our products.

We plan to continue to invest resources to comply with the evolving laws, regulations and standards applicable to public companies, and this investment may result in increased general and administrative expenses and a diversion of management's time and attention from revenue-generating activities to compliance activities. Operating as a public company and being subject to these rules and regulations makes it more expensive for us to obtain director and officer liability insurance, and we may be required to accept reduced coverage or incur substantially higher costs to obtain coverage. As a result, it may be difficult for us to attract and retain qualified members of our board of directors or executive officers.

The costs associated with operating as a public company may decrease our net income or increase any future net loss and may cause us to reduce costs in other areas of our business or increase the prices of our products to offset the effect of such costs. Additionally, if these requirements divert our management's attention from other business concerns, they could have a material adverse effect on our business, results of operation, financial condition or cash flows.

If we fail to maintain an effective system of disclosure controls and internal control over financial reporting, our ability to produce timely and accurate financial statements or comply with applicable regulations could be impaired.

As a public company, we are subject to the reporting requirements of the Exchange Act, Sarbanes-Oxley Act, and the listing standards of the NYSE. We expect that the requirements of these rules and regulations will continue to increase our legal, accounting and financial compliance costs, make some activities more difficult, time consuming and costly, and place significant strain on our personnel, systems and resources.

The Sarbanes-Oxley Act requires, among other things, that we maintain effective disclosure controls and procedures and internal control over financial reporting. We are continuing to develop and refine our disclosure controls and other procedures that are designed to ensure that information required to be disclosed by us in the reports that we will file with the SEC is recorded, processed, summarized and reported within the time periods specified in SEC rules and forms, and that information required to be disclosed in reports under the Exchange Act is accumulated and communicated to our principal executive and financial officers. We are also continuing to improve our internal control over financial reporting. In order to maintain and improve the effectiveness of our disclosure controls and procedures and internal control over financial reporting, we have expended, and anticipate that we will continue to expend, significant resources, including accounting-related costs and significant management oversight.

Our current controls and any new controls that we develop may become inadequate because of changes in our business. Further, weaknesses in our disclosure controls or our internal control over financial reporting may be discovered in the future. Any failure to develop or maintain effective controls, or any difficulties encountered in their implementation or improvement, could harm our operating results or cause us to fail to meet our reporting obligations and may result in financial statements that may not accurately reflect the results of our business and operations. Any failure to implement and maintain effective internal control over financial reporting also could adversely affect the results of management evaluations and independent registered

public accounting firm audits of our internal control over financial reporting that we include in our periodic reports that are filed with the SEC. Ineffective disclosure controls and procedures and internal control over financial reporting could also cause investors to lose confidence in our reported financial and other information, which would likely have a negative effect on the trading price of our common stock. In addition, if we are unable to continue to meet these requirements, we may not be able to remain listed on the NYSE.

As a public company, we are required to provide an annual management report on the effectiveness of our internal control over financial reporting and our independent registered public accounting firm is required to audit the effectiveness of our internal control over financial reporting. If we identify material weaknesses in our internal controls over financial reporting, if we are unable to assert that our internal control over financial reporting is effective, or if our independent registered public accounting firm is unable to express an opinion as to the effectiveness of our internal controls over financial reporting, investors may lose confidence in the accuracy and completeness of our financial reports and the market price of our common stock could be adversely affected, and we could become subject to investigations by the stock exchange on which our securities are listed, the SEC, or other regulatory authorities, which could require additional financial and management resources.

Any failure to maintain effective disclosure controls and internal control over financial reporting could have a material and adverse effect on our business and results of operations, and cause a decline in the price of our common stock.

If securities or industry analysts publish inaccurate or unfavorable research about our business or cease publishing research, our stock price and trading volume could decline.

The trading market for our common stock depends in part on the research and reports that securities or industry analysts publish about us or our business. If one or more of the analysts who cover us downgrade our stock or publish inaccurate or unfavorable research about our business, our stock price would likely decline. If one or more of these analysts cease coverage of our company or fail to publish reports on us regularly, demand for our stock could decrease, which might cause our stock price and trading volume to decline.

ITEM 1B. UNRESOLVED STAFF COMMENTS.

None.

ITEM 1C. CYBERSECURITY.

Risk management and strategy

The Company's cybersecurity program focuses primarily on securing and safeguarding computer systems, networks, cloud services, business applications, and data and is integrated in the Company's overall risk management strategy and framework. The Company has implemented protocols to protect against cyber threats and ensure the containment and security of sensitive business data, including ongoing security reviews of critical systems, continuous monitoring of event data, and employee training programs, which processes are aligned with the Company's overall business and operational goals and strategies. The Company also actively engages with key vendors, industry participants, and intelligence and law enforcement communities as part of its continuing efforts to evaluate and enhance the effectiveness of its information security policies and procedures. In 2023, the Company initiated efforts to streamline existing processes, enhance technological capabilities, and improve user experience and security.

The Company employs strategic partnerships with third-party entities to leverage resources and technologies for operational support, optimization, and heightened security. Collaboration with third parties forms a critical part of the Company's risk management strategy, facilitating effective management and mitigation of risks through partnerships, and ensuring adherence to applicable regulatory and industry standards. The Company incorporates supplier qualification processes and conducts thorough security and privacy risk assessments for third parties and lifecycle management.

Overall, the Company believes it has established a robust framework for confidentiality, integrity, and availability of information, adhering to relevant security standards, practices, and compliance requirements. In addition, the Company maintains insurance to help protect against risks associated with cybersecurity threats. The Company does not believe that any risks from cybersecurity threats have materially affected, or are reasonably likely to materially affect, the Company, including the Company's business strategy, results of operations, or financial condition. However, despite our efforts, we cannot eliminate all risks from cybersecurity threats, or provide assurances that we have not experienced an undetected cybersecurity incident. For more information about these risks, please see "Risk Factors – Failure to protect our information technology infrastructure against cyber-based attacks, network security breaches, service interruptions, or data corruption could significantly disrupt our operations and adversely affect our business and operating results." in this Form 10-K.

Governance

The Company's cybersecurity program is managed by its Chief Information Officer ("CIO"), whose team is responsible for leading enterprise-wide cybersecurity strategy, protocols, framework, standards and processes. The CIO, who has extensive experience in overseeing and managing information technology and security programs, is kept appraised of potential cybersecurity incidents, including the prevention, detection, mitigation and remediation thereof, through the work of the Company's information technology team, which conducts and oversees ongoing security reviews of critical systems and continuous monitoring of event data. The CIO provides periodic reports to the Company's Board of Directors, as well as its Chief Executive Officer and Chief Financial Officer and other members of senior management as appropriate. These reports include updates on cybersecurity risks and threats, the status of projects to strengthen the Company's information security systems, ongoing compliance with applicable legal and regulatory frameworks and industry standards, assessments of the Company's information security program, and the emerging threat landscape. The Company's Board of Directors provides oversight of the Company's cybersecurity program and helps guide the Company's strategy for managing cybersecurity risks in the context of the Company's overall risk management system.

ITEM 2. PROPERTIES.

We maintain approximately 610,000 square feet of office, research and development, manufacturing and administrative facilities in nine buildings at our campus in Alameda, California as of December 31, 2023. The leases for these nine buildings expire at various times in 2036, subject to our option to renew certain leases for an additional five to fifteen years. We also lease approximately 210,000 square feet of office and manufacturing facilities in two buildings in Roseville, California. The leases for these two buildings expire in 2035, subject to our option to renew the leases for an additional five to ten years. An additional approximately 50,000 square feet of space in one of the buildings, located at 620 Roseville Parkway, will be added to the lease upon the earlier of completion of certain improvements to the premises, which is not expected to occur in 2024, and June 1, 2025. In addition, we lease approximately 70,000 square feet of warehouse space in Livermore, California, and approximately 100,000 square feet of warehouse space in Salt Lake City, Utah. The leases for the Livermore warehouse spaces expire at

various times in 2025 to 2028. The lease for the Salt Lake City warehouse expires in 2027, subject to our option to renew the lease for an additional five years.

We also lease office and/or warehouse space in Germany, Italy, Brazil, Australia, Singapore, Japan and Taiwan as of December 31, 2023. The offices in Germany support our direct sales operations in Europe as well as distributor relationships in Europe and the Middle East; the offices in Brazil, Australia, Singapore, Japan and Taiwan support our sales and marketing efforts, including through our distribution partners, in Latin America, Australia and Southeast Asia, respectively; and the offices in Italy support the operations of Crossmed S.p.A., our wholly-owned subsidiary in Italy, including supporting our direct sales operations in Italy, San Marino, Vatican City, and Switzerland. We also warehouse and distribute finished products to our international customers utilizing third-party logistics providers in the Netherlands and Australia.

ITEM 3. LEGAL PROCEEDINGS.

For information with respect to Legal Proceedings, see Note “11. Commitments and Contingencies” to our consolidated financial statements in Part II, Item 8 of this Form 10-K.

ITEM 4. MINE SAFETY DISCLOSURES.

Not applicable.

PART II

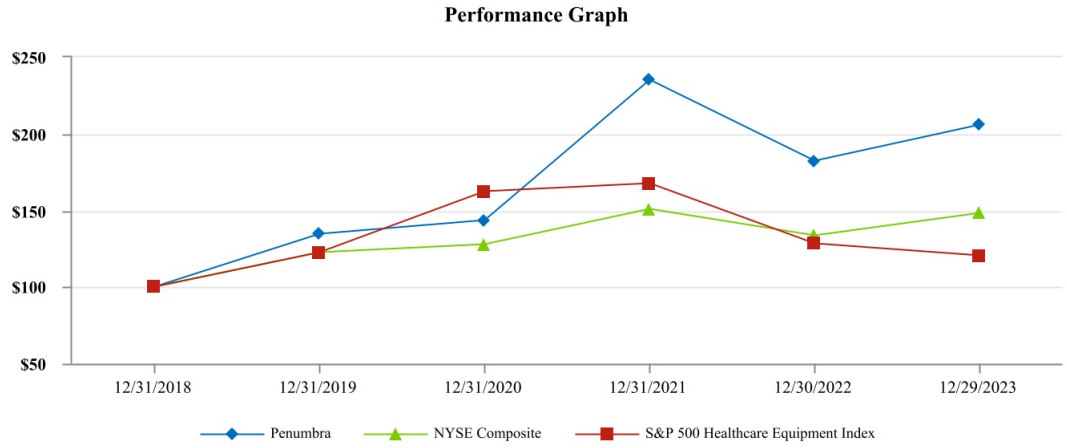
ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES.

Market Information

Our common stock has been listed on the NYSE under the symbol "PEN" since September 18, 2015. Prior to that date, there was no established public trading market for our common stock. As of February 8, 2024, there were 32 holders of record of our common stock. The actual number of stockholders is greater than this number of record holders, and includes stockholders who are beneficial owners, but whose shares are held in street name by brokers and other nominees. This number of holders of record also does not include stockholders whose shares may be held in trust by other entities.

Performance Graph

The following graph illustrates a comparison of the total cumulative stockholder return on our common stock with the total return for (i) the S&P Healthcare Equipment and (ii) the NYSE Composite for the period from December 31, 2018 through December 29, 2023. The figures represented below assume an investment of $100 in our common stock on December 31, 2018 and in the S&P Healthcare Equipment and NYSE Composite and the reinvestment of dividends into shares of common stock for the years ended December 31, 2019, 2020, 2021, 2022 and 2023. The comparisons in the table are required by the SEC and are not intended to forecast or be indicative of possible future performance of our common stock. This graph shall not be deemed "soliciting material" or be deemed "filed" for purposes of Section 18 of the Exchange Act, or otherwise subject to the liabilities under that Section, and shall not be deemed to be incorporated by reference into any of our filings under the Securities Act or the Exchange Act, whether made before or after the date hereof and irrespective of any general incorporation language in any such filing.



$100 investment in stock or index	Ticker	12/31/2018	12/31/2019	12/31/2020	12/31/2021	12/30/2022	12/29/2023
Penumbra	PEN	$ 100.00	$ 134.43	$ 143.21	$ 235.12	$ 182.05	$ 205.84
NYSE Composite	NYA	100.00	122.32	127.70	150.90	133.50	148.17
S&P 500 Healthcare Equipment Index	XHE	100.00	122.31	162.56	167.50	128.41	120.41

Dividend Policy

We have never declared or paid cash dividends on our capital stock. We currently intend to retain all available funds for use in the operation and expansion of our business, and do not anticipate paying any cash dividends in the foreseeable future. Any future determination related to dividend policy will be made at the discretion of our board of directors, subject to applicable laws, and will depend on a number of factors, including our financial condition, results of operations, capital requirements, contractual restrictions, general business conditions and other factors that our board of directors may deem relevant.

Issuer Purchases of Equity Securities

None.

Recent Sales of Unregistered Securities

None.

ITEM 6. [Reserved]

ITEM 7. 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 consolidated financial statements and related notes included elsewhere in this Form 10-K. This discussion and other parts of this report contain forward-looking statements that involve risk and uncertainties, such as statements of our plans, objectives, expectations, and intentions. As a result of many factors, including those factors set forth in the "Risk Factors" section of this Form 10-K, our actual results could differ materially from the results described in or implied by these forward-looking statements. A discussion of our results of operations for the year ended December 31, 2022 as compared to the year ended December 31, 2021 is included in Part II, Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations" of our Annual Report on Form 10-K for the year ended December 31, 2022, filed with the SEC on February 23, 2023, and is incorporated by reference into this Form 10-K.

Overview

References herein to "we," "us," "our," the "Company," and "Penumbra," refer to Penumbra, Inc. and its consolidated subsidiaries unless expressly indicated or the context requires otherwise.

Penumbra is a global healthcare company focused on innovative therapies. We design, develop, manufacture and market novel products and have a broad portfolio that addresses challenging medical conditions in markets with significant unmet need. Our team focuses on developing, manufacturing and marketing novel products for use by specialist physicians and healthcare providers to drive improved clinical and health outcomes. We believe that the cost-effectiveness of our products is attractive to our customers.

Since our founding in 2004, we have had a strong track record of organic product development and commercial expansion that has established the foundation of our global organization. We have successfully developed, obtained regulatory clearance or approval for, and introduced products into the thrombectomy market since 2007, access market since 2008, embolization market since 2011, neurosurgical market since 2014, and immersive healthcare market since 2020.

We expect to continue to develop and build our portfolio of products, including our thrombectomy, embolization, access and immersive healthcare technologies, while iterating on our currently available products. Generally, when we introduce a next generation product or a new product designed to replace a current product, sales of the earlier generation product or the product replaced decline. Our research and development activities are centered around the development of new products and clinical activities designed to support our regulatory submissions and demonstrate the effectiveness of our products.

We attribute our success to our culture built on cooperation, our highly efficient product innovation process, our disciplined approach to product and commercial development, our deep understanding of our target end markets and our relationships with specialist physicians and healthcare providers. We believe these factors have enabled us to rapidly innovate in a highly efficient manner.

We sell our products to healthcare providers primarily through our direct sales organization in the United States, most of Europe, Canada and Australia, as well as through distributors in select international markets. We generated revenue of $1,058.5 million, $847.1 million and $747.6 million for the years ended December 31, 2023, 2022 and 2021, respectively. This represents an annual increase of 25.0% and of 13.3%, respectively. We generated income from operations of $73.6 million and $6.1 million for the years ended December 31, 2023 and 2022, respectively, and a loss from operations of $7.5 million for the year ended December 31, 2021.

Factors Affecting Our Performance

There are a number of factors that have impacted, and we believe will continue to impact, our results of operations and growth. These factors include:

- The rate at which we grow our salesforce and the speed at which newly hired salespeople become fully effective can impact our revenue growth or our costs incurred in anticipation of such growth.
- Our industry is intensely competitive and, in particular, we compete with a number of large, well-capitalized companies. We must continue to successfully compete in light of our competitors' existing and future products and their resources to successfully market to the specialist physicians who use our products.
- We must continue to successfully introduce new products that gain acceptance with specialist physicians and other healthcare providers and successfully transition from existing products to new products, ensuring adequate supply. In

addition, as we introduce new products and expand our production capacity, we anticipate additional personnel will be hired and trained to build our inventory of components and finished goods in advance of sales, which may cause quarterly fluctuations in our operating results and financial condition.

- Publications of clinical results by us, our competitors and other third parties can have a significant influence on whether, and the degree to which, our products are used by specialist physicians and the procedures and treatments those physicians choose to administer for a given condition.
- The specialist physicians who use our interventional products may not perform procedures during certain times of the year, such as those periods when they are at major medical conferences or are away from their practices for other reasons, the timing of which occurs irregularly during the year and from year to year.
- Most of our sales outside of the United States are denominated in the local currency of the country in which we sell our products. As a result, our revenue from international sales can be significantly impacted by fluctuations in foreign currency exchange rates.
- The availability and levels of reimbursement within the relevant healthcare payment system for healthcare providers for procedures in which our products are used.

In addition, we have experienced and expect to continue to experience meaningful variability in our quarterly revenue, gross profit and gross margin percentage as a result of a number of factors, including, but not limited to: the number of available selling days, which can be impacted by holidays; the mix of products sold; the geographic mix of where products are sold; the demand for our products and the products of our competitors; the timing of or failure to obtain regulatory approvals or clearances for products; increased competition; the timing of customer orders; inventory write-offs due to obsolescence; costs, benefits and timing of new product introductions; costs, benefits and timing of the acquisition and integration of businesses and product lines we may acquire; the availability and cost of components and raw materials; and fluctuations in foreign currency exchange rates. We may experience quarters in which we have significant revenue growth sequentially followed by quarters of moderate or no revenue growth. Additionally, we may experience quarters in which operating expenses, in particular research and development expenses, fluctuate depending on the stage and timing of product development. For example, during the quarter ended September 30, 2023, we incurred a $18.2 million charge related to acquired in process research and development (“IPR&D”) as a result of an asset acquisition.

Critical Accounting Policies and Use of Estimates

Our consolidated financial statements have been prepared in accordance with generally accepted accounting principles in the United States (“U.S. GAAP”). The preparation of our consolidated financial statements in conformity with U.S. GAAP requires management to make estimates, assumptions and judgments that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the applicable periods. Management bases its estimates, assumptions and judgments on historical experience and on various other factors that it believes to be reasonable under the circumstances. Different assumptions and judgments would change the estimates used in the preparation of our consolidated financial statements, which, in turn, could materially change our results from those reported. Management evaluates its estimates, assumptions and judgments on an ongoing basis. Historically, our critical accounting estimates have not differed materially from actual results. However, if our assumptions change, we may need to revise our estimates, or take other corrective actions, either of which may also have a material adverse effect on our consolidated statements of operations, liquidity and financial condition.

We believe the following critical accounting policies involve significant areas where management applies judgments and estimates in the preparation of our consolidated financial statements.

Leases

We determine if an arrangement is a lease at inception. In addition, we determine whether leases meet the classification criteria of a finance or operating lease at the lease commencement date considering: (1) whether the lease transfers ownership of the underlying asset to the lessee at the end of the lease term, (2) whether the lease contains a bargain purchase option, (3) whether the lease term is for a major part of the remaining economic life of the underlying asset, (4) whether the present value of the sum of the lease payments and residual value guaranteed by the lessee equals or exceeds substantially all of the fair value of the underlying asset, and (5) whether the underlying asset is of such a specialized nature that it is expected to have no alternative use to the lessor at the end of the lease term. As of December 31, 2023, our lease population consisted of operating and finance real estate, equipment and vehicle leases.

Operating leases are included in operating lease right-of-use (“ROU”) assets, current operating lease liabilities, and non-current operating lease liabilities in our consolidated balance sheet. Finance leases are included in finance lease right-of-use

assets, current finance lease liabilities, and non-current finance lease liabilities in our consolidated balance sheet. ROU assets represent our right to use an underlying asset for the lease term and lease liabilities represent our obligation to make lease payments arising from the lease. Lease ROU assets and liabilities are recognized at the lease commencement date based on the present value of lease payments over the lease term. In determining the present value of lease payments, we use our incremental borrowing rate which requires our management's judgement as the rate implicit in the lease is generally not readily determinable. The determination of our incremental borrowing rate requires management judgment including the development of a synthetic credit rating and cost of debt as we currently does not carry any debt. The lease ROU assets also include adjustments for prepayments, accrued lease payments and exclude lease incentives. Our lease terms may include options to extend or terminate the lease when it is reasonably certain that we will exercise such options. Operating lease cost is recognized on a straight-line basis over the expected lease term. Finance lease cost is recognized as depreciation expense on a straight-line basis over the expected lease term and interest expense using the accelerated interest method of recognition. Lease agreements entered into after the adoption of ASC 842 that include lease and non-lease components are accounted for as a single lease component. Lease agreements with a noncancelable term of less than 12 months are not recorded on our consolidated balance sheet. For more information about our leases, refer to Note "10. Leases" to our consolidated financial statements in Part II, Item 8 of this Form 10-K.

Revenue Recognition

Revenue is primarily comprised of product revenue net of returns, discounts, administration fees and sales rebates. We recognize revenue when control of the promised goods or services is transferred to our customers, in an amount that reflects the consideration we expect to be entitled to in exchange for those goods or services. Revenue from product sales is recognized either on the date of shipment or the date of receipt by the customer, but is deferred for certain transactions when control has not yet transferred. With respect to products that we consign to hospitals, which primarily consist of coils, we recognize revenue at the time hospitals utilize products in a procedure. Refer to Note "18. Revenues" to our consolidated financial statements in Part II, Item 8 of this Form 10-K for more information and disclosures on our revenue.

Certain arrangements with customers contain multiple performance obligations. For these contracts, each promise is evaluated to determine if it is a performance obligation. We consider a number of factors when determining whether a promise is a contractual performance obligation, including whether the customer can benefit from the good or service on its own or together with other resources that are readily available to the customer or whether the goods or services are highly interdependent. Revenue is allocated to each performance obligation based on its relative standalone selling price. Standalone selling prices are based on observable prices at which we separately sell the products or services. If a standalone selling price is not directly observable, then we estimate the standalone selling prices considering market conditions and entity-specific factors including, but not limited to, the expected cost and margin of the products and services, geographies, and other market conditions. The use of alternative estimates could result in a different amount of revenue deferral.

We defer revenue for amounts that we have already invoiced our customers for and are ultimately expected to be recognized as revenue, but for which not all revenue recognition criteria have been met.

Revenue is recorded at the net sales price, which includes estimates of variable consideration such as product returns utilizing historical return rates, rebates, discounts, and other adjustments to net revenue. To the extent the transaction price includes variable consideration, we estimate the amount of variable consideration that should be included in the transaction price. Variable consideration is included in revenue only to the extent that it is probable that a significant reversal of the revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved. During the year ended December 31, 2023, we made no material changes in estimates for variable consideration.

Our terms and conditions permit product returns and exchanges. We base our estimates for sales returns on actual historical returns and they are recorded as reductions in revenue at the time of sale. Upon recognition, we reduce revenue and cost of revenue for the estimated return. Return rates can fluctuate over time, but are sufficiently predictable to allow us to estimate expected future product returns.

Income Taxes

We account for income taxes using the asset and liability method, whereby deferred tax asset and liability account balances are determined based on differences between the financial reporting and tax bases of assets and liabilities, and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse. We provide a valuation allowance to reduce the net deferred tax assets ("DTAs") to their estimated realizable value.

The calculation of our DTAs involves the use of estimates, assumptions and judgments while taking into account estimates of the amounts and type of future taxable income. DTAs are reduced to their estimated realizable value by a valuation

allowance when it is more likely than not that the future realization of all or some of the DTAs will not be achieved. Valuation allowances related to DTAs can be affected by changes to tax laws, statutory tax rates, and projections of future taxable income.

The calculation of our current provision for income taxes involves the use of estimates, assumptions and judgments while taking into account current tax laws, interpretation of current tax laws and possible outcomes of future tax audits. We have established reserves to address potential exposures related to tax positions that could be challenged by tax authorities. Although we believe our estimates, assumptions and judgments to be reasonable, any changes in tax law or interpretation of tax law and the resolutions of potential tax audits could significantly impact the amounts provided for income taxes in our consolidated financial statements.

We follow FASB ASC 740-10 “Accounting for Uncertainty in Income Taxes” that prescribes a financial statement recognition threshold and measurement attribute for uncertain tax positions taken or expected to be taken on our income tax returns, and also provides guidance on derecognition, classification, interest and penalty accrual, accounting in interim periods, and disclosure requirements. We include interest and penalties related to unrecognized tax benefits within income tax expense in the accompanying consolidated statements of operations.

As of December 31, 2023, our net DTA balance on a consolidated basis was $84.1 million, after reduction of a valuation allowance of $24.0 million. We had approximately $21.8 million and $63.2 million of federal and state net operating loss (“NOL”) carryforwards, respectively, available to offset future taxable income as of December 31, 2023. The federal NOL has an indefinite carryforward period but is limited to offset 80% of taxable income in the year utilized. The state NOL carryforwards have various carryover periods and will begin to expire as early as 2035. As of December 31, 2023, we had federal research and development tax credits of $27.1 million which are generally carried forward for 20 years and will begin to expire in 2037. We had California state research and development tax credits of $29.4 million that may be carried forward indefinitely.

Significant domestic DTAs were generated in recent years, primarily due to excess tax benefits from stock option exercises and vesting of restricted stock, as well as operating expenditures including research and development. We assessed the ability to realize the benefits of our DTAs in each reporting period by evaluating all available positive and negative evidence, objective and subjective in nature, including (1) cumulative results of operations in recent years, (2) sources of recent pre-tax income, (3) estimates of future taxable income, (4) respective carryback and/or carryforward periods of tax attributes available to date, and (5) limitation on NOL utilization against taxable income. We measured our current DTA balances against estimates of future income based on objectively verifiable operating results from our recent history, and concluded that sufficient future taxable income will be generated to realize the benefits of our federal DTAs prior to expiration, including our federal research and development tax credit DTAs. Furthermore, due to our substantial profitability increase in recent years, we determined that sufficient future California taxable income will be generated to realize partial benefit of our California DTAs. As a result, we released the valuation allowance against federal research and development tax credit DTAs net of ASC 740-10 reserve and recorded a partial release of our California DTAs, resulting in a $25.5 million income tax benefit recorded as of December 31, 2023. We continue to maintain a valuation allowance against our California tax credit DTAs until new evidence becomes available to justify realization of the asset.

As of December 31, 2023, we do not maintain valuation allowance against any of our foreign DTAs as we believe, at the required more-likely-than-not level of certainty, that our foreign subsidiaries will generate sufficient future taxable income to realize the benefit of their DTAs in full.

In December 2021, the Organizational for Economic Co-operation and Development (“OECD”) released guidance on the new global minimum tax regime known as Pillar Two. While various countries have adopted or in the process of passing legislation to adopt it, the United States has not yet conformed to Pillar Two as of December 31, 2023. We are currently evaluating the potential global tax implications of this new tax regime.

Goodwill

Goodwill represents the excess of the purchase price of an acquired business or assets over the fair value of the identifiable assets acquired and liabilities assumed. Goodwill is not amortized, but is tested for impairment at least annually, or more frequently if events or circumstances indicate the carrying value may no longer be recoverable and that an impairment loss may have occurred. Circumstances that could trigger an impairment test include, but are not limited to, a significant adverse change in the business climate or legal factors, an adverse action or assessment by a regulator, change in customers, target market and strategy, unanticipated competition, loss of key personnel, or change in reporting units. We operate as one segment, which is considered to be the sole reporting unit, and therefore goodwill is tested for impairment at the consolidated level.

The authoritative guidance allows an entity to assess qualitative factors to determine whether it is necessary to perform the quantitative goodwill impairment test. If an entity determines that as a result of the qualitative assessment that it is more likely

than not (i.e. greater than 50% likelihood) that the fair value of a reporting unit is less than its carrying amount, then the quantitative test is required. Otherwise, no further testing is required. The quantitative goodwill impairment test requires us to estimate and compare the fair value of our reporting unit with its carrying value.

Application of the goodwill impairment test requires judgments, including: identification of the reporting units, assigning goodwill to reporting units, a qualitative assessment to determine whether there are any impairment indicators, and determining the fair value of each reporting unit. Qualitative factors may include, but are not limited to, macroeconomic conditions, industry conditions, the competitive environment, changes in the market for our products and services, regulatory and political developments, cost factors, and entity specific factors such as strategies, overall financial performance (both current and projected) and market capitalization. In the fourth quarter of 2023 and 2022, we performed qualitative assessments for goodwill impairment and determined there were no indicators of impairment. Refer to Note “8. Goodwill” to our consolidated financial statements in Part II, Item 8 of this Form 10-K for more information.

Valuation of Assets Acquired and Liabilities Assumed in a Business Combination

For material acquisitions, of which there were none in 2023, we may engage independent appraisers to assist with the determination of the fair value of certain assets acquired and liabilities assumed using recognized business valuation methodologies and information and assumptions provided by our management.

In determining the fair value of certain identifiable assets acquired or liabilities assumed, management may utilize valuation techniques consistent with the income approach, market approach, or cost approach and provide its best estimates of inputs and assumptions that a market participant would use. Certain estimates used in the cost approach include the total cost and time to reconstruct a substitute asset of comparable utility adjusted for any obsolescence, a developer’s expected profit margin, and any opportunity costs lost over the period to reconstruct the substitute asset. Certain estimates used in the income approach may include the amount and timing of projected future cash flows, the discount rate used to discount those cash flows to present value, the assessment of the asset’s life cycle, and the consideration of legal, technical, regulatory, economic, and competitive risks.

Intangible Assets

Indefinite-lived intangible assets are tested for impairment at least annually in the fourth quarter of each year, or more frequently if events or circumstances indicate that it is more likely than not that the asset is impaired. In conducting the annual impairment test for its indefinite-lived intangible assets, we may first perform a qualitative assessment to determine whether it is more likely than not (i.e. greater than 50% likelihood) that an indefinite-lived intangible asset is impaired. In accordance with the authoritative guidance, we may elect to bypass the qualitative assessment and proceed directly to the quantitative test to compare the fair value of the indefinite-lived intangible asset to the carrying amount. If the fair value of the asset is less than the carrying amount, an impairment loss would be recognized in an amount equal to the difference between the carrying amount and the fair value.

The fair value of in-process research and development asset (“IPR&D”) projects acquired in a business combination are capitalized and accounted for as indefinite-lived intangible assets until the underlying project is completed, at which point the intangible asset will be accounted for as a finite-lived intangible asset. If a project is abandoned prior to completion, the carrying value of the IPR&D asset is written off. IPR&D acquired in an asset acquisition for use in research and development activities with no alternative future use are expensed in the consolidated statements of operations on the acquisition date. Accounting for acquisitions of IPR&D requires the Company to make certain judgements to determine if the transaction should be accounted for as an asset acquisition or a business combination, as well as assess if the IPR&D project has alternative future use in research and development activities.

Finite-lived intangible assets are amortized over the estimated economic useful lives of the assets, which is the period during which expected cash flows support the fair value of such intangible assets. We review finite-lived intangible assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. If such an event occurs, management determines whether there has been impairment by comparing the anticipated undiscounted future net cash flows to the related asset group’s carrying value. If an asset is considered impaired, the asset will be written down to the determined fair value based on discounted cash flows. We also periodically review the useful lives assigned to our intangible assets to ensure that our initial estimates do not exceed any revised estimated periods from which we expect to realize cash flows from the underlying intangible asset. If a change were to occur in any of the above-mentioned factors or estimates, the likelihood of a material change in our reported results would increase.

Refer to Notes “5. Business Combinations,” “6. Asset Acquisition” and “7. Intangible Assets” to our consolidated financial statements in Part II, Item 8 of this Form 10-K for more information.

Loss Contingencies

We are subject to certain legal proceedings, as well as demands, claims and threatened litigation that arise in the normal course of our business. We review the status of each significant matter quarterly and assess our potential financial exposure. Significant judgment is required in the determination of whether a potential loss is probable, reasonably possible, or remote as well as in the determination of whether a potential exposure is reasonably estimable. We base our judgments on the best information available at the time. As additional information becomes available, we reassess the potential liability related to our pending claims and litigation and may revise our estimates. Any revision of our estimates of potential liability could have a material impact on our financial position and operating results. For information with respect to legal proceedings, see Note “11. Commitments and Contingencies” to our consolidated financial statements in Part II, Item 8 of this Form 10-K.

Components of Results of Operations

Revenue. We sell our interventional products directly to hospitals and other healthcare providers and through distributors for use in procedures performed by specialist physicians to treat patients in two key markets: thrombectomy and embolization and access. We sell our products through purchase orders, and we do not have long term purchase commitments from our customers. Revenue from product sales is recognized either on the date of shipment or the date of receipt by the customer, but is deferred for certain transactions when control has not yet transferred. With respect to products that we consign to hospitals, which primarily consist of coils, we recognize revenue at the time hospitals utilize products in a procedure. Revenue also includes shipping and handling costs that we charge to customers.

Cost of Revenue. Cost of revenue consists primarily of the cost of raw materials and components, personnel costs, including stock-based compensation, inbound freight charges, receiving costs, inspection and testing costs, warehousing costs, royalty expense, shipping and handling costs and other labor and overhead costs incurred in the manufacturing of products. We manufacture substantially all of our products in our manufacturing facilities in Alameda and Roseville, California.

Operating Expenses

Research and Development (“R&D”). R&D expenses primarily consist of product development, clinical and regulatory expenses, materials, depreciation and other costs associated with the development of our products. R&D expenses also include salaries, benefits and other related costs, including stock-based compensation, for personnel and consultants. We expense R&D costs as they are incurred.

Sales, General and Administrative (“SG&A”). SG&A expenses primarily consist of salaries, benefits and other related costs, including stock-based compensation, for personnel and consultants engaged in sales, marketing, finance, legal, compliance, administrative, facilities and information technology and human resource activities. Our SG&A expenses also include marketing trials, medical education, training, commissions, generally based on sales, to direct sales representatives, amortization of acquired intangible assets and acquisition-related costs.

Income Tax Expense. We are taxed at the rates applicable within each jurisdiction in which we operate. The composite income tax rate, tax provisions, deferred tax assets and deferred tax liabilities will vary according to the jurisdiction in which profits arise. Tax laws are complex and subject to different interpretations by management and the respective governmental taxing authorities, and require us to exercise judgment in determining our income tax provision, our deferred tax assets and deferred tax liabilities and the potential valuation allowance recorded against our net DTAs. Deferred tax assets and liabilities are determined using the enacted tax rates in effect for the years in which those tax assets are expected to be realized. A valuation allowance is established when it is more likely than not that the future realization of all or some of the DTAs will not be achieved.

Results of Operations

The following table sets forth the components of our consolidated statements of operations in U.S. dollars and as a percentage of revenue for the periods presented:

	Year Ended December 31,								
	2023			2022			2021		
	(in thousands, except for percentages)								
Revenue	$ 1,058,522	100.0	%	$ 847,133	100.0	%	$ 747,590	100.0	%
Cost of revenue	375,879	35.5	%	311,926	36.8	%	272,208	36.4	%
Gross profit	682,643	64.5	%	535,207	63.2	%	475,382	63.6	%
Operating expenses:									
Research and development	84,423	8.0	%	79,407	9.4	%	104,552	14.0	%
Sales, general and administrative	506,454	47.8	%	449,718	53.1	%	378,331	50.6	%
Acquired in-process research and development	18,215	1.7	%	—	—	%	—	—	%
Total operating expenses	609,092	57.5	%	529,125	62.5	%	482,883	64.6	%
Income (loss) from operations	73,551	6.9	%	6,082	0.7	%	(7,501)	(1.0)	%
Interest and other income (expense), net	6,099	1.6	%	(2,190)	(0.3)	%	(3,001)	(0.4)	%
Income (loss) before income taxes	79,650	7.5	%	3,892	0.5	%	(10,502)	(1.4)	%
(Benefit from) provision for income taxes	(11,304)	(1.1)	%	5,894	0.7	%	(13,125)	(1.8)	%
Consolidated net income (loss)	$ 90,954	8.6	%	$ (2,002)	(0.2)	%	$ 2,623	0.4	%
Net loss attributable to non-controlling interest	—	—	%	—	—	%	(2,661)	(0.4)	%
Net income (loss) attributable to Penumbra, Inc.	$ 90,954	8.6	%	$ (2,002)	(0.2)	%	$ 5,284	0.7	%

Year Ended December 31, 2023 Compared to Year Ended December 31, 2022

Certain changes in presentation were made in the Company's revenues disaggregated by product categories for the year ended December 31, 2022 to conform to the presentation for the year ended December 31, 2023. During the year ended December 31, 2023, the Company made changes to its product categories to provide investors with more meaningful information to understand the performance of its business and strategic direction.

Revenue

	Year Ended December 31,		Change	
	2023	2022	$	%
	(in thousands, except for percentages)			
Thrombectomy	$ 677,343	$ 511,137	$ 166,206	32.5 %
Embolization and Access	381,179	335,996	45,183	13.4 %
Total	$ 1,058,522	$ 847,133	$ 211,389	25.0 %

Revenue increased $211.4 million, or 25.0%, to $1,058.5 million in 2023, from $847.1 million in 2022. The increase in overall revenue was primarily due to an increase in sales of our new and existing thrombectomy and embolization and access products.

Revenue from our global thrombectomy products increased $166.2 million, or 32.5%, to $677.3 million in 2023, from $511.1 million in 2022. This increase was driven by sales of our U.S. vascular thrombectomy products, which increased by 45.2% in the year ended December 31, 2023. This increase in our global thrombectomy products was primarily attributable to higher sales volume in the United States as a result of sales of new products and further market penetration of our existing products. Prices for our thrombectomy products remained substantially unchanged during the period.

Revenue from our global embolization and access products increased $45.2 million, or 13.4%, to $381.2 million in the year ended December 31, 2023, from $336.0 million in the year ended December 31, 2022. Prices for our embolization and access products remained substantially unchanged during the period.

Revenue by Geographic Area

The following table presents revenue by geographic area, based on our customers' shipping destinations:

	Year Ended December 31,				Change	
	2023		2022		$	%
	(in thousands, except for percentages)					
United States	$ 757,151	71.5 %	$ 591,715	69.8 %	$ 165,436	28.0 %
International	301,371	28.5 %	255,418	30.2 %	45,953	18.0 %
Total	$ 1,058,522	100.0 %	$ 847,133	100.0 %	$ 211,389	25.0 %

Revenue from sales in international markets increased $46.0 million, or 18.0%, to $301.4 million in 2023, from $255.4 million in 2022. Revenue from international sales represented 28.5% and 30.2% of our total revenue in 2023 and 2022, respectively.

Gross Margin

	Year Ended December 31,		Change	
	2023	2022	$	%
	(in thousands, except for percentages)			
Cost of revenue	$ 375,879	$ 311,926	$ 63,953	20.5 %
Gross profit	$ 682,643	$ 535,207	$ 147,436	27.5 %
Gross margin %	64.5 %	63.2 %		

Gross margin increased by 1.3% percentage points to 64.5% in 2023, from 63.2% in 2022. Gross margin is impacted by product mix, regional mix, and production initiatives to support demand and create future efficiencies. As such, with favorable product mix, improvement in productivity, and by leveraging our fixed costs on higher volume of new product sales during the year, our gross margin may be positively impacted in the future.

Research and Development ("R&D")

	Year Ended December 31,		Change	
	2023	2022	$	%
	(in thousands, except for percentages)			
R&D	$ 84,423	$ 79,407	$ 5,016	6.3 %
R&D as a percentage of revenue	*8.0 %*	*9.4 %*		

R&D expenses increased by $5.0 million or 6.3%, to $84.4 million in 2023, from $79.4 million in 2022. The increase was primarily due to a $6.4 million increase in personnel-related expenses driven by an increase in headcount and related expenses to support our growth, partially offset by a $2.7 million decrease in product development and testing costs.

We have continued to make investments, and plan to continue to make investments, in the development of our products. As part of our ongoing investment in the development of our products, we may incur additional expenses related to research and development milestones. In addition, we have experienced in the past, and may continue to experience in the future, variability in expenses incurred due to the timing and costs of clinical trials and product development, which may include additional personnel-related expenses in conjunction with the launch of new products.

Sales, General and Administrative ("SG&A")

	Year Ended December 31,		Change	
	2023	2022	$	%
	(in thousands, except for percentages)			
SG&A	$ 506,454	$ 449,718	$ 56,736	12.6 %
SG&A *as a percentage of revenue*	*47.8 %*	*53.1 %*		

SG&A expenses increased by $56.7 million, or 12.6%, to $506.5 million in 2023, from $449.7 million in 2022. The increase was primarily due to a $38.4 million increase in personnel-related expenses driven by an increase in headcount and related expenses to support our growth and a $8.1 million increase in costs related to marketing events.

As we continue to invest in our growth, we have expanded and may continue to expand our sales, marketing, and general and administrative teams through the hiring of additional employees in critical roles that support our strategic initiatives. In addition, we have experienced in the past, and may continue to experience in the future, variability in expenses incurred due to the timing and costs of investments to support the business.

Acquired In-Process Research and Development

	Year Ended December 31,		Change	
	2023	2022	$	%
	(in thousands, except for percentages)			
Acquired in-process research and development	$ 18,215	$ —	$ 18,215	100 %
Acquired in-process research and development as a percentage of revenue	*1.7 %*	*— %*		

During the year ended December 31, 2023, we recorded an $18.2 million acquired in-process research and development assets ("IPR&D") charge in connection with an asset acquisition.

(Benefit from) Provision for Income Taxes

	Year Ended December 31,		Change	
	2023	2022	$	%
	(in thousands, except for percentages)			
(Benefit from) provision for income taxes	$ (11,304)	$ 5,894	$ (17,198)	(291.8)%
Effective tax rate	*(14.2)%*	*151.4 %*		

Our benefit from income taxes was $11.3 million in 2023, which was primarily due to income taxes imposed on our worldwide profits, offset by excess tax benefits from stock-based compensation attributable to our U.S. jurisdiction and tax benefits from releasing the valuation allowance against federal research and development credit DTAs net of ASC 740-10 reserve and recording a partial release of our California DTAs. Our provision for income taxes was $5.9 million in 2022, which was primarily due to income taxes imposed on our worldwide profits, combined with excess tax deficiencies (shortfall) from

stock-based compensation attributable to our U.S. jurisdiction as a result of stock price fluctuation. Our effective tax rate was (14.2)% in 2023, compared to 151.4% in 2022. Our change in effective tax rate was primarily attributable to small tax benefits over relatively large worldwide profits for the year ended December 31, 2023, compared to large tax expenses over relatively small worldwide profits for the year ended December 31, 2022.

Our effective tax rate is driven by (1) income or loss before taxes, (2) permanent differences in taxable income for tax and financial reporting purposes, (3) tax expense attributable to our foreign jurisdictions, (4) changes to the valuation allowance maintained against our deferred tax assets, and (5) discrete tax adjustments such as excess tax expenses or benefits related to stock-based compensation. Our income tax provision is subject to volatility as the amount of excess tax expenses and benefits can fluctuate from period to period based on the price of our stock, the volume of share-based grants settled or vested, and the fair value assigned to equity awards under U.S. GAAP. In addition, changes in tax law or our interpretation thereof, and changes to our valuation allowance could cause us to experience an effective tax rate significantly different from previous periods.

As of December 31, 2023, we assessed all available qualitative and quantitative evidence, and concluded that sufficient future taxable income will be generated to realize the benefits of our federal DTAs prior to expiration, including our federal research and development tax credit DTAs. Furthermore, due to our substantial profitability increase in recent years, we determined that sufficient future California taxable income will be generated to realize partial benefit of our California DTAs. As a result, we released the valuation allowance against our federal research and development tax credit DTAs net of ASC 740-10 reserve and recorded a partial release of our California DTAs, resulting in a $25.5 million income tax benefit recorded as of December 31, 2023. We continue to maintain a valuation allowance against our California tax credit DTAs until new evidence becomes available to justify realization of the asset.

Quarterly Results of Operations

For our unaudited quarterly results of operations for the eight quarters ended December 31, 2023, please see Note “19. Selected Quarterly Financial Data (Unaudited)” to our consolidated financial statements in Part II, Item 8 of this Form 10-K.

Our quarterly results of operations should be read in conjunction with the consolidated financial statements and related notes thereto. We have prepared the unaudited information on the same basis as our audited consolidated financial statements. Our operating results for any quarter are not necessarily indicative of results for any future quarters or for a full year. Our unaudited quarterly results tables include all adjustments, consisting only of normal recurring adjustments, that we consider necessary for a fair presentation of our consolidated financial position and operating results for the quarters presented. Seasonal fluctuations, underlying business trends have affected, and are likely to continue to affect, our business. Commercial queries typically increase significantly in the fourth quarter of each year. These seasonal trends have caused, and will likely continue to cause, fluctuations in our quarterly results, including fluctuations in sequential revenue growth rates.

However, we may have quarters for which we experience significant revenue and gross profit growth followed by quarters with limited revenue and gross profit growth due to a number of factors, including mix of products sold, limited growth in demand and the effects of hiring and integrating new sales people and their transition into existing or new sales territories. Other factors affecting our revenue and gross profit growth include acceptance of new products by specialist physicians and successfully transitioning these physicians to new products from existing products, buildup of inventory of new products and write downs or write offs of inventory of older products, introduction of new products by competitors, publication of clinical results that may influence specialist physicians and the fact that the specialist physicians who use our products may not perform procedures during certain times of the year due to their attendance at major medical conferences or for other reasons, the timing of which occurs irregularly during the year and from year to year.

Liquidity and Capital Resources

As of December 31, 2023, we had $764.3 million in working capital, which included $167.5 million in cash and cash equivalents and $121.7 million in marketable investments. As of December 31, 2023, we held approximately 14.5% of our cash and cash equivalents in foreign entities.

In addition to our existing cash and cash equivalents and marketable investment balances, our principal source of liquidity is our accounts receivable. In order to further strengthen our liquidity position and financial flexibility during the COVID-19 pandemic, on April 24, 2020 we entered into a Credit Agreement (the "Credit Agreement") with JPMorgan Chase Bank, N.A., as administrative agent and lender, and Bank of America, N.A. and Citibank, N.A. as lenders. The Credit Agreement was secured and provided for up to $100 million in available revolving borrowing capacity with an option, subject to certain conditions, for the Company to increase the aggregate borrowing capacity to up to $150 million, and originally matured on April 23, 2021. During the three months ended March 31, 2021, 2022 and 2023, the Credit Agreement was amended to extend the maturity date and make other changes to the terms of the Credit Agreement. The Credit Agreement matured on February 16, 2024 and was not renewed.

As of December 31, 2023, the Company was in compliance with the requirements in the Credit Agreement to maintain a minimum fixed charge coverage ratio and to not exceed a maximum leverage ratio. As of December 31, 2023, there were no borrowings outstanding under the Credit Agreement. Refer to Note "9. Indebtedness" to our consolidated financial statements in Part II, Item 8 in this Form 10-K for more information.

We believe our current sources of liquidity will be sufficient to meet our liquidity requirements for at least the next 12 months. Our principal liquidity requirements are to fund our operations, expand manufacturing operations which includes, but is not limited to, maintaining sufficient levels of inventory to meet the anticipated demand of our customers, fund research and development activities and fund our capital expenditures. We may also lease or purchase additional facilities to facilitate our growth. We expect to continue to make investments as we launch new products, expand our manufacturing operations and information technology infrastructures and further expand into international markets. We may, however, require or elect to secure additional financing as we continue to execute our business strategy. If we require or elect to raise additional funds, we may do so through equity or debt financing, which may not be available on favorable terms, could result in dilution to our stockholders and could require us to agree to covenants that limit our operating flexibility.

The following table summarizes our cash and cash equivalents, marketable investments and selected working capital data as of December 31, 2023 and December 31, 2022:

	Year Ended December 31,	
	2023	2022
	(in thousands)	
Cash and cash equivalents	$ 167,486	$ 69,858
Marketable investments	121,701	118,172
Accounts receivable, net	201,768	203,384
Accounts payable	27,155	26,679
Accrued liabilities	110,555	106,300
Working capital[(1)]	764,258	610,767

[(1)] Working capital consists of total current assets less total current liabilities.

The following table sets forth, for the periods indicated, our beginning balance of cash and cash equivalents, net cash flows provided by (used in) operating, investing and financing activities and our ending balance of cash and cash equivalents:

	Year Ended December 31,		
	2023	2022	2021
		(in thousands)	
Cash and cash equivalents at beginning of year	$ 69,858	$ 59,379	$ 69,670
Net cash provided by (used in) operating activities	97,333	(55,661)	9,502
Net cash (used in) provided by investing activities	(16,076)	54,790	(21,735)
Net cash provided by financing activities	16,203	11,622	836
Cash and cash equivalents at end of year	167,486	69,858	59,379

Net Cash Provided By (Used In) Operating Activities

Net cash provided by (used in) operating activities consists primarily of net income adjusted for certain non-cash items (including depreciation and amortization, stock-based compensation expense, inventory write-offs and write-downs, changes in deferred tax balances, acquired in-process research and development expensed in connection with an asset acquisition, and the effect of changes in working capital and other activities).

Net cash provided by operating activities was $97.3 million in 2023 and consisted of net income of $91.0 million and net changes in operating assets and liabilities of $79.1 million offset by non-cash items of $85.5 million. The change in operating assets and liabilities includes an increase in inventories of $67.7 million to support our revenue growth, an increase in prepaid expenses and other current and non-current assets of $18.9 million, and an increase in accounts receivable of $0.3 million. This was partially offset by an increase in accrued expenses and other non-current liabilities of $6.2 million primarily as a result of the growth in our business activities, an increase in accounts payable of $1.1 million, and proceeds of $0.5 million received related to lease incentives from operating leases.

Net cash used in operating activities was $55.7 million in 2022 and consisted of net loss of $2.0 million and net changes in operating assets and liabilities of $121.5 million offset by non-cash items of $67.9 million. The change in operating assets and liabilities includes an increase in inventories of $74.6 million to support our revenue growth, an increase in accounts receivable of $69.9 million, and an increase in prepaid expenses and other current and non-current assets of $1.2 million. This was partially offset by an increase in accounts payable of $13.4 million, an increase in accrued expenses and other non-current liabilities of $10.5 million primarily as a result of the growth in our business activities and proceeds of $0.3 million received related to lease incentives from operating leases.

Net cash provided by operating activities was $9.5 million in 2021 and consisted of net income of $2.6 million and non-cash items of $73.6 million offset by net changes in operating assets and liabilities of $66.7 million. The change in operating assets and liabilities includes an increase in inventories of $51.6 million to support our revenue growth, an increase in accounts receivable of $21.3 million, an increase in prepaid expenses and other current and non-current assets of $13.0 million, and a decrease in accounts payable of $1.6 million. This was partially offset by an increase in accrued expenses and other non-current liabilities of $17.1 million primarily as a result of the growth in our business activities and proceeds of $3.7 million received related to lease incentives from operating leases.

Net Cash (Used In) Provided By Investing Activities

Net cash (used in) provided by investing activities relates primarily to purchases of marketable investments and capital expenditures, partially offset by proceeds from maturities and sales of marketable investments.

Net cash used in investing activities was $16.1 million in 2023 and primarily consisted of capital expenditures of $15.2 million and cash paid in an asset acquisition of $1.0 million, partially offset by proceeds from maturities of marketable investments, net of purchases, of $0.6 million.

Net cash provided by investing activities was $54.8 million in 2022 and primarily consisted of proceeds from maturities and sales of marketable investments of $74.1 million, partially offset by capital expenditures of $19.3 million.

Net cash used in investing activities was $21.7 million in 2021 and primarily consisted of capital expenditures of $21.2 million and purchases of marketable investments, net of proceeds from maturities and sales, of $3.1 million. This was partially offset by $2.9 million cash acquired in connection with the Sixense acquisition.

Net Cash Provided By Financing Activities

Net cash provided by financing activities primarily relates to proceeds from exercises of stock options and issuances of common stock under our employee stock purchase plan, partially offset by payments of employee taxes related to vested restricted stock units and payments towards the reduction of our finance lease obligations.

Net cash provided by financing activities was $16.2 million in 2023 and primarily consisted of proceeds from the issuance of stock under our employee stock purchase plan of $14.9 million and proceeds from exercises of stock options of $5.5 million. This was partially offset by $2.1 million of payments of employee taxes related to vested restricted stock units and payments related to finance lease obligations of $2.0 million.

Net cash provided by financing activities was $11.6 million in 2022 and primarily consisted of proceeds from the issuance of stock under our employee stock purchase plan of $13.8 million and proceeds from exercises of stock options of $7.8 million. This was partially offset by $8.0 million of payments of employee taxes related to vested restricted stock units and payments related to finance lease obligations of $1.8 million.

Net cash provided by financing activities was $0.8 million in 2021 and primarily consisted of proceeds from the issuance of stock under our employee stock purchase plan of $13.7 million and proceeds from exercises of stock options of $4.7 million. This was partially offset by $15.8 million of payments of employee taxes related to vested restricted stock units and payments related to finance lease obligations of $1.5 million.

Contractual Obligations and Commitments

In the normal course of business, the Company enters into contracts and commitments that obligate us to make payments in the future. Our contractual obligations consist primarily of: non-cancelable operating and finance leases and purchase commitments. Information regarding our obligations relating to lease arrangements and purchase commitments, as well as amounts recorded for uncertain tax positions, are provided in Part II, Item 8, “Financial Statements and Supplementary Data”of this Form 10-K in Note “10. Leases”, Note “11. Commitments and Contingencies”, and Note “15. Income Taxes”, respectively.

The Company is also subject to certain royalty obligations under a license agreement with amounts due thereunder fluctuating depending on sales levels. Royalty expense included in cost of sales for the years ended December 31, 2023, 2022 and 2021 was $2.6 million, $2.5 million and $2.3 million, respectively. For more information on these royalty obligations, refer to Note “11. Commitments and Contingencies” to our consolidated financial statements in Part II, Item 8 of this Form 10-K.

Recently Issued Accounting Standards

For information with respect to recently issued accounting standards and the impact of these standards on our consolidated financial statements, refer to Note “2. Summary of Significant Accounting Policies” to our consolidated financial statements in Part II, Item 8 of this Form 10-K.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK.

We are exposed to various market risks, which may result in potential losses arising from adverse changes in market rates, such as interest rates and foreign exchange rates. We do not enter into derivatives or other financial instruments for trading or speculative purposes and do not believe we are exposed to material market risk with respect to our cash and cash equivalents and/or our marketable investments.

Interest Rate Risk. We had cash and cash equivalents of $167.5 million as of December 31, 2023, which consisted of funds held in money market funds, general checking and savings accounts. In addition, we had marketable investments of $121.7 million, which consisted primarily of commercial paper, corporate bonds, certificates of deposit, U.S. treasury securities, and U.S. states and municipalities. Our investment policy is focused on the preservation of capital and supporting our liquidity needs. Under the policy, we invest in highly rated securities, while limiting the amount of credit exposure to any one issuer other than the U.S. government. We do not invest in financial instruments for trading or speculative purposes, nor do we use leveraged financial instruments. We utilize external investment managers who adhere to the guidelines of our investment policy. A hypothetical 100 basis point change in interest rates would not have a material impact on the value of our cash and cash equivalents or marketable investments.

Foreign Exchange Risk Management. We operate in countries other than the United States, and, therefore, we are exposed to foreign currency risks. We bill most sales outside of the United States in local currencies, primarily in euros, with some sales being denominated in other currencies. We expect that the percentage of our sales denominated in foreign currencies may increase in the foreseeable future as we continue to expand into international markets. When sales or expenses are not denominated in U.S. dollars, a fluctuation in exchange rates could affect our net income. We do not believe our net income would be materially impacted by an immediate 10% adverse change in foreign exchange rates. We do not currently hedge our exposure to foreign currency exchange rate fluctuations; however, we may choose to hedge our exposure in the future.

While our gross margin for the year ended December 31, 2023 was primarily impacted by product mix, regional mix, and production initiatives to support demand and create future efficiencies, changes in prices did not have a significant impact on our results of operations for any periods presented on our consolidated financial statements.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA.
PENUMBRA, INC.
INDEX TO THE CONSOLIDATED FINANCIAL STATEMENTS

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the stockholders and the Board of Directors of Penumbra, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Penumbra, Inc. and subsidiaries (the "Company") as of December 31, 2023, the related consolidated statements of operations, comprehensive income (loss), stockholders' equity, and cash flows, for each of the three years in the period ended December 31, 2023, and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2023 and 2022, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2023, in conformity with accounting principles generally accepted in the United States of America.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2023, based on criteria established in *Internal Control — Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated February 22, 2024, expressed an unqualified opinion on the Company's internal control over financial reporting.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current-period audit of the financial statements that was communicated or required to be communicated to the audit committee and that (1) relates to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Income Taxes – Realizability of Federal Research & Development Deferred Tax Assets — Refer to Notes 2 and 15 to the financial statements

Critical Audit Matter Description

The Company recognizes deferred income taxes based on differences between the financial reporting and tax bases of assets and liabilities at the enacted statutory tax rates and laws in effect for the years in which the differences are expected to reverse. Valuation allowances are established when necessary to reduce deferred tax assets (“DTAs”) to the amounts expected to be realized based on estimates of future taxable income.

We identified management's determination that sufficient future taxable income will be generated to realize the benefits of the Company's federal DTAs prior to expiration, resulting in a release of the valuation allowance against the federal research and development tax credit DTAs as a critical audit matter because of the significant judgments and estimates made by management in their evaluation, including (1) cumulative results of operations in recent years, (2) sources of recent pre-tax income, (3) estimates of future taxable income, (4) respective carryback and/or carryforward periods of tax attributes available to date, and (5) limitations on net operating loss utilization against taxable income. This in turn led to a high degree of auditor judgment, subjectivity, and audit effort in performing audit procedures and evaluating audit evidence relating to management's conclusion to release the valuation allowance against the federal research and development tax credit DTAs as of December 31, 2023.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures related to estimated future taxable income and the determination of whether it is more likely than not that the federal research and development deferred tax assets will be realized included the following, among others:

- We tested the effectiveness of controls over federal research and development deferred tax assets, including management's controls over the estimates of federal taxable income and the determination of whether it is more likely than not that the federal research and development deferred tax assets will be realized.
- We evaluated the reasonableness of the methods and assumptions used by management to determine whether a valuation allowance is necessary.
- With the assistance of our income tax specialists, we considered the following sources of information used in management's evaluation of whether deferred taxes are more likely than not to be realized:
  - Estimates of future federal taxable income.
  - The length of net operating loss carryforward periods.
  - The tax ordering rules of DTAs.
  - Tax credit carryforward and consideration of when those will expire.
- We evaluated whether the sources of management's estimated federal taxable income was of the appropriate character and sufficient to utilize the federal research and development deferred tax assets under the relevant tax law.

/s/ Deloitte & Touche LLP
San Francisco, California
February 22, 2024

We have served as the Company's auditor since 2008.

Penumbra, Inc.
Consolidated Balance Sheets
(in thousands, except share and per share amounts)

	December 31,	
	2023	2022
Assets		
Current assets:		
Cash and cash equivalents	$ 167,486	$ 69,858
Marketable investments	121,701	118,172
Accounts receivable, net of allowance for credit losses of $ 3,169 and $ 862 at December 31, 2023 and 2022, respectively	201,768	203,384
Inventories	388,023	334,006
Prepaid expenses and other current assets	36,424	30,279
Total current assets	915,402	755,699
Property and equipment, net	72,691	65,015
Operating lease right-of-use assets	188,756	192,636
Finance lease right-of-use assets	31,092	33,323
Intangible assets, net	71,056	81,161
Goodwill	166,270	166,046
Deferred taxes	85,158	64,213
Other non-current assets	25,880	12,793
Total assets	$ 1,556,305	$ 1,370,886
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	$ 27,155	$ 26,679
Accrued liabilities	110,555	106,300
Current operating lease liabilities	11,203	10,033
Current finance lease liabilities	2,231	1,920
Total current liabilities	151,144	144,932
Non-current operating lease liabilities	197,229	198,955
Non-current finance lease liabilities	23,680	24,865
Other non-current liabilities	5,308	3,276
Total liabilities	377,361	372,028
Commitments and contingencies (Note 11)		
Stockholders' equity:		
Preferred stock, $ 0.001 par value per share - 5,000,000 shares authorized, none issued and outstanding at December 31, 2023 and December 31, 2022	—	—
Common stock, $ 0.001 par value per share - 300,000,000 shares authorized, 38,681,549 issued and outstanding at December 31, 2023; 300,000,000 shares authorized, 38,107,977 issued and outstanding at December 31, 2022	39	38
Additional paid-in capital	1,047,198	963,040
Accumulated other comprehensive loss	(3,151)	(8,124)
Retained earnings	134,858	43,904
Total stockholders' equity	1,178,944	998,858
Total liabilities and stockholders' equity	$ 1,556,305	$ 1,370,886

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

Penumbra, Inc.
Consolidated Statements of Operations
(in thousands, except share and per share amounts)

	Year Ended December 31,		
	2023	2022	2021
Revenue	$ 1,058,522	$ 847,133	$ 747,590
Cost of revenue	375,879	311,926	272,208
Gross profit	682,643	535,207	475,382
Operating expenses:			
Research and development	84,423	79,407	104,552
Sales, general and administrative	506,454	449,718	378,331
Acquired in-process research and development	18,215	—	—
Total operating expenses	609,092	529,125	482,883
Income (loss) from operations	73,551	6,082	(7,501)
Interest and other income (expense), net	6,099	(2,190)	(3,001)
Income (loss) before income taxes	79,650	3,892	(10,502)
(Benefit from) provision for income taxes	(11,304)	5,894	(13,125)
Consolidated net income (loss)	$ 90,954	$ (2,002)	$ 2,623
Net loss attributable to non-controlling interest	—	—	(2,661)
Net income (loss) attributable to Penumbra, Inc.	$ 90,954	$ (2,002)	$ 5,284
Net income (loss) attributable to Penumbra, Inc. per share:			
Basic	$ 2.37	$ (0.05)	$ 0.14
Diluted	$ 2.32	$ (0.05)	$ 0.14
Weighted average shares outstanding:			
Basic	38,401,171	37,841,874	36,764,290
Diluted	39,216,564	37,841,874	37,881,180

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

Penumbra, Inc.
Consolidated Statements of Comprehensive Income (Loss)
(in thousands)

	Year Ended December 31,		
	2023	2022	2021
Consolidated net income (loss)	$ 90,954	$ (2,002)	$ 2,623
Other comprehensive income (loss), net of tax:			
Foreign currency translation adjustments, net of tax	2,031	(2,589)	(3,929)
Net change in unrealized gains (losses) on available-for-sale securities, net of tax	2,942	(2,905)	(1,242)
Total other comprehensive income (loss), net of tax	$ 4,973	$ (5,494)	$ (5,171)
Consolidated comprehensive income (loss)	$ 95,927	$ (7,496)	$ (2,548)
Net loss attributable to non-controlling interest	$ —	$ —	$ (2,661)
Comprehensive income (loss) attributable to Penumbra, Inc.	$ 95,927	$ (7,496)	$ 113

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

Penumbra, Inc.
Consolidated Statements of Stockholders' Equity
(in thousands, except share amounts)

	Common Stock							
	Shares	Amount	Additional Paid-in Capital	Accumulated Other Comprehensive (Loss) Income	Retained Earnings (Accumulated Deficit)	Total Penumbra, Inc. Stockholders' Equity	Non-Controlling Interest	Total Stockholders' Equity
Balance at December 31, 2020	36,414,732	$ 36	$ 598,299	$ 2,541	$ 40,622	$ 641,498	$ (3,710)	$ 637,788
Issuance of common stock	498,185	—	4,507	—	—	4,507	157	4,664
Issuance of common stock under employee stock purchase plan	64,852	—	13,705	—	—	13,705	—	13,705
Issuance of common stock in connection with Sixense acquisition[1]	661,877	1	174,133	—	—	174,134	—	174,134
Replacement share-based awards issued in connection with Sixense acquisition[1]	—	—	80,693	—	—	80,693	—	80,693
Acquisition of subsidiary stock from noncontrolling interests[1]	—	—	(10,375)	—	—	(10,375)	6,214	(4,161)
Shares held for tax withholdings	(61,163)	—	(15,832)	—	—	(15,832)	—	(15,832)
Stock-based compensation	—	—	65,484	—	—	65,484	—	65,484
Other comprehensive loss	—	—	—	(5,171)	—	(5,171)	—	(5,171)
Net income (loss)	—	—	—	—	5,284	5,284	(2,661)	2,623
Balance at December 31, 2021	37,578,483	$ 37	$ 910,614	$ (2,630)	$ 45,906	$ 953,927	$ —	$ 953,927
Issuance of common stock	460,177	1	7,786	—	—	7,787	—	7,787
Issuance of common stock under employee stock purchase plan	113,893	—	13,766	—	—	13,766	—	13,766
Shares held for tax withholdings	(44,576)	—	(8,042)	—	—	(8,042)	—	(8,042)
Stock-based compensation	—	—	38,916	—	—	38,916	—	38,916
Other comprehensive loss	—	—	—	(5,494)	—	(5,494)	—	(5,494)
Net loss	—	—	—	—	(2,002)	(2,002)	—	(2,002)
Balance at December 31, 2022	38,107,977	$ 38	$ 963,040	$ (8,124)	$ 43,904	$ 998,858	$ —	$ 998,858
Issuance of common stock	426,333	1	5,517	—	—	5,518	—	5,518
Issuance of common stock under employee stock purchase plan	83,799		14,896	—	—	14,896	—	14,896
Issuance of common stock in connection with asset acquisition[2]	71,211	—	17,227	—	—	17,227	—	17,227
Shares held for tax withholdings	(7,771)	—	(2,074)	—	—	(2,074)	—	(2,074)
Stock-based compensation	—	—	48,592	—	—	48,592	—	48,592
Other comprehensive income	—	—	—	4,973	—	4,973	—	4,973
Net income	—	—	—	—	90,954	90,954	—	90,954
Balance at December 31, 2023	38,681,549	$ 39	$ 1,047,198	$ (3,151)	$ 134,858	$ 1,178,944	$ —	$ 1,178,944

[1] Refer to Note "5. Business Combinations" and Note "12. Stockholders' Equity" for more information on the impact of the acquisition of Sixense Enterprises Inc. during the year ended December 31, 2021.

[2] Refer to Note "6. Asset Acquisition" for more information on the impact of the asset acquisition during the year ended December 31, 2023.

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

Penumbra, Inc.
Consolidated Statements of Cash Flows
(in thousands)

	Year Ended December 31,		
	2023	2022	2021
CASH FLOWS FROM OPERATING ACTIVITIES:			
Net income (loss)	$ 90,954	$ (2,002)	$ 2,623
Adjustments to reconcile net income (loss) to net cash provided by (used in) operating activities:			
Depreciation and amortization	27,257	24,321	16,408
Stock-based compensation	50,516	37,378	65,763
Inventory write-offs and write-downs	6,198	3,445	2,818
Deferred taxes	(19,061)	1,458	(14,091)
Acquired in-process research and development	18,215	—	—
Other	2,338	1,274	2,692
Changes in operating assets and liabilities:			
Accounts receivable	(266)	(69,857)	(21,344)
Inventories	(67,710)	(74,631)	(51,554)
Prepaid expenses and other current and non-current assets	(18,909)	(1,237)	(13,032)
Accounts payable	1,097	13,385	(1,565)
Accrued expenses and other non-current liabilities	6,221	10,542	17,076
Proceeds from lease incentives	483	263	3,708
Net cash provided by (used in) operating activities	97,333	(55,661)	9,502
CASH FLOWS FROM INVESTING ACTIVITIES:			
Asset acquisition, net of cash acquired	(988)	—	—
Cash acquired in a business combination	—	—	2,919
Purchases of marketable investments	(81,940)	—	(126,794)
Proceeds from sales of marketable investments	—	1,180	2,000
Proceeds from maturities of marketable investments	82,565	72,908	121,720
Purchases of property and equipment	(15,213)	(19,298)	(21,180)
Other	(500)	—	(400)
Net cash (used in) provided by investing activities	(16,076)	54,790	(21,735)
CASH FLOWS FROM FINANCING ACTIVITIES:			
Proceeds from exercises of stock options	5,517	7,786	4,664
Proceeds from issuance of stock under employee stock purchase plan	14,896	13,766	13,705
Payment of employee taxes related to vested common and restricted stock	(2,074)	(8,042)	(15,832)
Payments of finance lease obligations	(1,981)	(1,751)	(1,451)
Other	(155)	(137)	(250)
Net cash provided by financing activities	16,203	11,622	836
Effect of foreign exchange rate changes on cash and cash equivalents	168	(272)	1,106
NET INCREASE (DECREASE) IN CASH AND CASH EQUIVALENTS	97,628	10,479	(10,291)
CASH AND CASH EQUIVALENTS—Beginning of period	69,858	59,379	69,670
CASH AND CASH EQUIVALENTS—End of period	$ 167,486	$ 69,858	$ 59,379
SUPPLEMENTAL DISCLOSURES OF CASH FLOW INFORMATION:			
Cash paid for income taxes	$ 6,557	$ 2,919	$ 1,496
NONCASH INVESTING AND FINANCING ACTIVITIES:			
Right-of-use assets obtained in exchange for operating lease obligations	$ 9,339	$ 72,279	$ 101,510
Right-of-use assets obtained in exchange for finance lease obligations	1,118	305	1,346
Fair value of common stock issued as consideration in connection with an acquisition (Note 6 and Note 5, respectively)	17,227	—	174,133
Fair value of replacement options issued as consideration in connection with an acquisition (Note 5)	—	—	80,693
Purchase of property and equipment funded through accounts payable and accrued liabilities	1,182	2,293	2,330

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

Penumbra, Inc.
Notes to Consolidated Financial Statements

1. Organization and Description of Business

Penumbra, Inc. (the "Company") is a global healthcare company focused on innovative therapies. The Company designs, develops, manufactures and markets novel products and has a broad portfolio that addresses challenging medical conditions in markets with significant unmet need. The Company focuses on developing, manufacturing and marketing novel products for use by specialist physicians and other healthcare providers to drive improved clinical and health outcomes. The Company believes that the cost-effectiveness of our products is attractive to our customers.

2. Summary of Significant Accounting Policies

Basis of Presentation and Consolidation

The accompanying consolidated financial statements have been prepared in accordance with generally accepted accounting principles in the United States ("U.S. GAAP").

The consolidated financial statements include the accounts of the Company and its wholly-owned subsidiaries. All intercompany balances and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities and equity accounts; disclosure of contingent assets and liabilities at the date of the financial statements; and the reported amounts of revenues and expenses during the reporting period. On an ongoing basis, the Company evaluates its estimates, including those related to marketable investments, allowances for credit losses, standalone selling prices used to allocate revenue to performance obligations which are not directly observable, the amount of variable consideration included in the transaction price, warranty reserve, valuation of inventories, useful lives of intangible assets and property and equipment, operating and finance lease right-of-use ("ROU") assets and liabilities, income taxes, contingent consideration, potential liabilities related to pending claims and litigation, and other contingencies, among others. The Company bases its estimates on historical experience and on various other assumptions that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other data. Actual results could differ from those estimates.

Segments

The Company determined its operating segment on the same basis that it uses to evaluate its performance internally. The Company has one business activity: the design, development, manufacturing and marketing of innovative medical products, and operates as one operating segment. The Company's chief operating decision-maker ("CODM"), its Chief Executive Officer, reviews its consolidated operating results for the purpose of allocating resources and evaluating financial performance. The Company's entity-wide disclosures are included in Note "18. Revenues."

Foreign Currency Translation

The Company's consolidated financial statements are prepared in United States Dollars ("USD"). Its foreign subsidiaries use their local currency as their functional currency and maintain their records in the local currency. Accordingly, the assets and liabilities of these subsidiaries are translated into USD using the current exchange rates in effect at the balance sheet date and equity accounts are translated into USD using historical rates. Revenues are translated using the exchange rate as of the date of transaction and expenses are translated using the average exchange rates in effect for the year involved. The resulting foreign currency translation adjustments are recorded in accumulated other comprehensive income (loss) in the consolidated balance sheets. Transactions denominated in currencies other than the respective functional currencies are translated at exchange rates as of the date of transaction with foreign currency gains and losses recorded in other expense, net in the consolidated statements of operations. The Company realized net foreign currency transaction gains of $ 1.8 million for the year ended December 31, 2023 and net foreign currency transaction losses of $ 3.2 million and $ 0.5 million during the years ended December 31, 2022 and 2021, respectively.

As the Company's international operations grow, its risks associated with fluctuation in currency rates will become greater, and the Company will continue to reassess its approach to managing this risk. In addition, currency fluctuations or a weakening USD can increase the costs of the Company's international expansion. To date, the Company has not entered into any foreign currency hedging contracts.

Concentration of Credit Risk

Financial instruments that potentially subject the Company to a concentration of credit risk consist of cash and cash equivalents, marketable investments (as described in greater detail in this footnote under the header “Cash, Cash Equivalents and Marketable Investments” below) and accounts receivable. The majority of the Company’s cash is held by one financial institution in the U.S. in excess of federally insured limits. The Company maintained investments in money market funds that were not federally insured during the year ended December 31, 2023 and held cash in foreign entities of approximately $ 24.3 million and $ 14.8 million at December 31, 2023 and 2022, respectively, which was not federally insured.

The Company’s revenue has been derived from sales of its products in the United States and international markets. The Company uses both its own salesforce and independent distributors to sell its products. Concentrations of credit risk with respect to accounts receivable are limited due to the large number of entities comprising the Company’s customer base. The Company performs ongoing credit evaluations of its customers, including its distributors, does not require collateral, and maintains allowances for potential credit losses on customer accounts when deemed necessary.

During the years ended December 31, 2023, 2022, and 2021, no customer accounted for greater than 10% of the Company’s revenue. During the years ended December 31, 2023 and 2022, one customer accounted for greater than 10 % of the Company’s receivable balance.

Significant Risks and Uncertainties

The Company is subject to risks common to medical device companies including, but not limited to, new technological innovations, dependence on key personnel, protection of proprietary technology, compliance with government regulations, product liability, uncertainty of market acceptance of products and the potential need to obtain additional financing. The Company is dependent on third-party suppliers, in some cases single-source suppliers.

There can be no assurance that the Company’s products will continue to be accepted in the marketplace, nor can there be any assurance that any future products can be developed or manufactured at an acceptable cost and with appropriate performance characteristics, or that such products will be successfully marketed, if at all.

The Company’s products require approval or clearance from the FDA prior to commencing commercial sales in the United States. There can be no assurance that the Company’s products will receive all of the required approvals or clearances. Approvals or clearances are also required in foreign jurisdictions in which the Company sells its products. If the Company is denied such approvals or clearances or such approvals or clearances are delayed, it may have a material adverse impact on the Company’s results of operations, financial position and liquidity.

Fair Value of Financial Instruments

Carrying amounts of certain of the Company’s financial instruments, including cash equivalents, accounts receivable, prepaid expenses and other current assets, accounts payable and accrued liabilities, approximate fair value due to their relatively short maturities.

Cash, Cash Equivalents and Marketable Investments

The Company invests its cash primarily in highly liquid corporate debt securities, debt instruments of U.S. federal, state and municipal governments, and their agencies, in money market funds and in commercial paper. All highly liquid investments with stated maturities of three months or less from the date of purchase are classified as cash equivalents; all highly liquid investments with stated maturities of greater than three months are classified as marketable investments. The majority of the Company’s cash and investments are held in U.S. banks.

The Company determines the appropriate classification of its investments in marketable investments at the time of purchase and re-evaluates such designation at each balance sheet date. The Company’s marketable investments have been classified and accounted for as available-for-sale. Investments with remaining maturities of more than one year are viewed by the Company as available to support current operations and are classified as current assets under the caption marketable investments in the accompanying consolidated balance sheets. Investments in marketable investments are carried at fair value, with the unrealized gains and losses reported as a component of accumulated other comprehensive income (loss). Any realized gains or losses on the sale of marketable investments are determined on a specific identification method, and such gains and losses are reflected as a component of other income (expense), net.

Available-for-Sale Securities

The Company is exposed to credit losses through its investments in available-for-sale securities when the fair value of its investments is less than their amortized cost basis. The Company reviews each available-for-sale security in an unrealized position held in its portfolio to determine whether the decline in fair value below its amortized cost basis is the result of credit losses or other factors. An allowance for credit losses is to be recorded as a charge to net income in an amount equal to the difference between the impaired security's amortized cost basis and the amount expected to be collected over the lifetime of security, limited by the amount that the fair value is less than its amortized cost basis. Any remaining difference between its amortized cost basis and fair value is deemed not to be due to expected credit losses and is recorded as a component of accumulated other comprehensive income (loss). The Company's review of its securities in an unrealized loss position considers several factors to determine if an expected credit loss is present including the discounted present value of expected cash flows of the security, the capacity to hold a security or sell a security before recovery of the decline in amortized cost, the credit rating of the security and forecasted and historical factors that affect the value of the security.

During the years ended December 31, 2023, 2022 and 2021, the Company reviewed its available-for-sale securities in an unrealized loss position and concluded that the decline in fair value was not related to credit losses and is recoverable. Accordingly, no allowance for credit losses was recorded and instead the unrealized losses are reported as a component of accumulated other comprehensive income (loss).

Accounts Receivable

Accounts receivable are measured at amortized cost less the allowance for credit losses. The Company measures expected credit losses for its accounts receivables utilizing a loss-rate approach. The allowance for expected credit losses assessment requires a degree of estimation and judgement. The expected loss-rate is calculated by utilizing historical credit losses incurred as a percentage of the Company's historical accounts receivable balances, pooled by customers with similar geographic credit risk characteristics. The loss-rate is adjusted for management's expectations regarding current conditions and forecasts about future conditions which impact expected credit losses. The Company considers factors such as customers credit risk, geographic related risks and economic conditions that may affect a customer's credit quality classification.

Inventories

Inventories are stated at the lower of cost (determined under the first-in first-out method) or net realizable value. Write-downs are provided for raw materials, components or finished goods that are determined to be excessive or obsolete. The Company regularly reviews inventory quantities in consideration of actual loss experience, projected future demand and remaining shelf life to record a provision for excess and obsolete inventory when appropriate. As a result of these evaluations, the Company recognized total write-offs and write-downs of $ 6.2 million, $ 3.4 million, and $ 2.8 million for the years ended December 31, 2023, 2022 and 2021, respectively.

Property and Equipment, net

Property and equipment are stated at cost less accumulated depreciation. Depreciation is computed using the straight-line method over the estimated useful lives of the assets. Leasehold improvements are amortized using the straight-line method over the shorter of the lease term or estimated useful life. Machinery and equipment and furniture and fixtures are depreciated over a five to ten year period and computers and software are depreciated over two to seven years . Upon retirement or sale, the cost and the related accumulated depreciation are removed from the consolidated balance sheet and the resulting gain or loss is reflected in operations. Maintenance and repairs are charged to consolidated statements of operations as incurred.

Impairment of Long-Lived Assets

The Company reviews long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. When such an event occurs, management determines whether there has been impairment by comparing the anticipated undiscounted future net cash flows to the related asset group's carrying value. If an asset is considered impaired, the asset is written down to fair value, which is determined based either on discounted cash flows or appraised value, depending on the nature of the asset. There was no impairment of long-lived assets during the years ended December 31, 2023, 2022 or 2021.

Contingent Consideration

Certain agreements the Company enters into involve the potential payment of future consideration that is contingent upon certain performance and revenue milestones being achieved. Contingent consideration obligations incurred in connection with a

business combination are recorded at their fair values on the acquisition date and remeasured at their fair values each subsequent reporting period until the related contingencies are resolved. The resulting changes in fair values are recognized generally within sales, general and administrative expense, depending on the nature of the contingent consideration liability, in the consolidated statements of operations. Asset acquisitions are accounted for using a cost accumulation and allocation model and the cost of the acquisition is allocated to the assets acquired and liabilities assumed. Contingent consideration obligations incurred in connection with an asset acquisition are recorded when it is probable that they will occur and they can be reasonably estimated.

Loss Contingencies

The Company is subject to certain legal proceedings, as well as demands, claims and threatened litigation that arise in the normal course of its business. The Company reviews the status of each significant matter quarterly and assesses its potential financial exposure. If the potential loss from a claim or legal proceeding is considered probable and the amount can be reasonably estimated, the Company records a liability and an expense for the estimated loss and discloses it in the Company's financial statements if it is significant. If the Company determines that a loss is possible and the range of the loss can be reasonably determined, the Company does not record a liability or an expense but the Company discloses the range of the possible loss. The Company bases its judgments on the best information available at the time. As additional information becomes available, the Company reassesses the potential liability related to its pending claims and litigation and may revise its estimates. Any revision of the Company's estimates of potential liability could have a material impact on its financial position and operating results.

Intangible Assets

Intangible assets primarily consist of developed technology, purchased rights to licensed technology, customer relationships, and trade secrets and processes.

Indefinite-lived intangible assets are tested for impairment at least annually, in the fourth quarter, or more frequently if events or circumstances indicate that it is more likely than not that the asset is impaired. In conducting the annual impairment test for its indefinite-lived intangible assets, the Company may first perform a qualitative assessment to determine whether it is more likely than not (i.e. greater than 50% likelihood) that an indefinite-lived intangible asset is impaired. In accordance with the authoritative guidance, the Company may elect to bypass the qualitative assessment and proceed directly to the quantitative test to compare the fair value of the indefinite-lived intangible asset to the carrying amount. If the fair value of the asset is less than the carrying amount, an impairment loss would be recognized in an amount equal to the difference between the carrying amount and the fair value.

The fair value of in-process research and development asset ("IPR&D") projects acquired in a business combination are capitalized and accounted for as indefinite-lived intangible assets until the underlying project is completed, at which point the intangible asset will be accounted for as a finite-lived intangible asset. If a project is abandoned prior to completion, the carrying value of the IPR&D asset is written off. IPR&D acquired in an asset acquisition for use in research and development activities with no alternative future use are expensed in the consolidated statements of operations on the acquisition date.

Finite-lived intangible assets are amortized over the estimated economic useful lives of the assets, which is the period during which expected cash flows support the fair value of such intangible assets. The Company reviews finite-lived intangible assets for impairment whenever events or changes in circumstances indicate that the carrying amount of the assets or asset group may not be recoverable. If such an event occurs, the Company determines whether there has been impairment by comparing the anticipated undiscounted future net cash flows to the related asset group's carrying value. If an asset is considered impaired, the asset will be written down to the determined fair value based on discounted cash flows. The Company also periodically reviews the useful lives assigned to our intangible assets to ensure that our initial estimates do not exceed any revised estimated periods from which we expect to realize cash flows from the underlying intangible asset. If a change were to occur in any of the above-mentioned factors or estimates, the likelihood of a material change in our reported results would increase.

Refer to Notes "5. Business Combinations," "6. Asset Acquisition" and "7. Intangible Assets" for more information.

Goodwill

Goodwill represents the excess of the purchase price of an acquired business or assets over the fair value of the identifiable assets acquired and liabilities assumed. Goodwill is not amortized, but is tested for impairment annually in the fourth quarter, or more frequently if events or circumstances indicate the carrying value may no longer be recoverable and that an impairment

loss may have occurred. The Company operates as one segment, which is considered to be the sole reporting unit, and therefore goodwill is tested for impairment at the consolidated level.

The authoritative guidance allows an entity to assess qualitative factors to determine whether it is necessary to perform the quantitative goodwill impairment test. If an entity determines that as a result of the qualitative assessment that it is more likely than not (i.e. greater than 50% likelihood) that the fair value of a reporting unit is less than its carrying amount, then the quantitative test is required. Otherwise, no further testing is required. The quantitative goodwill impairment test requires the Company to estimate and compare the fair value of its reporting unit with its carrying value.

Application of the goodwill impairment test requires judgments, including: identification of the reporting units, assigning goodwill to reporting units, a qualitative assessment to determine whether there are any impairment indicators, and determining the fair value of each reporting unit. Qualitative factors may include, but are not limited to, macroeconomic conditions, industry conditions, the competitive environment, changes in the market for the Company's products and services, regulatory and political developments, cost factors, and entity specific factors such as strategies, overall financial performance (both current and projected) and market capitalization. In the fourth quarter of 2023 and 2022, the Company performed qualitative assessments for goodwill impairment and determined there were no indicators of impairment. Refer to Note "5. Business Combinations" and Note "8. Goodwill" for more information.

Revenue Recognition

Revenue is primarily comprised of product revenue net of returns, discounts, administration fees and sales rebates. Under ASC 606, the Company recognizes revenue when control of the promised goods or services is transferred to our customers, in an amount that reflects the consideration we expect to be entitled to in exchange for those goods or services. Revenue from product sales is recognized either on the date of shipment or the date of receipt by the customer, but is deferred for certain transactions when control has not yet transferred. With respect to products that the Company consigns to hospitals, which primarily consist of coils, the Company recognizes revenue at the time hospitals utilize products in a procedure.

Certain arrangements with customers contain multiple performance obligations. For these contracts, each promise is evaluated to determine if it is a performance obligation. The Company considers a number of factors when determining whether a promise is a contractual performance obligation, including whether the customer can benefit from the good or service on its own or together with other resources that are readily available to the customer or whether the goods or services are highly interdependent. Revenue is allocated to each performance obligation based on its relative standalone selling price. Standalone selling prices are based on observable prices at which the Company separately sells the products or services. If a standalone selling price is not directly observable, then the Company estimates the standalone selling prices considering entity-specific factors including, but not limited to, the expected cost and margin of the products and services, geographies, and other market conditions. The use of alternative estimates could result in a different amount of revenue deferral.

Deferred revenue represents amounts that the Company has already invoiced and are ultimately expected to be recognized as revenue, but for which not all revenue recognition criteria have been met. As of December 31, 2023 and December 31, 2022, respectively. Refer to Note "18. Revenues" for more information about the Company's revenue.

Revenue is recorded at the net sales price, which includes estimates of variable consideration such as product returns utilizing historical return rates, rebates, discounts, and other adjustments to net revenue. To the extent the transaction price includes variable consideration, the Company estimates the amount of variable consideration that should be included in the transaction price. Variable consideration is included in revenue only to the extent that it is probable that a significant reversal of the revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved.

The Company's terms and conditions permit product returns and exchanges. The Company bases its estimates for sales returns on actual historical returns and they are recorded as reductions in revenue at the time of sale. Upon recognition, the Company reduces revenue and cost of revenue for the estimated return. Return rates can fluctuate over time, but are sufficiently predictable to allow the Company to estimate expected future product returns.

For more information and disclosures on the Company's revenue, refer to Note "18. Revenues."

Shipping Costs

Shipping and handling costs charged to customers are recorded as revenue. Shipping and handling costs are included in cost of revenue.

Research and Development ("R&D") Costs

R&D costs primarily consist of product development, clinical and regulatory expenses, materials, depreciation and other costs associated with the development of the Company's products. R&D costs also include related personnel and consultants' salaries, benefits and related costs, including stock-based compensation. The Company expenses R&D costs as they are incurred.

The Company's clinical trial accruals are based on estimates of patient enrollment and related costs at clinical investigator sites. The Company estimates preclinical and clinical trial expenses based on the services performed pursuant to contracts with research institutions and clinical research organizations that conduct and manage preclinical studies and clinical trials on its behalf. In accruing service fees, the Company estimates the time period over which services will be performed and the level of patient enrollment and activity expended in each period. If the actual timing of the performance of services or the level of effort varies from the estimate, the Company will adjust the accrual accordingly. Payments made to third parties under these arrangements in advance of the receipt of the related services are recorded as prepaid expenses until the services are rendered.

Internal Use Software

The Company capitalizes certain costs incurred for the development of computer software for internal use. These costs generally relate to third-party software as well as the internal development of software associated with our REAL Immersive System offerings. The Company capitalizes these costs when it is determined that it is probable that the project will be completed and the software will be used to perform the function intended, and the preliminary project stage is completed. Capitalized internal use software development costs are included in Property and equipment, net within the consolidated balance sheets.

Capitalized internal use software is amortized on a straight-line basis over its estimated useful life. For software that supports our REAL Immersive System, the amortization expense is recorded in cost of revenue within the consolidated statements of operations. Costs related to the preliminary project stage, post-implementation, training and maintenance are expensed as incurred.

Cloud Computing Arrangements

The Company capitalizes certain implementation costs incurred in agreements that qualify as cloud computing arrangements. The cost expenditures for implementation, set-up, and other upfront costs incurred in a cloud computing arrangement that is hosted by the vendor are capitalized and are recorded in prepaid expenses and other current assets and other non-current assets in our consolidated balance sheets. Such costs are amortized over the life of the related cloud computing arrangement.

As of December 31, 2023 and 2022, approximately $ 4.6 million and $ 4.6 million, associated with these arrangements are included in prepaids and other current assets in our consolidated balance sheets, respectively, while approximately $ 0.9 million and $ 5.1 million are included in other non-current assets in our consolidated balance sheets, respectively.

Advertising Costs

Advertising costs are included in sales, general and administrative expenses and are expensed as incurred. Advertising costs were $ 1.2 million, $ 1.1 million and $ 1.1 million for the years ended December 31, 2023, 2022 and 2021, respectively.

Stock-Based Compensation

Stock-based compensation expense is associated with restricted stock units ("RSUs"), RSUs with performance conditions ("PSUs"), stock options, and the Company's Employee Stock Purchase Plan.

The Company recognizes the cost of stock-based compensation in the financial statements based upon fair value. The fair value of restricted stock unit ("RSU") awards is determined based on the number of units granted and the closing price of the Company's common stock as of the grant date. The fair value of each purchase under the Company's employee stock purchase plan ("ESPP") is estimated at the beginning of the offering period using the Black-Scholes option pricing model. The fair value of stock options is determined as of the grant date using the Black-Scholes option pricing model. The Company's determination of the fair value of equity-settled awards is impacted by the price of the Company's common stock as well as changes in assumptions regarding a number of complex and subjective variables. These variables include, but are not limited to, the expected term that awards will remain outstanding, expected common stock price volatility over the term of the awards, risk-free interest rates and expected dividends.

The fair value of an award is recognized over the requisite service period (usually the vesting period) on a straight-line basis for non-performance based awards. Stock-based compensation expense recognized at fair value includes the impact of estimated forfeitures. The Company estimates future forfeitures at the date of grant and revises the estimates, if necessary, in subsequent periods if actual forfeitures differ from those estimates. To the extent actual forfeiture results differ from the estimates, the difference is recorded as a cumulative adjustment in the period forfeiture estimates are revised. No compensation cost is recorded for awards that do not vest.

The Company grants certain PSUs to senior management for which vesting is contingent on the achievement of financial performance targets and continued service. The number of shares awarded is based on the actual performance during the performance period compared to the performance targets and the closing price of the Company's common stock on the date of grant. Additionally, from time to time the Company grants PSUs to sales employees for which vesting is contingent on the achievement of sales performance targets and continued service. Certain PSUs granted to sales employees have a fixed monetary amount, that will be settled in a variable number of shares and are accounted for as liability-classified awards prior to the number of shares being determined and issued. Once the number of shares are determined and the awards are issued, the awards become equity-classified and the corresponding liability is reclassified from accrued liabilities to additional paid-in capital on the consolidated balance sheets.

When the performance targets are probable of being achieved, stock-based compensation costs associated with PSUs are recognized on a graded vesting basis over its requisite service period. Graded vesting results in more accelerated expense recognition compared to traditional time-based vesting over the same vesting period. Each reporting period, the Company monitors the probability of achieving the performance targets and may adjust periodic stock-based compensation expense based on its determination of the likelihood of achieving these performance targets and the estimated number of shares or value of common stock that will vest.

The Company accounts for stock-based compensation issued to non-employees by recognizing the fair value of non-employee awards over the requisite service period (usually the vesting period) on a straight-line basis. Therefore, equity instruments issued to non-employees are recorded at their fair value on the grant date in the same manner as employee awards. The fair value of these equity instruments is expensed over the service period.

Estimates of the fair value of equity-settled awards as of the grant date using valuation models, such as the Black-Scholes option pricing model, are affected by assumptions regarding a number of complex variables. Changes in the assumptions can materially affect the fair value of the award and ultimately how much stock-based compensation expense is recognized. These inputs are subjective and generally require significant analysis and judgment to develop. For stock options, the Company uses its historical data to calculate the expected term and volatility used in the valuation of options. The risk-free interest rate is based on the yield available on U.S. Treasury zero-coupon issues similar in duration to the expected term of the equity-settled award.

Income Taxes

The Company accounts for income taxes using the asset and liability method, whereby deferred tax asset ("DTA") and liability account balances are determined based on differences between the financial reporting and tax bases of assets and liabilities, and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse. The Company provides a valuation allowance to reduce the net DTAs to their estimated realizable value. The Company evaluates the likelihood of future realization of its deferred tax assets based on all available evidence and establishes a valuation allowance to reduce deferred tax assets when it is more likely than not that they will not be realized or releases a valuation allowance to increase deferred tax assets when it is more likely than not that they will be realized.

The calculation of the Company's current provision for income taxes involves the use of estimates, assumptions and judgments while taking into account current tax laws, interpretation of current tax laws and possible outcomes of future tax audits. The Company has established reserves to address potential exposures related to tax positions that could be challenged by tax authorities. Although the Company believes its estimates, assumptions and judgments to be reasonable, any changes in tax law or its interpretation of tax laws and the resolutions of potential tax audits could significantly impact the amounts provided for income taxes in the Company's consolidated financial statements.

The calculation of the Company's DTA balance involves the use of estimates, assumptions and judgments while taking into account estimates of the amounts and type of future taxable income. Actual future operating results and the underlying amount and type of income could differ materially from the Company's estimates, assumptions and judgments thereby impacting the Company's financial position and results of operations.

The Company follows the guidance relating to accounting for uncertainty in income taxes, which prescribes a recognition threshold and measurement attribute for the financial statement recognition and measurement of uncertain tax positions taken or expected to be taken in the Company's income tax return, and also provides guidance on derecognition, classification, interest and penalties, accounting in interim periods and disclosure.

The Company includes interest and penalties related to unrecognized tax benefits within income tax expense in the accompanying consolidated statements of operations.

Comprehensive Income (Loss)

Comprehensive income (loss) consists of net income (loss), unrealized gains or losses on available-for-sale investments and the effects of foreign currency translation adjustments. The Company presents comprehensive income (loss) and its components in the consolidated statements of comprehensive income (loss).

Net Income (Loss) Per Share of Common Stock

The Company's basic net income (loss) attributable to Penumbra, Inc. per share is calculated by dividing the net income (loss) attributable to Penumbra, Inc. per share by the weighted average number of shares of common stock outstanding for the period. The diluted net income (loss) per share attributable to Penumbra, Inc. is computed by giving effect to all potential dilutive common stock equivalents outstanding for the period. For purposes of this calculation, potentially dilutive securities consist primarily of stock options, share purchase rights under the ESPP, unvested RSUs, and unvested PSUs once the performance conditions have been achieved.

Leases

The Company determines if an arrangement is a lease at inception. In addition, the Company determines whether leases meet the classification criteria of a finance or operating lease at the lease commencement date considering: (1) whether the lease transfers ownership of the underlying asset to the lessee at the end of the lease term, (2) whether the lease contains a bargain purchase option, (3) whether the lease term is for a major part of the remaining economic life of the underlying asset, (4) whether the present value of the sum of the lease payments and residual value guaranteed by the lessee equals or exceeds substantially all of the fair value of the underlying asset, and (5) whether the underlying asset is of such a specialized nature that it is expected to have no alternative use to the lessor at the end of the lease term. As of December 31, 2023, the Company's lease population consisted of operating and finance real estate, equipment and vehicle leases.

Operating leases are included in operating lease right-of-use assets, current operating lease liabilities, and non-current operating lease liabilities in our consolidated balance sheet. Finance leases are included in finance lease right-of-use assets, current finance lease liabilities, and non-current finance lease liabilities in our consolidated balance sheet. ROU assets represent the Company's right to use an underlying asset for the lease term and lease liabilities represent the Company's obligation to make lease payments arising from the lease. Lease ROU assets and liabilities are recognized at the lease commencement date based on the present value of lease payments over the lease term. In determining the present value of lease payments, the Company uses its incremental borrowing rate which requires management's judgement as the rate implicit in the lease is generally not readily determinable. The determination of the Company's incremental borrowing rate requires management judgment, including the development of a synthetic credit rating and cost of debt as the Company currently does not carry any debt. The operating lease ROU assets also include adjustments for prepayments, accrued lease payments and exclude lease incentives. The Company's lease terms may include options to extend or terminate the lease when it is reasonably certain that the Company will exercise such options. Operating lease cost is recognized on a straight-line basis over the expected lease term. Finance lease cost is recognized as depreciation expense on a straight-line basis over the expected lease term and interest expense using the accelerated interest method of recognition. Lease agreements that include lease and non-lease components are accounted for as a single lease component. Lease agreements with a non-cancelable term of less than 12 months are not recorded on the Company's consolidated balance sheet. For more information about the Company's leases, refer to Note "10. Leases."

Recently Issued Accounting Standards

In December 2023, the FASB issued ASU No. 2023-09, Income Taxes— Improvements to Income Tax Disclosures. The standard enhances annual income tax disclosures, by requiring additional disaggregated information about an entity's effective tax rate reconciliation and income taxes paid. The ASU adds guidance that requires public business entities to disclose additional information in specified categories with respect to the reconciliation of the effective tax rate to the statutory rate (the rate reconciliation) for federal, state, and foreign income taxes. It also requires greater detail about individual reconciling items in the rate reconciliation to the extent the impact of those items exceeds a specified threshold (5%). In addition to new

disclosures associated with the rate reconciliation, the ASU requires information pertaining to taxes paid (net of refunds received) to be disaggregated for federal, state, and foreign taxes and further disaggregated for specific jurisdictions to the extent the related amounts exceed the quantitative threshold. For public business entities, the amendments in ASU 2023-09 are effective for annual periods beginning after December 15, 2024. Early adoption is permitted for annual financial statements not yet issued or made available for issuance. The Company is assessing the impact the new guidance will have on its consolidated financial statements and does not elect to early adopt as of December 31, 2023.

In November 2023, the FASB issued Accounting Standards Update (ASU) 2023-07, Segment Reporting (Topic 280): Improvements to Reportable Segment Disclosures. The ASU expands public entities' segment disclosures by requiring disclosure of significant segment expenses that are regularly reviewed by the CODM and included within each reported measure of segment profit or loss, an amount and description of its composition for other segment items, and interim disclosures of a reportable segment's profit or loss and assets. The ASU also allows, in addition to the measure that is most consistent with U.S. GAAP, the disclosure of additional measures of segment profit or loss that are used by the CODM in assessing segment performance and deciding how to allocate resources. All disclosure requirements under ASU 2023-07 are also required for public entities with a single reportable segment. The ASU is effective for fiscal years beginning after December 15, 2023, and interim periods within fiscal years beginning after December 15, 2024, on a retrospective basis, with early adoption permitted. The Company is assessing the impact the new guidance will have on its consolidated financial statements and does not elect to early adopt as of December 31, 2023.

3. Investments and Fair Value of Financial Instruments

Marketable Investments

The Company's marketable investments have been classified and accounted for as available-for-sale. The Company's marketable investments as of December 31, 2023 and 2022 were as follows (in thousands):

	December 31, 2023				
		Securities with net gains or losses in accumulated other comprehensive income (loss)			
	Cost	Gross Unrealized Gains	Gross Unrealized Losses	Allowance for Credit Loss	Fair Value
Commercial paper	$ 39,727	$ 32	$ (3)	$ —	$ 39,756
Certificate of Deposit	6,392	9	—	—	6,401
U.S. treasury	10,226	—	(160)	—	10,066
U.S. states and municipalities	2,950	—	(35)	—	2,915
Corporate bonds	62,964	29	(430)	—	62,563
Total	$ 122,259	$ 70	$ (628)	$ —	$ 121,701

	December 31, 2022				
		Securities with net gains or losses in accumulated other comprehensive income (loss)			
	Cost	Gross Unrealized Gains	Gross Unrealized Losses	Allowance for Credit Loss	Fair Value
U.S. treasury	$ 14,482	$ —	$ (478)	$ —	$ 14,004
U.S. agency securities and government sponsored securities	6,999	—	(176)	—	6,823
U.S. states and municipalities	23,460	—	(501)	—	22,959
Corporate bonds	76,731	—	(2,345)	—	74,386
Total	$ 121,672	$ —	$ (3,500)	$ —	$ 118,172

As of December 31, 2023, the total amortized cost basis of the Company's available-for-sale debt securities in an unrealized loss position exceeded its fair value by $ 0.6 million. The Company reviewed its available-for-sale securities in an

unrealized loss position and concluded that the decline in fair value was not related to credit losses and is recoverable. During the year ended December 31, 2023, no allowance for credit losses was recorded and instead the unrealized losses are reported as a component of accumulated other comprehensive income (loss).

The following tables present the gross unrealized losses and the fair value for those marketable investments that were in an unrealized loss position for less than and more than twelve months as of December 31, 2023 and 2022 (in thousands):

	December 31, 2023					
	Less than 12 months		More than 12 months		Total	
	Fair Value	Gross Unrealized Losses	Fair Value	Gross Unrealized Losses	Fair Value	Gross Unrealized Losses
Commercial paper	$ 16,241	$ (3)	$ —	$ —	$ 16,241	$ (3)
U.S. treasury	5,677	(54)	4,389	(106)	10,066	(160)
U.S. states and municipalities	—	—	2,915	(35)	2,915	(35)
Corporate bonds	15,945	(2)	30,912	(428)	46,857	(430)
Total	$ 37,863	$ (59)	$ 38,216	$ (569)	$ 76,079	$ (628)

	December 31, 2022					
	Less than 12 months		More than 12 months		Total	
	Fair Value	Gross Unrealized Losses	Fair Value	Gross Unrealized Losses	Fair Value	Gross Unrealized Losses
U.S. treasury	$ —	$ —	$ 14,004	$ (478)	$ 14,004	$ (478)
U.S. agency securities and government sponsored securities	—	—	6,823	(176)	6,823	(176)
U.S. states and municipalities	4,567	(68)	13,772	(433)	18,339	(501)
Corporate bonds	15,327	(101)	59,059	(2,244)	74,386	(2,345)
Total	$ 19,894	$ (169)	$ 93,658	$ (3,331)	$ 113,552	$ (3,500)

The contractual maturities of the Company's marketable investments as of December 31, 2023 were as follows (in thousands):

	December 31, 2023	
Marketable Investments	Amortized Cost	Fair Value
Due in one year	$ 116,528	$ 116,024
Due in one to five years	5,731	5,677
Total	$ 122,259	$ 121,701

Fair Value of Financial Instruments

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability (an exit price) in an orderly transaction between market participants at the reporting date. The accounting guidance establishes a three-tiered hierarchy, which prioritizes the inputs used in the valuation methodologies in measuring fair value:

Level 1 - Quoted prices in active markets for identical assets or liabilities.

Level 2 - Inputs other than Level 1 that are observable, either directly or indirectly, such as quoted prices in markets that are not active; or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities.

Level 3 - Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

The categorization of a financial instrument within the valuation hierarchy is based on the lowest level of input that is significant to the fair value measurement.

The Company classifies its cash equivalents and marketable investments within Level 1 and Level 2, as it uses quoted market prices or alternative pricing sources and models utilizing market observable inputs.

The Company determined the fair value of its Level 1 financial instruments, which are traded in active markets, using quoted market prices for identical instruments.

Marketable investments classified within Level 2 of the fair value hierarchy are valued based on other observable inputs, including broker or dealer quotations or alternative pricing sources. When quoted prices in active markets for identical assets or liabilities are not available, the Company relies on non-binding quotes from its investment managers, which are based on proprietary valuation models of independent pricing services. These models generally use inputs such as observable market data, quoted market prices for similar instruments, historical pricing trends of a security as relative to its peers. To validate the fair value determination provided by its investment managers, the Company reviews the pricing movement in the context of overall market trends and trading information from its investment managers. In addition, the Company assesses the inputs and methods used in determining the fair value in order to determine the classification of securities in the fair value hierarchy.

The Company did not hold any Level 3 marketable investments as of December 31, 2023 or December 31, 2022. Additionally, the Company did not have any financial assets and liabilities measured at fair value on a non-recurring basis as of December 31, 2023 and 2022.

The following tables set forth the Company's financial assets and liabilities measured at fair value by level within the fair value hierarchy (in thousands):

	As of December 31, 2023			
	Level 1	Level 2	Level 3	Fair Value
Financial Assets				
Cash equivalents:				
Money market funds	$ 86,991	$ —	$ —	$ 86,991
Marketable investments:				
Commercial paper	—	39,756	—	39,756
Certificate of deposit	—	6,401	—	6,401
U.S. treasury	10,066	—	—	10,066
U.S. states and municipalities	—	2,915	—	2,915
Corporate bonds	—	62,563	—	62,563
Total	$ 97,057	$ 111,635	$ —	$ 208,692

	As of December 31, 2022			
	Level 1	Level 2	Level 3	Fair Value
Financial Assets				
Cash equivalents:				
Money market funds	$ 21,521	$ —	$ —	$ 21,521
Marketable investments:				
U.S. treasury	14,004	—	—	14,004
U.S. agency and government sponsored securities	—	6,823	—	6,823
U.S. states and municipalities	—	22,959	—	22,959
Corporate bonds	—	74,386	—	74,386
Total	$ 35,525	$ 104,168	$ —	$ 139,693

4. Balance Sheet Components

Accounts Receivable, Net

The Company's allowance for credit losses related to accounts receivable balances was comprised of the following (in thousands):

	Balance At Beginning Of Year	Write-offs	Provision for (Benefit from) Expected Credit Losses	Recoveries	Balance At End Of Year
For the year ended:					
December 31, 2021	$ 2,198	$ —	$ —	$ (106)	$ 2,092
December 31, 2022	2,092	—	(1,230)	—	862
December 31, 2023	$ 862	$ —	$ 2,307	$ —	$ 3,169

Inventories

The components of inventories consisted of the following (in thousands):

	December 31, 2023	December 31, 2022
Raw materials	$ 119,511	$ 90,786
Work in process	34,489	26,793
Finished goods	234,023	216,427
Inventories	$ 388,023	$ 334,006

Property and Equipment, Net

Property and equipment, net consisted of the following (in thousands):

	December 31, 2023	December 31, 2022
Machinery and equipment	$ 43,152	$ 37,160
Furniture and fixtures	18,049	16,042
Leasehold improvements	29,241	25,611
Software	19,939	16,863
Computers	18,427	9,841
Construction in progress	3,535	7,523
Total property and equipment	132,343	113,040
Less: Accumulated depreciation and amortization	(59,652)	(48,025)
Property and equipment, net	$ 72,691	$ 65,015

Depreciation and amortization expense, excluding intangible assets and software, was $ 11.4 million, $ 9.8 million and $ 9.3 million for the years ended December 31, 2023, 2022 and 2021, respectively. Software amortization expense was $ 2.3 million, $ 1.7 million and $ 1.0 million for the years ended December 31, 2023, 2022 and 2021, respectively. The Company had accumulated software amortization of $ 7.9 million and $ 6.3 million for the years ended December 31, 2023 and 2022, respectively.

Accrued Liabilities

The following table shows the components of accrued liabilities as of December 31, 2023 and 2022 (in thousands):

	December 31,	
	2023	2022
Payroll and employee-related expenses	$ 65,395	$ 60,480
Accrued expenses	11,711	10,902
Deferred revenue	6,985	9,158
Other accrued liabilities	26,464	25,760
Total accrued liabilities	$ 110,555	$ 106,300

The following table shows the changes in the Company's estimated product warranty accrual, included in accrued liabilities, as of December 31, 2023, 2022 and 2021 (in thousands):

	December 31,		
	2023	2022	2021
Balance at the beginning of the year	$ 5,370	$ 4,310	$ 2,896
Accruals of warranties issued	1,865	2,451	2,973
Settlements of warranty claims	(1,480)	(1,391)	(1,559)
Balance at the end of the year	$ 5,755	$ 5,370	$ 4,310

5. Business Combinations

Acquisition of Sixense Enterprises Inc.

Transaction Overview

On October 1, 2021 (the "Sixense Acquisition Closing Date"), the Company closed the acquisition of Sixense Enterprises Inc. ("Sixense") pursuant to the Agreement and Plan of Merger, dated September 17, 2021 (the "Merger Agreement"), among the Company, Sixense, Seychelles Merger Corporation, a wholly owned subsidiary of the Company, and a stockholders' agent (the "Merger"). Sixense, a privately held company, specializes in enterprise use of virtual reality hardware and software and has been an integral partner on the development of the Company's REAL Immersive System portfolio. The Merger allows the Company to streamline its efforts and collaborate more closely on its Immersive healthcare offerings.

The Company and Sixense formed a joint venture, MVI Health Inc. ("MVI"), in 2017 for the purpose of exploring healthcare applications of virtual reality technology. At the time of MVI's formation, the Company contributed cash and in-kind services to MVI and Sixense contributed an exclusive license to use its technology for healthcare applications, each for a 50 % equity interest in MVI. In 2018, the Company acquired 40 % of the outstanding shares of MVI from Sixense and consolidated the financial results of MVI into the accompanying consolidated financial statements, with the amounts attributable to the non-controlling interest classified separately. As of the Sixense Acquisition Closing Date, the Company and Sixense owned a 90 % and 10 % equity interest in MVI, respectively.

As a result of the Merger, Sixense became a wholly owned subsidiary of the Company and the Company acquired, among other things, the remaining 10 % equity interest in MVI held by Sixense.

The Company accounted for the acquired assets and liabilities assumed from Sixense in accordance with ASC 805, *Business Combinations* ("ASC 805") and for its changes in ownership interest in MVI as an equity transaction in accordance with ASC 810, *Consolidation* ("ASC 810"). The carrying amount of the noncontrolling interest was adjusted to zero , and the difference between the acquisition date fair value of the equity interest acquired of $ 4.2 million and its carrying amount of ($ 6.2) million was recognized within additional paid in capital.

Fair Value of Consideration Transferred

The following table summarizes the Sixense Acquisition Closing Date fair value of the consideration transferred (in thousands):

Fair value of common stock issued [1]	$	174,133
Fair value of replacement stock options [2]		80,693
Consideration for settlement of pre-existing liabilities due to Sixense [3]		(3,810)
Total purchase price	$	251,016

[1] The fair value of the 661,877 shares of common stock issued as part of consideration transferred was determined based on the acquisition date closing market price of the Company's common stock of $ 263.09 .

[2] Per ASC 805, the replacement of stock options or other share-based payment awards in conjunction with a business combination represents a modification of share-based payment awards that must be accounted for in accordance with ASC 718, *Compensation - Stock Compensation* ("ASC 718"). As a result of the Company's obligation to issue replacement awards, a portion of the fair-value-based measure of replacement awards is included in measuring the purchase consideration transferred in the business combination. To determine the portion of the replacement awards that is part of the purchase consideration, the Company measured the fair value of both the replacement awards and the historical awards as of the Sixense Acquisition Closing Date, in accordance with ASC 718. The fair value of the replacement awards, whether vested or unvested, was included in the purchase consideration to the extent that pre-acquisition services had been rendered. The fair value of replacement stock options assumed for which pre-acquisition services were rendered of $ 80.7 million was allocated to the purchase consideration and $ 25.8 million was recognized immediately in the post-combination financial statements as pre-acquisition services were not rendered but the vesting of all stock options was accelerated in connection with the Merger. Refer to Note "12. Stockholders' Equity" for more information.

[3] In the connection with the Merger, the Company effectively settled pre-existing liabilities due to or on behalf of Sixense.

Fair Value of Consideration Transferred

The purchase price measurement period was closed as of September 30, 2022. The following table presents the allocation of the purchase price, reflecting immaterial measurement period adjustments recorded during the three months ended September 30, 2022 (in thousands):

		Acquisition-Date Fair Value	Estimated Useful Life of Finite-Lived Intangible Assets
Tangible assets acquired and (liabilities) assumed:			
Cash and cash equivalents	$	2,919	
Prepaid expenses and other current and non-current assets		1,971	
Deferred tax assets		20,678	
Deferred tax liabilities		(19,398)	
Accrued liabilities and other current liabilities		(1,341)	
Intangible assets acquired:			
Developed technology		62,466	8.75 years
In-process research and development		20,823	
Net assets acquired		88,118	
Fair value of subsidiary stock indirectly acquired through the Merger		4,161	
Total net assets acquired		92,279	
Goodwill		158,737	
Total purchase price	$	251,016	

The intangible assets acquired and the fair value of the privately-held subsidiary stock indirectly acquired are Level 3 fair value measurements for which fair value is derived from valuations using inputs that are unobservable and significant to the overall fair value measurement.

The value of the intangible assets was determined based on the replacement cost method, assuming the highest and best use by a market participant which was determined to be a company outside of the healthcare industry due to the intangibles acquired relating to non-healthcare applications. This is due to Sixense having previously licensed the healthcare rights prior to the acquisition to MVI. Since there were no standalone forecasts available due to the early stage of the non-healthcare business, the Company determined the cost approach provides the most reasonable approach to determine fair value of the intangible assets. The fair value of the intangible assets acquired was based on the following significant inputs: (i) total cost and time to reconstruct a substitute asset of comparable utility adjusted for any obsolescence; (ii) a developer's expected profit margin; and (iii) the opportunity cost lost over the period to reconstruct the substitute asset.

The acquired in-process research and development ("IPR&D") intangible asset is accounted for as an indefinite-lived asset until the completion or abandonment of the associated research and development effort. If the research and development effort associated with the IPR&D is successfully completed and commercial feasibility is reached, then the IPR&D intangible asset will be amortized over its estimated useful life to be determined at the date the effort is completed. During the three months ended September 30, 2022, the Company reclassified the $ 20.8 million IPR&D asset from the Sixense acquisition to a finite-lived developed technology intangible asset upon the completion of the IPR&D project and began amortizing the intangible asset over its useful life of 8.8 years. Refer to Note "7. Intangible Assets" for more information.

The finite lived developed technology intangible assets are amortized on a straight-line basis over their assigned estimated useful lives. The acquired intangible assets will not be amortized for tax purposes. As a result, a $ 19.4 million deferred tax liability was recorded as of December 31, 2021.

The goodwill arising from the Sixense acquisition is primarily attributed to the assembled workforce and expected synergies from future growth, which does not qualify for separate recognition as an identifiable intangible asset. Goodwill will not be deductible for tax purposes.

The fair value of the noncontrolling interest of $ 4.2 million was valued using the income approach and an option pricing model. The fair value of the noncontrolling interest was based on the following significant inputs: (i) the amount and timing of projected future cash flows; (ii) the discount rate used to discount those cash flows to present value; and (iii) the discount for lack of marketability.

The amount of Sixense's net revenue and net loss included in the Company's consolidated statements of operations was not material for the year ended December 31, 2021.

The following table presents certain unaudited pro forma information, for illustrative purposes only, for the year ended December 31, 2021, as if Sixense had been acquired on January 1, 2021 ("Pro Forma Closing Date"). The unaudited estimated pro forma information combines the historical results of Sixense with the Company's consolidated historical results and includes the following pro forma adjustments for the respective periods, net of tax effects: (i) the elimination of pre-acquisition transactions between Sixense and the Company; (ii) the reclassification of MVI's losses historically presented in "Net loss attributable to non-controlling interest" to "Net loss attributable to Penumbra, Inc.," (iii) adjustments to reflect the immediately recognized stock-based compensation expense related to the fair value of fully vested replacement stock options outstanding but for which services had not been rendered as of the Pro Forma Closing Date; and (iv) intangible asset amortization. Additionally, transaction costs incurred are assumed to have occurred on the Pro Forma Closing Date.

The pro forma information may not be indicative of what would have occurred had the acquisition taken place on January 1, 2021, and may not be indicative of the Company's future consolidated results. Additionally, the pro forma financial information does not include the impact of possible business model changes and does not reflect the impact of synergies or business integration costs. The unaudited pro forma information is presented below (unaudited, in thousands):

	Year Ended December 31, 2021 (unaudited, in thousands)
Pro forma revenues	$ 747,840
Proforma net income (loss) attributable to Penumbra, Inc.	$ 17,552
Proforma net loss attributable to non-controlling interest	$ —

6. Asset Acquisition

On September 29, 2023 (the "Asset Acquisition Closing Date"), the Company acquired IPR&D in an asset acquisition. IPR&D acquired in an asset acquisition is recorded using the cost accumulation model and is immediately expensed if there is no alternative future use at the time of acquisition. On the Asset Acquisition Closing Date, the Company recorded an $ 18.2 million charge to acquired IPR&D expense in the consolidated statements of operations as the IPR&D had no alternative future use.

The total consideration transferred was allocated to the non-monetary assets acquired and liabilities assumed using the cost accumulation model based on their relative fair value. The following table summarizes the Asset Acquisition Closing Date fair value of the consideration transferred (in thousands):

Fair value of common stock consideration [1]	$	17,227
Payment of certain acquiree transaction costs and other liabilities on behalf of acquiree [2]		1,001
Total purchase price	$	18,228

[1] The fair value of the 71,211 shares of common stock issued as part of consideration transferred was determined based on the Asset Acquisition Closing Date market price of the Company's common stock of $ 241.91 .

[2] Transaction costs and other pre-existing liabilities paid on behalf of the acquiree as part of the consideration transferred for the IPR&D are presented in the investing activities section of the consolidated statements of cash flows.

7. Intangible Assets

The following table presents details of the Company's acquired intangible assets as of December 31, 2023 and 2022 (in thousands, except weighted-average amortization period):

As of December 31, 2023	Weighted-Average Amortization Period	Gross Carrying Amount	Accumulated Amortization	Net
Finite-lived intangible assets:				
Developed technology	8.8 years	$ 83,289	$ (19,640)	$ 63,649
Customer relationships	15.0 years	6,579	(2,851)	3,728
Trade secrets and processes	20.0 years	5,256	(1,577)	3,679
Total intangible assets	9.6 years	$ 95,124	$ (24,068)	$ 71,056

As of December 31, 2022	Weighted-Average Amortization Period	Gross Carrying Amount	Accumulated Amortization	Net
Finite-lived intangible assets:				
Developed technology	8.8 years	$ 83,289	$ (10,113)	$ 73,176
Customer relationships	15.0 years	6,383	(2,340)	4,043
Trade secrets and processes	20.0 years	5,256	(1,314)	3,942
Other	5.0 years	1,646	(1,646)	—
Total intangible assets	9.6 years	$ 96,574	$ (15,413)	$ 81,161

The gross carrying amount and accumulated amortization of the customer relationships and other intangible assets are subject to foreign currency translation effects. The Company's $ 5.3 million trade secrets and processes intangible asset was recognized in connection with a royalty buyout agreement in 2018.

The Company reviews indefinite-lived intangible assets for impairment annually during the fourth quarter or more frequently if events or circumstances indicate that an impairment loss may have occurred. During the three months ended September 30, 2022, the Company reclassified a $ 20.8 million IPR&D asset from the Sixense acquisition to a finite-lived developed technology intangible asset upon the completion of the IPR&D project and began amortizing the intangible asset over its useful life of 8.8 years. Prior to reclassifying the IPR&D asset to a finite-lived intangible asset during the three months ended September 30, 2022, the Company performed an impairment analysis and determined that the IPR&D asset was not impaired.

The following table presents the amortization recorded related to the Company's finite-lived intangible assets for the years ended December 31, 2023, 2022 and 2021 (in thousands):

	Year Ended December 31,		
	2023	2022	2021
Cost of revenue	$ 263	$ 263	$ 263
Sales, general and administrative	9,949	8,917	2,618
Total	$ 10,212	$ 9,180	$ 2,881

As of December 31, 2023, expected amortization expense for the unamortized acquired intangible assets for the next five years and thereafter is as follows (in thousands):

	Amortization Expense
2024	$ 10,220
2025	10,220
2026	10,220
2027	10,220
2028	10,220
Thereafter	19,956
Total amortization	$ 71,056

8. Goodwill

The following table presents the changes in goodwill during the year ended December 31, 2023 (in thousands):

	Total Company
Balance as of December 31, 2022	$ 166,046
Foreign currency translation adjustments	224
Balance as of December 31, 2023	$ 166,270

Goodwill Impairment Review

The Company reviews goodwill for impairment annually during the fourth quarter, or more frequently if events or circumstances indicate that an impairment loss may have occurred. During the fourth quarter of 2023 and 2022, the Company reviewed goodwill for impairment and no impairment was identified.

9. Indebtedness

Credit Agreement

On April 24, 2020, the Company entered into a Credit Agreement (the "Credit Agreement") with JPMorgan Chase Bank, N.A., as administrative agent and lender, and Bank of America, N.A. and Citibank, N.A. as lenders. The Credit Agreement was secured and provided for up to $ 100 million in available revolving borrowing capacity with an option, subject to certain conditions, for the Company to increase the aggregate borrowing capacity to up to $ 150 million, and originally matured on April 23, 2021. During the three months ended March 31, 2021, 2022 and 2023, the Credit Agreement was amended to extend the maturity date and make other changes to the terms of the Credit Agreement. The Credit agreement matured on February 16, 2024 and was not renewed.

The Credit Agreement required the Company to maintain a minimum fixed charge coverage ratio and to not exceed a maximum leverage ratio. As of December 31, 2023, the Company was in compliance with these requirements. As of December 31, 2023, there were no borrowings outstanding under the Credit Agreement.

10. Leases

As of December 31, 2023, 2022 and 2021, the Company's contracts that contained a lease consisted of real estate, equipment and vehicle leases.

The Company leases real estate for office and warehouse space under non-cancelable operating and finance leases that expire at various dates through 2036, subject to the Company's option to renew certain leases for an additional five to fifteen years . The Company also leases other equipment and vehicles primarily under non-cancelable operating and finance leases that expire at various dates through 2028.

The following table presents the components of the Company's lease cost, lease term and discount rate during the years ended December 31, 2023, 2022 and 2021 (in thousands, except years and percentages):

	Year Ended December 31,		
	2023	2022	2021
Lease Cost			
Operating lease cost	$ 22,955	$ 20,305	$ 11,646
Finance lease cost:			
Amortization of right-of-use assets	3,350	3,253	3,082
Interest on lease liabilities	1,375	1,439	1,495
Variable lease cost[(1)]	10,835	10,012	6,699
Total lease costs	$ 38,515	$ 35,009	$ 22,922
Weighted Average Remaining Lease Term			
Operating leases	12.5 years	13.4 years	13.1 years
Finance leases	10.3 years	11.4 years	12.2 years
Weighted Average Discount Rate			
Operating leases	5.07 %	4.94 %	4.92 %
Finance leases	5.37 %	5.30 %	5.30 %

[(1)] Variable lease costs represent payments that are dependent on usage, a rate or index. Variable lease cost primarily relates to common area maintenance charges for its real estate leases as the Company does not separate lease from non-lease components.

In the second quarter of 2021, the fifteen-year term 1310 Harbor Bay Lease commenced once the building was made ready and available for its intended use. The Company determined that the 1310 Harbor Bay lease is a non-cancelable operating lease which will expire in 2036.

During the third quarter of 2021, we signed a lease for approximately thirteen years for additional space located at 620 Roseville Parkway, Roseville, California. Per the terms of the lease, improvements will be constructed and permanently affixed to the property in two phases. Phase 1 of the 620 Roseville Parkway Lease commenced once the Phase 1 premises were made ready and available for their intended use, which occurred during the first quarter of 2022. As of December 31, 2023, the lease for the Phase 2 premises has not commenced as the improvements to the premises have not been completed nor has it been made ready and available for its intended use. Per the terms of the lease, the Company anticipates that the lease will commence for the Phase 2 premises no later than the second quarter of 2025. The Company determined that the 620 Roseville Parkway Lease is a non-cancelable operating lease which will expire in 2035.

During the year ending December 31, 2022, additional office space was made available for the Company's use at its headquarters and certain existing property leases were modified. During the year ending December 31, 2023, additional office

space was made available for the Company's use at its headquarters. This resulted in an increase of operating right-of-use ("ROU") assets in exchange for operating leases liabilities in both years.

The following table is a schedule, by years, of maturities of the Company's operating and finance lease liabilities as of December 31, 2023 (in thousands):

	Operating Lease Payments[1]	Finance Lease Payments
Year Ending December 31:		
2024	$ 21,290	$ 3,559
2025	21,148	3,484
2026	21,080	3,098
2027	20,818	2,989
2028	20,886	2,935
Thereafter	181,071	18,044
Total undiscounted lease payments	286,293	34,109
Less imputed interest	(77,861)	(8,198)
Present value of lease liabilities	$ 208,432	$ 25,911

[1] The table above excludes the estimated future minimum lease payments of Phase 2 of the 620 Roseville Parkway Lease due to uncertainty around when Phase 2 lease will commence and payments will be due. The total estimated lease payments of the Phase 2 lease is approximately $ 10.3 million.

Supplemental cash flow information related to leases during the years ended December 31, 2023, 2022 and 2021 are as follows (in thousands):

	Year Ended December 31,		
	2023	2022	2021
Cash paid for amounts included in the measurement of lease liabilities:			
Operating cash flows from operating leases	$ 19,662	$ 17,554	$ 9,690
Financing cash flows from finance leases	$ 1,981	$ 1,751	$ 1,451
Right-of-use assets obtained in exchange for lease obligations:			
Operating leases	$ 9,339	$ 72,279	$ 101,510
Finance leases	$ 1,118	$ 305	$ 1,346

11. Commitments and Contingencies

Purchase Commitments

As of December 31, 2023, the Company had non-cancelable purchase obligations of $ 25.1 million, which primarily consisted of contracts with suppliers to purchase raw materials to be used to manufacture products, of which $ 12.2 million were due within one year.

Royalty Obligations

In March 2005, the Company entered into a license agreement that requires the Company to make minimum royalty payments to the licensor on a quarterly basis. As of December 31, 2018, the license agreement required minimum annual royalty payments of $ 0.1 million in equal quarterly installments. In July 2019, the Company amended the license agreement to extend its term for an additional ten years and to increase the required minimum annual royalty payments by $ 0.2 million for a required minimum annual royalty payment of $ 0.3 million payable in equal quarterly installments. Unless terminated earlier, the term of the amended license agreement shall expire June 30, 2029.

Royalty expense included in cost of sales for the years ended December 31, 2023, 2022 and 2021 was $ 2.6 million, $ 2.5 million and $ 2.3 million, respectively.

Contingencies

From time to time, the Company may have certain contingent liabilities that arise in the ordinary course of business. The Company accrues a liability for such matters when it is probable that future expenditures will be made and such expenditures can be reasonably estimated.

Indemnification

The Company enters into standard indemnification arrangements in the ordinary course of business. In many such arrangements, the Company agrees to indemnify, hold harmless, and reimburse the indemnified parties for losses suffered or incurred by the indemnified parties in connection with any trade secret, copyright, patent or other intellectual property infringement claim by any third-party with respect to the Company's technology. The Company also agrees to indemnify many indemnified parties for product defect and similar claims. The term of these indemnification agreements is generally perpetual. The maximum potential amount of future payments the Company could be required to make under these agreements is not determinable because it involves claims that may be made against the Company in the future, but have not yet been made.

The Company has entered into indemnification agreements with its directors and officers that may require the Company to indemnify its directors and officers against liabilities that may arise by reason of their status or service as directors or officers, other than liabilities arising from willful misconduct of the individual.

The Company has not incurred costs to defend lawsuits or settle claims related to these indemnification agreements. No liability associated with any of these indemnification requirements has been recorded to date.

Litigation

From time to time, the Company is subject to certain legal proceedings, as well as demands, claims and threatened litigation that arise in the normal course of our business. The Company reviews the status of each significant matter quarterly and assesses its potential financial exposure. If the potential loss from a claim or legal proceeding is considered probable and the amount can be reasonably estimated, the Company records a liability and an expense for the estimated loss and discloses it in the Company's financial statements if it is significant. If the Company determines that a loss is possible and the range of the loss can be reasonably determined, the Company does not record a liability or an expense but the Company discloses the range of the possible loss. The Company bases its judgments on the best information available at the time. As additional information becomes available, the Company reassesses the potential liability related to its pending claims and litigation and may revise its estimates.

On April 7, 2023, a former contractor who had been retained by the Company through a third party staffing agency filed a putative class action lawsuit as well as a Private Attorney General Act ("PAGA") representative action complaint against the Company in the Superior Court of the State of California for the County of Alameda, on behalf of the contractor and similarly situated Company contractors and employees in California, alleging various claims pursuant to the California Labor Code related to wages, overtime, meal and rest breaks, reimbursement of business expenses, wage statements and records, and other similar allegations. Additionally, on April 10, 2023, a current employee of the Company filed a PAGA representative action complaint against the Company in the Superior Court of the State of California for the County of Alameda, on behalf of the employee and similarly situated Company employees in California, alleging similar claims. The complaints seek payment of various alleged unpaid wages, penalties, interest and attorneys' fees in unspecified amounts. The Company believes the claims lack merit, and intends to defend itself vigorously. Given the early stage of these proceedings, it is not yet possible to reliably determine any potential liability that could result from these matters, and as such, the Company has not accrued any amount for potential losses associated with these matters.

12. Stockholders' Equity

Stockholders' Equity

Preferred Stock

The Company has 5,000,000 of authorized preferred stock issuable. There is no preferred stock outstanding as of December 31, 2023 and 2022.

Common Stock

Each share of common stock is entitled to one vote. The holders of common stock are also entitled to receive dividends whenever funds are legally available and when declared by the board of directors, subject to the prior rights of holders of all classes of stock outstanding.

Issuance of Common Stock in Connection with the Acquisition of Sixense

As consideration for the acquisition of Sixense, the Company issued 661,877 shares of its common stock as part of the total consideration transferred in connection with the Merger. Additionally, on October 1, 2021, the Company converted all stock options held by Sixense service providers that would continue as service providers after the Merger into fully vested options to purchase an aggregate amount of 447,017 shares of the Company's common stock. Please see Note "5. Business Combinations" for more information.

Issuance of Common Stock in Connection with an Asset Acquisition

On September 29, 2023, the Company issued 71,211 shares of common stock as part of the total consideration transferred in connection with an asset acquisition. Please see Note "6. Asset Acquisition" for more information.

Stock-Based Benefit Plans

2005 Stock Plan

The Company adopted the Penumbra, Inc. 2005 Stock Plan (the "2005 Plan") in January 2005. The 2005 Plan was subsequently amended and restated in 2006, 2007, 2008 and 2010. Under the 2005 Plan, the board of directors could grant incentive stock options ("ISOs"), non-qualified stock options ("NSOs"), and/or stock awards to eligible persons, including employees, non-employees, directors, consultants and other independent advisors who provide services to the Company. Stock purchase rights could also be granted under the 2005 Plan. The board of directors had the authority to determine to whom options would be granted, the number of options, the term and the exercise price. ISOs could only be granted to Company employees, which include officers and directors of the Company. NSOs and stock purchase rights could be granted to employees and consultants. For individuals holding more than 10 % of the voting rights of all classes of stock, the exercise price for an ISO could not be less than 110 % of the fair market value of a share of common stock on the date of grant. Options granted under the 2005 Plan permitted an optionee to exercise options immediately upon grant irrespective of the vesting term. Options generally vest annually at a rate of 1/4 after the first year and 1/48 per month thereafter. The term of the options is no longer than five years for ISOs, for which the grantee owns greater than 10 % of the voting power of all classes of stock and no longer than 10 years for all other options. On September 17, 2015, the Penumbra, Inc. 2014 Equity Incentive Plan (as amended and restated, the "2014 Plan") replaced the 2005 Plan and no further equity awards may be granted under the 2005 Plan. The remaining 564 shares of common stock available for issuance from the 2005 Plan were transferred to and may be granted under the 2014 Plan. As of December 31, 2023, 5,000 shares of common stock were reserved for issuance under the 2005 Plan.

2011 Equity Incentive Plan

The Company adopted the Penumbra, Inc. 2011 Equity Incentive Plan (the "2011 Plan") in October 2011. Under the 2011 Plan, the board of directors could grant ISOs, NSOs, restricted stock, and/or RSUs to eligible persons, including employees, directors and consultants who provide services to the Company. Stock Appreciation Rights ("SAR") could also be granted under the 2011 Plan. The board of directors had the authority to determine to whom options would be granted, the number of options, the term and the exercise price. ISOs could only be granted to Company employees, which include officers and directors of the Company. NSOs, SARs, restricted stock and RSUs could be granted to employees and consultants. For individuals holding more than 10 % of the voting rights of all classes of stock, the exercise price for an ISO could not be less than 110 % of the fair market value of a share of common stock on the date of grant. Stock options granted under the 2011 Plan generally have a contractual life of ten years , and generally vest over a period of four years . On September 17, 2015, the 2014 Plan replaced the 2011 Plan and no further equity awards may be granted under the 2011 Plan. The remaining 89,559 shares of common stock available for issuance under the 2011 Plan were transferred to and may be granted under the 2014 Plan. As of December 31, 2023, there were no shares of common stock reserved for issuance under the 2011 Plan.

Amended and Restated 2014 Equity Incentive Plan

The Company adopted the 2014 Plan in May 2014. The 2014 Plan was amended and restated as of September 17, 2015. The 2014 Plan replaced the 2011 Plan and the 2005 Plan and no further equity awards may be granted under the 2011 Plan or

the 2005 Plan. As of December 31, 2023, 6,964,221 shares of common stock were reserved for issuance and 5,932,280 shares of common stock were available for grant under the 2014 Plan.

Employee Stock Purchase Plan

The Penumbra, Inc. Employee Stock Purchase Plan (the "ESPP"), became effective on September 17, 2015. The ESPP initially reserved 600,000 shares of common stock for purchase under the ESPP, with the number of shares reserved for purchase increasing each year pursuant to an "evergreen" provision set forth in the ESPP. As of December 31, 2023, 755,623 shares of common stock were reserved and available for issuance under the ESPP. All qualifying employees of the Company and its designated subsidiaries are eligible to participate in the ESPP. Offerings to the Company's employees to purchase stock under the ESPP will begin on each May 20 and November 20 and will end on the following November 19 and May 19, respectively, each referred to as offering periods except that the first offering period under the ESPP began on September 17, 2015 and ended on May 19, 2016. Under the ESPP, each employee may purchase shares by authorizing payroll deductions at a minimum of 1 % and up to 15 % of his or her eligible compensation for each pay period during the offering period. Unless the participating employee withdraws from the offering, his or her accumulated payroll deductions will be used to purchase the Company's common stock on the last business day of the offering period at a price equal to 85 % of the fair market value of the common stock on either the first or the last day of the offering period, whichever is lower, provided that no more than 2,000 shares of the Company's common stock or such other lesser maximum number established by the ESPP administrator may be purchased by any one employee during each offering period. Under applicable tax rules, an employee may purchase no more than $ 25,000 worth of common stock, valued at the start of the purchase period (corresponding to an offering period), under the ESPP in any calendar year.

Early Exercises

The 2005 Plan and 2011 Plan allowed the board of directors to grant stock options that provide employee option holders the right to elect to exercise unvested options in exchange for restricted common stock. As of December 31, 2023 and 2022, there were no such early exercised unvested shares.

Stock-Based Benefit Plan Activity and Stock-Based Compensation

Stock Options

Activity of stock options under the 2005 Plan, 2011 Plan and 2014 Plan (collectively, the "Plans") during the year ended December 31, 2023 is set forth below:

	Number of Shares	Weighted-Average Exercise Price	Weighted Average Remaining Contractual Life (in years)	Aggregate Intrinsic Value (in thousands)
Balance at December 31, 2022	841,773	$ 29.73		
Grants	—	$ —		
Exercised	(239,395)	$ 23.04		
Canceled/Forfeited	(6,958)	$ 197.74		
Balance at December 31, 2023	595,420	$ 30.46		
Vested and expected to vest—December 31, 2023	595,420	$ 30.46	1.97	$ 131,636
Exercisable—December 31, 2023	595,420	$ 30.46	1.97	$ 131,636

The total intrinsic value of stock options exercised during the years ended December 31, 2023, 2022 and 2021 was $ 60.0 million, $ 48.2 million and $ 81.1 million, respectively. The intrinsic value is calculated as the difference between the estimated fair value of the Company's common stock at the exercise date and the exercise price of the stock option.

The Company did not grant stock options during the year ended December 31, 2023. The weighted average grant date fair value of stock options for the years ended December 31, 2022 and 2021 was $ 84.25 and $ 238.14 per share, respectively, based on a black-scholes valuation model.

Restricted Stock Units

The activity of unvested restricted stock units ("RSU") under the Plans is set forth below:

	Number of Shares	Weighted Average Grant Date Fair Value
Unvested at December 31, 2022	470,019	$ 202.51
Granted	92,805	250.54
Released/Vested	(179,679)	196.51
Canceled/Forfeited	(36,401)	215.90
Unvested at December 31, 2023	346,744	$ 217.07

The fair value of the RSUs that vested during the years ended December 31, 2023, 2022 and 2021 was $ 48.3 million, $ 26.8 million and $ 42.3 million, respectively. As of December 31, 2023, 325,066 RSUs are expected to vest.

Performance Stock Units

Under the 2104 Plan, the Company grants certain PSUs to senior management for which vesting is contingent on the achievement of financial performance targets over an annual performance period and continued service. The number of shares awarded is based on the actual performance during the performance period compared to the performance targets and the closing price of the Company's common stock on the date of grant.

Additionally, the Company grants certain PSUs to sales employees for which vesting is contingent on the achievement of sales performance targets and continued service. These PSUs have a fixed monetary amount, that will be settled in a variable number of shares and are accounted for as liability-classified awards prior to the number of shares being determined and issued. Once the number of shares is determined and the PSUs are issued, the awards are accounted for as equity-classified awards.

When the performance targets are probable of being achieved, stock-based compensation costs associated with PSUs are recognized on a graded vesting basis over its requisite service period, which generally is a period of four to five years . Graded vesting results in more accelerated expense recognition compared to traditional time-based vesting over the same vesting period. Each reporting period, the Company monitors the probability of achieving the performance targets and may adjust periodic stock-based compensation expense based on its determination of the likelihood of achieving these performance targets and the estimated number of shares or value of common stock that will vest.

The activity of unvested equity-classified PSUs under the Plans is set forth below:

	Number of Shares[1]	Weighted Average Grant Date Fair Value[1]
Unvested at December 31, 2022	25,830	$ 208.86
Granted	83,820	260.17
Released/Vested	(7,259)	205.88
Canceled/Forfeited	(7,614)	256.44
Unvested at December 31, 2023	94,777	$ 250.65

[1] The table above excludes liability-classified PSUs. During the year ended December 31, 2023, the Company recorded $ 2.2 million in stock-based compensation for liability-classified PSUs.

The fair value of the PSUs that vested during the years ended December 31, 2023, 2022 and 2021 was $ 1.9 million, $ 1.2 million and $ 2.3 million, respectively. As of December 31, 2023, 87,138 PSUs are expected to vest.

Employee Stock Purchase Plan

Under the ESPP, employees purchased 83,799 shares, 113,893 shares, and 64,852 shares for $ 14.9 million, $ 13.8 million, and $ 13.7 million during the years ended December 31, 2023, 2022, and 2021, respectively.

Stock-based Compensation

The Company uses the Black-Scholes option pricing model to determine the fair value of stock options and ESPP rights. The valuation model for stock compensation expense requires the Company to make assumptions and judgments about the

variables used in the calculation including the expected term (weighted average period of time that the options granted are expected to be outstanding); expected volatility of the Company's common stock and an assumed risk-free interest rate.

The Company used the following assumptions in its Black-Scholes option pricing model to determine the fair value of stock options and ESPP rights:

	Stock Options		ESPP Rights		
	Year Ended December 31,		Year Ended December 31,		
	2022	2021	2023	2022	2021
Expected term (in years)	5.62	2.85	0.50	0.50	0.50
Expected volatility	42 %	42 %	41 %	46 %	43 %
Risk-free interest rate	2.76 %	0.38 %	5.04 %	1.30 %	0.10 %
Expected dividend yield	— %	— %	0 %	0 %	0 %

The Company did not grant stock options during the year ended December 31, 2023. All stock options granted by the Company during the year ended December 31, 2021, were granted as replacement stock options in connection with the Merger. Refer to Note "5. Business Combinations" for more information.

Weighted Average Expected Term. The Company's expected term for stock options and ESPP rights is based on historical data.

Volatility. In 2023, 2022 and 2021, volatility assumptions used in the valuation of options and ESPP rights were calculated based on the historical volatility of the Company's stock.

Risk-Free Interest Rate. The risk-free interest rate is based upon U.S. Treasury zero-coupon issues with remaining terms similar to the expected term of the stock options or ESPP rights.

Dividend Yield. The Company has never paid any dividends and does not plan to pay dividends in the foreseeable future, and therefore, used an expected dividend yield of zero in the valuation model.

Forfeitures. The Company estimates forfeitures at the time of grant, and revises those estimates in subsequent periods if actual forfeitures differ from those estimates. The Company uses historical data to estimate pre-vesting forfeitures and record stock-based compensation expense only for those awards that are expected to vest. To the extent actual forfeitures differ from the estimates, the difference will be recorded as a cumulative adjustment in the period that the estimates are revised.

The following table sets forth the stock-based compensation expense included in the consolidated statements of operations (in thousands):

	Year Ended December 31,		
	2023	2022	2021[1]
Cost of sales	$ 5,330	$ 3,882	$ 2,898
Research and development	8,838	5,908	30,037
Sales, general and administrative	36,348	27,588	32,828
Total	$ 50,516	$ 37,378	$ 65,763

[1] The Company recorded a $ 25.8 million charge to stock-based compensation related to the acceleration of vesting of all replacement stock options in connection with the Merger. Refer to Note "5. Business Combinations" for more information.

As of December 31, 2023, total unrecognized compensation cost related to unvested stock-based compensation arrangements, excluding PSUs, was $ 64.6 million which is expected to be recognized over a weighted average period of 2.5 years.

As of December 31, 2023, total unrecognized compensation cost related to liability-classified and equity-classified PSUs was $ 14.6 million, which is expected to be recognized over a weighted average period of 3.3 years.

The total stock-based compensation cost capitalized in inventory was $ 1.3 million, $ 2.2 million and $ 1.8 million as of December 31, 2023, 2022 and 2021, respectively.

13. Accumulated Other Comprehensive Income (Loss)

Other comprehensive income (loss) consists of two components: unrealized gains or losses on the Company's available-for-sale marketable investments and gains or losses from foreign currency translation adjustments. Until realized and reported as a component of consolidated net income (loss), these comprehensive income (loss) items accumulate and are included within accumulated other comprehensive income (loss). Unrealized gains and losses on our marketable investments are reclassified from accumulated other comprehensive income (loss) into earnings when realized upon sale, and are determined based on specific identification of securities sold. Gains and losses from the translation of assets and liabilities denominated in non-U.S. dollar functional currencies are included in accumulated other comprehensive income (loss).

The following table summarizes the changes in the accumulated balances during the period, and includes information regarding the manner in which the reclassifications out of accumulated other comprehensive income (loss) into earnings affect our consolidated statements of comprehensive income (loss) (in thousands):

	Year Ended December 31, 2023			Year Ended December 31, 2022		
	Marketable Investments	Currency Translation Adjustments	Total	Marketable Investments	Currency Translation Adjustments	Total
Balance, beginning of the year	$ (3,500)	$ (4,624)	$ (8,124)	$ (595)	$ (2,035)	$ (2,630)
Other comprehensive loss before reclassifications:						
Unrealized gains (losses) — marketable investments	2,942	—	2,942	(2,905)	—	(2,905)
Foreign currency translation gains (losses)	—	2,030	2,030	—	(2,590)	(2,590)
Income tax effect — expense	—	1	1	—	1	1
Net of tax	2,942	2,031	4,973	(2,905)	(2,589)	(5,494)
Amounts reclassified from accumulated other comprehensive loss to consolidated net income:						
Realized (loss) gain — marketable investments	—	—	—	—	—	—
Income tax effect — (expense) benefit	—	—	—	—	—	—
Net of tax	—	—	—	—	—	—
Net current-year other comprehensive income (loss)	2,942	2,031	4,973	(2,905)	(2,589)	(5,494)
Balance, end of the year	$ (558)	$ (2,593)	$ (3,151)	$ (3,500)	$ (4,624)	$ (8,124)

14. Employee Benefit Plan

The Company offers a retirement savings plan under Section 401(k) of the Internal Revenue Code ("IRC") to its eligible U.S. employees whereby they may contribute up to the maximum amount permitted by the IRC. The Company makes 401(k) matching contributions of eligible compensation under the plan, subject to a maximum dollar threshold. Contribution expense was $ 6.6 million, $ 6.7 million, and $ 5.6 million for the years ended December 31, 2023, 2022 and 2021, respectively.

15. Income Taxes

The Company's income tax (benefit) expense, deferred tax assets and liabilities, and reserves for unrecognized tax benefits reflect management's best assessment of estimated current and future taxes to be paid. The Company is subject to income taxes in both the United States and foreign jurisdictions. Significant judgments and estimates are required in determining the consolidated income tax (benefit) expense.

The Company is incorporated in the United States and operates in various countries with different tax laws and rates. A portion of the Company's income or (loss) before taxes and the (benefit from) provision for income taxes are generated from international operations.

Income (loss) before income taxes and equity in losses of unconsolidated investee for the years ended December 31, 2023, 2022 and 2021 is summarized as follows (in thousands):

	Year Ended December 31,		
	2023	2022	2021
United States	$ 72,936	$ (1,837)	$ (15,155)
Foreign	6,714	5,729	4,653
Total income (loss) before income taxes	$ 79,650	$ 3,892	$ (10,502)

Income tax (benefit) or provision in 2023, 2022 and 2021 is comprised of federal, state, and foreign taxes.

The components of the (benefit from) provision for income taxes are summarized as follows (in thousands):

	Year Ended December 31,		
	2023	2022	2021
Current:			
Federal	$ 5,897	$ 1,672	$ 44
State	3,033	1,428	439
Foreign	4,890	1,725	1,345
Total current	$ 13,820	$ 4,825	$ 1,828
Deferred:			
Federal	(19,221)	1,905	(13,698)
State	(4,648)	(360)	(1,131)
Foreign	(1,255)	(476)	(124)
Total deferred	$ (25,124)	$ 1,069	$ (14,953)
(Benefit from) provision for income taxes	$ (11,304)	$ 5,894	$ (13,125)

The Company's actual (benefit from) or provision for tax differed from the amounts computed by applying the Company's U.S. federal statutory income tax rate to pretax income as a result of the following:

	Year Ended December 31,		
	2023	2022[1]	2021[1]
Income tax at federal statutory rate	21.0 %	21.0 %	21.0 %
State income taxes, net of federal benefit	3.0	15.9	7.6
Rate differential on foreign operations	0.2	(11.7)	(2.7)
Foreign taxes	1.5	(6.9)	1.3
Mutual agreement procedure adjustment	—	—	2.1
Prepaid tax ASC 810-10	0.2	51.9	(0.3)
Meals expenses	1.9	—	—
Stock-based compensation	(8.5)	72.9	86.1
Global intangible low-taxed income ("GILTI")	—	—	(6.5)
Permanent differences	1.0	6.9	(2.7)
Foreign Derived Intangible Income	(1.3)	(3.3)	—
In-Process Research & Development	4.8	—	—
Change in valuation allowance	(32.0)	—	18.2
Research and Development tax credits	(5.9)	—	—
Other	(0.1)	4.7	0.9
Effective tax rate	(14.2) %	151.4 %	125.0 %

[1] The 2022 and 2021 effective tax rate reconciliations have been updated to conform to the 2023 presentation.

Deferred income tax assets and liabilities consist of the following (in thousands):

	December 31,	
	2023	2022
Deferred tax assets:		
Net operating loss carryforwards	$ 7,972	$ 37,290
Tax credits	45,127	41,934
Accruals and reserves	10,779	9,236
Capitalized research expenses	41,611	22,960
Stock-based compensation	9,110	12,478
UNICAP adjustments	12,441	10,810
ASC 842 Lease Liabilities	56,584	57,161
Foreign Withholding Tax	1,078	—
Other	2,787	2,901
Gross deferred tax assets	187,489	194,770
Valuation allowance	(23,957)	(46,693)
Total deferred tax assets	163,532	148,077
Deferred tax liabilities:		
Depreciation and amortization	(26,327)	(29,781)
ASC 842 Lease ROU Assets	(53,093)	(54,786)
Other	(3)	(257)
Total deferred tax liabilities	(79,423)	(84,824)
Net deferred tax assets	$ 84,109	$ 63,253

As of December 31, 2023, the Company had approximately $ 21.8 million and $ 63.2 million of federal and state net operating loss (“NOL”) carryforwards, respectively, available to offset future taxable income. The federal NOL has an indefinite carryforward period but is limited to offset 80 % of taxable income in the year utilized. The state NOL carryforwards have various carryover periods and will begin to expire as early as 2035. As of December 31, 2023, the Company had federal research and development tax credits of $ 27.1 million which are generally carried forward for 20 years and will begin to expire in 2037. The Company had California state research and development tax credits of $ 29.4 million that may be carried forward indefinitely.

The Company generated significant domestic DTAs in recent years, primarily due to the excess tax benefits from stock option exercises and vesting of restricted stock units, as well as operating expenditures including research and development. The Company assessed its ability to realize the benefits of its domestic DTAs by evaluating all available positive and negative evidence, objective and subjective in nature, including (1) cumulative results of operations in recent years, (2) sources of recent pre-tax income, (3) estimates of future taxable income, (4) respective carryback and/or carryforward periods of tax attributes available to date, and (5) limitations on NOL utilization against taxable income. The Company measured its current DTA balances against estimate of future income based on objectively verifiable operating results from recent history, and concluded that sufficient future taxable income will be generated to realize the benefits of its federal DTAs prior to expiration, including federal research and development tax credit DTAs. Furthermore, due to substantial profitability increase in recent years, the Company determined that sufficient future California taxable income will be generated to realize partial benefit of California DTAs. As a result, the Company released the valuation allowance against federal research and development tax credit DTAs, net of ASC 740-10 reserve and recorded a partial release of its California DTAs, resulting in a $ 25.5 million income tax benefit recorded as of December 31, 2023. The Company continues to maintain a valuation allowance against its California tax credit DTAs until new evidence becomes available to justify realization of the asset.

As of December 31, 2023, the Company does not maintain valuation allowance against any of its foreign DTAs, because sufficient future taxable income will be generated by foreign subsidiaries to utilize the benefit of their DTAs in full at the required more-likely-than-not level of certainty.

The change in the Company's deferred tax valuation allowance against net DTAs from January 1, 2021 to December 31, 2023, is as follows (in thousands):

	Beginning Balance	Additions Charged To Expenses or Other Accounts[1]	Deductions Credited to Expenses or Other Accounts[2]	Ending Balance
For the year ended:				
December 31, 2021	$ 28,768	$ 10,386	$ (2,044)	$ 37,110
December 31, 2022	37,110	9,583	—	46,693
December 31, 2023	46,693	1,673	(24,409)	23,957

[1] Additions include current year additions charged to expenses and current year build due to increases in net DTAs, return to provision true-ups, and other adjustments.

[2] Deductions include current year releases credited to expenses and current year reductions due to decreases in net DTAs, return to provision true-ups, and other adjustments.

The Company maintains that all foreign earnings, with the exception of a portion of the earnings of its German subsidiary, are permanently reinvested outside the U.S. and therefore deferred taxes attributable to such are not provided for in the Company's financial statements as of December 31, 2023.

IRC Sections 382 and 383 limit the use of NOL and business credits if there is a change in ownership. In 2023, the Company determined there has been no ownership changes from 2013 to 2023, and therefore, is not subject to any tax attributes utilization limit in the current year. The NOLs and tax credits gained from the 2021 acquisition of Sixense would be subject to IRC Section 382 and 383 limitations. However, the Company does not believe such limitation would cause any impairment of those tax attributes. Their full tax benefit is anticipated to be realized in future years.

A reconciliation of the change in the gross unrecognized tax benefits from January 1, 2021 to December 31, 2023, is as follows (in thousands):

	December 31,		
	2023	2022	2021
Beginning Balance	$ 11,237	$ 9,026	$ 8,625
Gross increase for tax positions of current year	1,702	1,842	1,935
Gross increase for tax positions of prior years	15	481	216
Gross decrease for tax positions of prior years	(366)	(112)	(1,411)
Settlement with taxing authority	—	—	(339)
Lapse of statute of limitations	(27)	—	—
Ending Balance	$ 12,561	$ 11,237	$ 9,026

The Company recognizes interest and penalties related to uncertain tax positions in income tax expense. As of December 31, 2023, 2022 and 2021, the Company consistently had $ 0.2 million of accrued interest and penalties attributable to uncertain tax positions for each period. Included in the $ 12.6 million balance of unrecognized tax benefits as of December 31, 2023 is $ 6.8 million of tax benefit that, if recognized, would affect the effective tax rate.

The Company files U.S., state and foreign income tax returns in jurisdictions with various statutes of limitations. Due to NOL and tax credit carryovers, the tax years ending December 31, 2004 through December 31, 2023 remain subject to examination by federal and state tax authorities. In Australia and Canada, tax years ending December 31, 2009 through December 31, 2023 generally remain subject to examination by tax authorities. In Germany, tax years ending December 31, 2018 through December 31, 2023 remain subject to examination by tax authorities.

The Company does not anticipate significant changes in the balance of gross unrecognized tax benefits over the next 12 months.

In December 2021, the Organizational for Economic Co-operation and Development ("OECD") released guidance on the new global minimum tax regime known as Pillar Two. While various countries have adopted or in the process of passing legislation to adopt it, the United States has not yet conformed to Pillar Two as of December 31, 2023. The Company is currently evaluating the potential global tax implications of this new tax regime.

16. Net Income (Loss) per Share

The Company computed basic net income (loss) attributable to Penumbra, Inc. per share based on the weighted average number of shares of common stock outstanding during the period. The Company computed diluted net income (loss) attributable to Penumbra, Inc. per share based on the weighted average number of shares of common stock outstanding plus potentially dilutive common stock equivalents outstanding during the period. For the purposes of this calculation, stock options, restricted stock units, performance stock units and stock sold through the ESPP are considered common stock equivalents.

A reconciliation of the numerator and denominator used in the calculation of the basic and diluted net income (loss) attributable to Penumbra, Inc. is as follows (in thousands, except share and per share amounts):

	Year Ended December 31,		
	2023	2022	2021
Numerator:			
Net income (loss) attributable to Penumbra, Inc.	$ 90,954	$ (2,002)	$ 5,284
Denominator:			
Weighted average shares used to compute net income (loss) attributable to common stockholders:			
Basic	38,401,171	37,841,874	36,764,290
Potential dilutive stock-based options and awards, as calculated using treasury stock method	815,393	—	1,116,890
Diluted	39,216,564	37,841,874	37,881,180
Net income (loss) attributable to Penumbra, Inc. per share from:			
Basic	$ 2.37	$ (0.05)	$ 0.14
Diluted	$ 2.32	$ (0.05)	$ 0.14

For the years ended December 31, 2023 and 2021, outstanding stock-based awards of 11 thousand and 15 thousand shares, respectively, were excluded from the computation of diluted net income attributable to Penumbra, Inc. per share because their effect would have been anti-dilutive. For the year ended December 31, 2022 outstanding stock-based awards of 2.0 million shares were excluded from the computation of diluted net loss attributable to Penumbra, Inc. per share because their effect would have been anti-dilutive.

17. Interest and other income (expense), net

The following table shows the components of interest and other income (expense), net for the years ending December 31, 2023, 2022 and 2021 (in thousands):

	December 31,		
	2023	2022	2021
Interest income	$ 6,825	$ 1,886	$ 2,871
Interest expense	(1,739)	(1,749)	(1,933)
Other income (expense), net[(1)]	1,013	(2,327)	(3,939)
Interest and other income (expense), net	$ 6,099	$ (2,190)	$ (3,001)

[(1)] Consists primarily of the effect of foreign currency gains or losses as well as other non-operating income or expense.

18. Revenues

Revenue Recognition

Revenue is recognized in an amount that reflects the consideration we expect to be entitled to in exchange for goods or services. All revenue recognized in the consolidated statements of operations is considered to be revenue from contracts with customers.

Certain changes in presentation were made to the Company's revenues disaggregated by product categories for the years ended December 31, 2022, and 2021 to conform to the presentation for the year ended December 31, 2023. During the year ended December 31, 2023, the Company made changes to its product categories to provide investors with more meaningful information to understand the performance of its business and strategic direction.

The Company's revenues, disaggregated by geography, based on the destination to which the Company ships its products, for the years ended December 31, 2023, 2022 and 2021 was as follows (in thousands):

	Year Ended December 31,		
	2023	2022	2021
United States	$ 757,151	$ 591,715	$ 527,789
International	301,371	255,418	219,801
Total	$ 1,058,522	$ 847,133	$ 747,590

The Company's revenues disaggregated by product categories, for the years ended December 31, 2023, 2022 and 2021 was as follows (in thousands):

	Year Ended December 31,		
	2023	2022	2021
Thrombectomy	$ 677,343	$ 511,137	$ 437,775
Embolization and Access	381,179	335,996	309,815
Total	$ 1,058,522	$ 847,133	$ 747,590

China Distribution and Technology Licensing Agreement

In December 2020, the Company entered into a distribution and technology licensing arrangement with its existing distribution partner in China. In addition to modifying the Company's standard distribution agreement with its partner in China, the Company agreed to license the technology for certain products to its partner in China to permit the manufacturing and commercialization of such products in China as well as provide certain regulatory support. During the three months ended March 31, 2022, the Company further amended the distribution agreement and entered into an additional license arrangement, pursuant to which the Company agreed to license the technology for additional products to its partner in China on substantially the same terms as the existing license arrangement. Apart from the standard distribution agreement, the Company will receive fixed payments upon transferring its distinct licensed technology and providing related regulatory support and receive royalty payments on the downstream sales of the licensed products. During the three months ended September 30, 2023, the Company entered into an additional licensing arrangement, pursuant to which the Company agreed to license the technology for additional products to its partner in China and will receive fixed payments upon transferring its distinct licensed technology and providing related regulatory support and royalty payments on the down-stream sale of the licensed products.

During the years ended December 31, 2023 and 2022 the Company recognized $ 55.3 million and $ 48.6 million, respectively, in revenue under these arrangements based on the relative standalone fair value of the performance obligations satisfied.

Performance Obligations

Delivery of products - The Company's contracts with customers, other than the China licensing arrangements described above, typically contain a single performance obligation, delivery of the Company's products. Satisfaction of that performance obligation occurs when control of the promised goods transfers to the customer, which is generally upon shipment or receipt by customer for non-consignment sale agreements and upon utilization for consignment sale agreements.

Payment terms - Our payment terms vary by the type and location of our customer. The timing between fulfillment of performance obligations and when payment is due is not significant and does not give rise to financing transactions. The Company did not have any contracts with significant financing components as of December 31, 2023.

Product returns - The Company may allow customers to return products purchased at the Company's discretion. The Company estimates the amount of its product sales that may be returned by its customers and records this estimate as a reduction of revenue in the period in which the related product revenue is recognized. The Company currently estimates product return liabilities using its own historic sales information, trends, industry data, and other relevant data points.

Warranties - The Company offers its standard warranty to all customers and it is not available for sale on a standalone basis. The Company's standard warranty represents its guarantee that its products function as intended, are free from defects, and comply with agreed-upon specifications and quality standards. This assurance does not constitute a service and is not a separate performance obligation.

Transaction Price

Revenue is recorded at the net sales price, which includes estimates of variable consideration such as product returns utilizing historical return rates, rebates, discounts, and other adjustments to net revenue. To the extent the transaction price includes variable consideration, the Company estimates the amount of variable consideration that should be included in the transaction price. When determining if variable consideration should be constrained, management considers whether there are factors that could result in a significant reversal of revenue and the likelihood of a potential reversal. Variable consideration is included in revenue only to the extent that it is probable that a significant reversal of the revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved. These estimates are reassessed each reporting period as required. During the year ended December 31, 2023, the Company made no material changes in estimates for variable consideration. When the Company performs shipping and handling activities after control of goods is transferred to the customer, they are considered as fulfillment activities, and costs are accrued for when the related revenue is recognized. Taxes collected from customers relating to product sales and remitted to governmental authorities are excluded from revenues.

Contract assets and liabilities

The following information summarizes the Company's contract assets and liabilities (in thousands):

	December 31,	
	2023	2022
Contract assets	$ 18,000	$ —
Contract liabilities	$ 6,496	$ 8,783

Contract assets for the periods presented primarily represent the difference between the revenue that was recognized based on the relative standalone selling price of the related performance obligations satisfied and the contractual billing terms in the licensing arrangements.

Contract liabilities represents amounts that the Company has already invoiced and are ultimately expected to be recognized as revenue, but for which not all revenue recognition criteria have been met and is recognized as the associated performance obligations are satisfied. Revenue recognized during the year ended December 31, 2023 relating to contract liabilities as of December 31, 2022 was $ 2.3 million.

19. Selected Quarterly Financial Data (Unaudited)

The following tables provide the selected quarterly financial data for 2023 and 2022 (in thousands, except share and per share amounts):

	2023 Quarters Ended			
Selected Statement of Operations Data:	**March 31**	**June 30**	**September 30**	**December 31**
Revenue	$ 241,398	$ 261,499	$ 270,946	$ 284,679
Cost of revenue	90,326	94,638	93,228	97,687
Gross profit	151,072	166,861	177,718	186,992
Acquired in-process research and development	—	—	18,215	—
Total operating expenses	143,064	148,972	165,093	151,963
Income before provision for (benefit from) income taxes	8,652	19,536	13,304	38,158
Provision for (benefit from) income taxes	90	576	4,090	(16,060)
Consolidated net income	8,562	18,960	9,214	54,218
Net income attributable to Penumbra, Inc.	$ 8,562	$ 18,960	$ 9,214	$ 54,218
Net income attributable to Penumbra, Inc. per share				
Basic	$ 0.22	$ 0.49	$ 0.24	$ 1.40
Diluted	$ 0.22	$ 0.48	$ 0.23	$ 1.38
Weighted average shares used to compute net income (loss) per share:				
Basic	38,186,342	38,320,999	38,462,463	38,628,565
Diluted	39,075,388	39,201,155	39,219,966	39,291,044

	2022 Quarters Ended			
Selected Statement of Operations Data:	**March 31**	**June 30**	**September 30**	**December 31**
Revenue	$ 203,895	$ 208,344	$ 213,678	$ 221,216
Cost of revenue	76,477	74,309	78,351	82,789
Gross profit	127,418	134,035	135,327	138,427
Total operating expenses	131,464	134,174	129,893	133,594
Income before provision for (benefit from) income taxes	(5,104)	(1,167)	3,035	7,128
(Benefit from) provision for income taxes	(5,183)	2,520	5,306	3,251
Consolidated net income (loss)	79	(3,687)	(2,271)	3,877
Net income (loss) attributable to Penumbra, Inc.	$ 79	$ (3,687)	$ (2,271)	$ 3,877
Net income per share:				
Basic	$ 0.00	$ (0.10)	$ (0.06)	$ 0.10
Diluted	$ 0.00	$ (0.10)	$ (0.06)	$ 0.10
Weighted average shares used to compute net income (loss) per share:				
Basic	37,646,122	37,767,519	37,918,452	38,030,344
Diluted	38,708,657	37,767,519	37,918,452	38,896,940

20. Subsequent Events

On February 6, 2024, the Company completed a strategic investment in a privately held company. Under the terms of the investment, the Company paid $ 10.0 million in exchange for shares of Series B preferred stock which represented less than a 1 % investment in outstanding equity securities of the privately held company. The Company is completing its accounting analysis for this investment but anticipates it will be accounted for as an equity security without a readily determinable fair value using the alternative method on the consolidated balance sheets. The measurement alternative method allows the Company to elect to measure the equity investment at cost minus impairment, if any, plus or minus changes resulting from observable price changes in orderly transactions for the identical or a similar investment of the same issuer.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE.

None.

ITEM 9A. CONTROLS AND PROCEDURES.

Evaluation of Disclosure Controls and Procedures

We maintain disclosure controls and procedures that are designed to ensure that the information required to be disclosed in our reports 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 management, including our principal executive officer and principal financial officer, as appropriate to allow timely decisions regarding required disclosure. In designing and evaluating the disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives, and management is required to apply its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

As required by Rule 13a-15(b) under the Exchange Act, our management, including our principal executive officer and principal financial officer, evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of December 31, 2023. Based on this review, our principal executive officer and principal financial officer have concluded that the Company's disclosure controls and procedures were effective at the reasonable assurance level as of December 31, 2023.

Management's Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is a process designed by, or under the supervision of, our principal executive officer and principal financial officer to provide reasonable assurance regarding the reliability of financial reporting and the preparation of consolidated financial statements for external purposes in accordance with generally accepted accounting principles and includes those policies and procedures that (1) pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of our assets; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that our receipts and expenditures are being made only in accordance with authorizations of our management and directors; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on our consolidated financial statements.

Our management, including our principal executive officer and principal financial officer, conducted an evaluation of the effectiveness of our internal control over financial reporting based on criteria established in "Internal Control-Integrated Framework (2013)" issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). Our management concluded that our internal control over financial reporting was effective as of December 31, 2023.

The effectiveness of our internal control over financial reporting as of December 31, 2023 has been audited by Deloitte & Touche LLP, an independent registered public accounting firm, as stated in their report which is included in Part II, Item 9A of this Form 10-K.

Changes in Internal Control Over Financial Reporting

There was no change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) that occurred during the quarterly period ended December 31, 2023 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the stockholders and the Board of Directors of Penumbra, Inc.

Opinion on Internal Control over Financial Reporting

We have audited the internal control over financial reporting of Penumbra, Inc. and subsidiaries (the "Company") as of December 31, 2023, based on criteria established in *Internal Control — Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2023, based on criteria established in *Internal Control — Integrated Framework (2013)* issued by COSO.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets and related consolidated statements of operations, comprehensive (loss) income, stockholders' equity, and cash flows as of and for the year ended December 31, 2023, of the Company and our report dated February 22, 2024, expressed an unqualified opinion on those financial statements.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed 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. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Deloitte & Touche LLP

San Francisco, CA
February 22, 2024

ITEM 9B. OTHER INFORMATION.

Rule 10b5-1 Trading Plans

During the quarterly period ended December 31, 2023, certain of our directors and officers adopted or terminated trading plans, each of which was or is, as applicable, intended to satisfy the affirmative defense conditions of Rule 10b5-1(c) under the Exchange Act (the "Rule 10b5-1 Trading Arrangements"). Each Rule 10b5-1 Trading Arrangement was entered into or terminated, as applicable, during an open trading window under our Securities Trading Policy. The following table presents the material terms of each Rule 10b5-1 Trading Arrangement adopted or terminated by our officers and directors during the three months ended December 31, 2023, other than terms with respect to the price at which the individual executing the Rule 10b5-1 Trading Arrangement is authorized to trade:

Name and Title of Officer or Director	Plan Action	Plan Action Date	Plan Duration	Total Securities to be Sold
Don Kassing , Director	Adoption	11/8/2023	3/1/2024 - 1/7/2025	1,458
Arani Bose , Director	Adoption	11/22/2023	2/28/2024 - 8/30/2024	30,000
Johanna Roberts , Executive Vice President, General Counsel and Secretary	Adoption	11/29/2023	3/1/2024 - 12/31/2024	9,000
Adam Elsesser , Chairman, Chief Executive Officer and President	Adoption	11/29/2023	5/20/2024 - 12/31/2024	120,000
Lambert Shiu , Chief Accounting Officer	Termination [1]	11/7/2023	11/30/2023 - 5/10/2024	9,204
Thomas Wilder , Director	Termination [2]	11/8/2023	11/13/2023 - 8/30/2024	840

[1] As of the termination date of his Rule 10b5-1 Trading Arrangement, Mr. Shiu had not sold any shares of common stock under the terms thereof.

[2] As of the termination date of his Rule 10b5-1 Trading Arrangement, Mr. Wilder had not sold any shares of common stock under the terms thereof.

ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS.

Not applicable.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE.

The information required by this item is incorporated by reference to the information set forth in our Definitive Proxy Statement to be filed with the SEC in connection with our Annual Meeting of Stockholders to be held in June 2024 (the “Proxy Statement”).

ITEM 11. EXECUTIVE COMPENSATION.

The information required by this item is incorporated by reference to the information in the Proxy Statement.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS.

The information required by this item is incorporated by reference to the information in the Proxy Statement.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE.

The information required by this item is incorporated by reference to the information in the Proxy Statement.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES.

The information required by this item is incorporated by reference to the information in the Proxy Statement.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES.

1. Financial Statements: The financial statements included in “Index to Consolidated Financial Statements” in Part II, Item 8 are filed as part of this Form 10-K.
2. Exhibits: The exhibits listed in the accompanying index to exhibits are filed or incorporated by reference as part of this Form 10-K.

ITEM 16. FORM 10-K SUMMARY.

None.

EXHIBIT INDEX

Exhibit Number	Description	Incorporation by Reference			
		Form	File No.	Exhibit(s)	Filing Date
3.1	Restated Certificate of Incorporation of Penumbra, Inc.	8-K	001-37557	3.3	September 29, 2015
3.2	Second Amended and Restated Bylaws of Penumbra, Inc.	8-K	001-37557	3.1	August 5, 2022
4.1	Specimen Common Stock Certificate	S-1/A	333-206412	4.1	September 8, 2015
4.2	Description of Securities Registered Pursuant to Section 12 of the Securities Exchange Act of 1934	10-K	001-37557	4.2	February 23, 2023
10.1Ψ	Lease for facilities at 1321 and 1351 Harbor Bay Parkway, Alameda, California, dated January 1, 2022	10-K	001-37557	10.1	February 23, 2023
10.2	Lease for facilities at 1301, 1311, 1401 and 1431 Harbor Bay Parkway, Alameda, California, dated December 17, 2015	10-K	001-37557	10.4	March 8, 2016
10.3	First Amendment to Lease Agreement for facilities at 1301, 1311, 1401 and 1431 Harbor Bay Parkway, Alameda, California, dated July 14, 2021	10-K	001-37557	10.7	February 22, 2022
10.4	Second Amendment to Lease Agreement for facilities at 1301, 1311, 1401 and 1431 Harbor Bay Parkway, Alameda, California, dated September 1, 2021	10-K	001-37557	10.8	February 22, 2022
10.5Ψ	Third Amendment to Lease Agreement for facilities at 1301, 1311, 1401 and 1431 Harbor Bay Parkway, Alameda, California, dated October 1, 2023				
10.6†	Amended and Restated 2014 Equity Incentive Plan, and forms of Restricted Stock Agreement, Stock Option Agreement and Early Exercise Stock Option Agreement	S-1	333-206412	10.19	August 14, 2015
10.7†	Amended and Restated 2014 Equity Incentive Plan - Restricted Stock Agreement	10-Q	001-37557	10.1	November 12, 2015
10.8†	Amended and Restated 2014 Equity Incentive Plan - Stock Option Agreement	10-Q	001-37557	10.2	November 12, 2015
10.9†	Amended and Restated 2014 Equity Incentive Plan - Restricted Stock Unit Agreement	10-K	001-37557	10.9	March 8, 2016
10.10†	2014 Equity Incentive Plan, and forms of Restricted Stock Agreement, Stock Option Agreement and Early Exercise Stock Option Agreement	S-1	333-206412	10.5	August 14, 2015
10.11†	2005 Stock Plan, and forms of Notice of Grant and Early Exercise Stock Option Agreement	S-1	333-206412	10.7	August 14, 2015
10.12†	Amended and Restated 2014 Equity Incentive Plan - Form of Restricted Stock Unit Agreement	10-K	001-37557	10.13	February 26, 2019
10.13†	Amended and Restated 2014 Equity Incentive Plan - Form of Performance-Based Restricted Stock Unit Agreement	10-K	001-37557	10.14	February 26, 2019
10.14†	Amended and Restated 2014 Equity Incentive Plan – Form of Stock Option Agreement	10-K	001-37557	10.19	February 22, 2022
10.15†	Form of Indemnification Agreement by and between Penumbra, Inc. and each of its directors and executive officers	S-1	333-206412	10.9	August 14, 2015
10.16†	Offer Letter with Adam Elsesser	S-1	333-206412	10.10	August 14, 2015
10.17†	Offer Letter with Johanna Roberts	10-K	001-37557	10.19	February 26, 2020
10.18†	Offer Letter with Maggie Yuen	10-K	001-37557	10.22	February 26, 2020
10.19†Ψ	Equity Award Agreement Amendment by and between Penumbra, Inc. and Johanna Roberts, dated January 4, 2023				

10.20†Ψ	Equity Award Agreement Amendment by and between Penumbra, Inc. and Maggie Yuen, dated January 4, 2023				
10.21†Ψ	Equity Award Agreement Amendment by and between Penumbra, Inc. and Lambert Shiu, dated January 4, 2023				
10.22†	Form of Employee Nondisclosure and Assignment Agreement	S-1	333-206412	10.17	August 14, 2015
10.23†	Employee Stock Purchase Plan	S-1/A	333-206412	10.18	August 31, 2015
10.24	Amended and Restated Lease for facilities at 630 Roseville Parkway, Roseville, California, dated January 29, 2019 and amended on July 31, 2019	10-K	001-37557	10.25	February 26, 2020
10.25	Lease for facilities at 1310 Harbor Bay Parkway, Alameda, California, dated September 3, 2019	10-Q	001-37557	10.1	November 7, 2019
10.26Ψ	First Amendment to Lease for facilities at 1310 Harbor Bay Parkway, Alameda, California, dated April 10, 2020	10-K	001-37557	10.30	February 22, 2022
10.27	Second Amendment to Lease for facilities at 1310 Harbor Bay Parkway, Alameda, California, dated August 5, 2020	10-K	001-37557	10.31	February 22, 2022
10.28	Third Amendment to Lease for facilities at 1310 Harbor Bay Parkway, Alameda, California, dated July 29, 2021	10-K	001-37557	10.32	February 22, 2022
10.29	Fourth Amendment to Lease for facilities at 1310 Harbor Bay Parkway, Alameda, California, dated October 15, 2021	10-K	001-37557	10.33	February 22, 2022
10.30	Fifth Amendment to Lease for facilities at 1310 Harbor Bay Parkway, Alameda, California, dated April 1, 2022	10-K	001-37557	10.27	February 23, 2022
10.31Ψ	Lease for facilities at 1070 South 3800 West, Salt Lake City, Utah, dated April 26, 2019 and amended on April 4, 2022	10-K	001-37557	10.28	February 23, 2022
21.1	Subsidiaries of the Registrant				
23.1	Consent of Deloitte & Touche LLP				
24.1	Power of Attorney (included on signature page)				
31.1	Certification of Principal Executive Officer required under Rule 13a-14(a) and 15d-14(a) of the Securities Exchange Act of 1934, as amended				
31.2	Certification of Principal Financial Officer required under Rule 13a-14(a) and 15d-14(a) of the Securities Exchange Act of 1934, as amended				
32.1*	Certification of Principal Executive Officer and Principal Financial Officer required under Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended, and 18 U.S.C. §1350				
97.1	Compensation Recoupment Policy				

101	The following materials from the Company's Annual Report on Form 10-K for the year ended December 31, 2023 formatted in Inline Extensible Business Reporting Language (iXBRL): (i) Consolidated Balance Sheets as of December 31, 2023 and December 31, 2022, (ii) Consolidated Statements of Operations for the years ended December 31, 2023, 2022 and 2021, (ii) Consolidated Statements of Comprehensive Income (loss) for the years ended December 31, 2023, 2022 and 2021, (iii) Consolidated Statements of Stockholders' Equity for the years ended December 31, 2023, 2022, and 2021, (iv) Consolidated Statements of Cash Flows for the years ended December 31, 2023, 2022, and 2021, and (v) Notes to Consolidated Financial Statements.
104	Cover Page Interactive Data File (formatted as iXBRL with applicable taxonomy extension information contained in Exhibit 101)

* Furnished herewith.

Ψ Certain schedules and exhibits to this exhibit have been omitted pursuant to Item 601(a)(5) of Regulation S-K promulgated under the Securities Act. The registrant agrees to furnish a copy of any omitted schedule or exhibit to the SEC upon request.

† Indicates a management contract or compensatory plan or arrangement.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

PENUMBRA, INC.

Date: February 22, 2024

By: /s/ Maggie Yuen
Maggie Yuen
Chief Financial Officer
(Principal Financial Officer)

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Adam Elsesser and Maggie Yuen, and each of them, his or her attorney-in-fact, each with the power of substitution, for him or her in any and all capacities, to sign any amendments to this Annual Report on Form 10-K, and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each of said attorneys-in-fact, or his or her substitutes, may do or cause to be done by virtue of hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/s/ Adam Elsesser Adam Elsesser	Chairman, Chief Executive Officer and President (Principal Executive Officer)	February 22, 2024
/s/ Maggie Yuen Maggie Yuen	Chief Financial Officer (Principal Financial Officer)	February 22, 2024
/s/ Lambert Shiu Lambert Shiu	Chief Accounting Officer (Principal Accounting Officer)	February 22, 2024
/s/ Arani Bose Arani Bose	Director	February 22, 2024
/s/ Don Kassing Don Kassing	Director	February 22, 2024
/s/ Harpreet Grewal Harpreet Grewal	Director	February 22, 2024
/s/ Thomas C. Wilder Thomas C. Wilder	Director	February 22, 2024
/s/ Bridget O'Rourke Bridget O'Rourke	Director	February 22, 2024
/s/ Janet Leeds Janet Leeds	Director	February 22, 2024
/s/ Surbhi Sarna Surbhi Sarna	Director	February 22, 2024

Exhibit 10.5

THIRD AMENDMENT TO LEASE AGREEMENT

This Third Amendment to Lease Agreement (this "**Third Amendment**") is made and intended to be effective as of October 1, 2023 (the "**Third Amendment Effective Date**"), between **HARBOR BAY NLA LLC**, a Delaware limited liability company (together with any of its successors or assigns, hereinafter called the "**Landlord**"), and **PENUMBRA, INC.**, a Delaware corporation (together with any of its respective successors or assigns permitted by the Existing Lease (as defined below), hereinafter called the "**Tenant**").

RECITALS

A. Landlord (as successor-in-interest to SKS Harbor Bay Associates, LLC) and Tenant are parties to that certain Lease Agreement dated as of December 17, 2015 (the "O**riginal Lease**"), as amended by that certain First Amendment to Lease Agreement dated as of July 14, 2021 (the "**First Amendment**"), and that certain Second Amendment to Lease Agreement dated as of September 1, 2021 (the "**Second Amendment**," together with the First Amendment and the Original Lease, as so amended, collectively, the "**Existing Lease**"). The Existing Lease, as amended by this Third Amendment, is referred to herein as the "**Lease**".

B. On the Third Amendment Effective Date, Landlord tendered possession of the Must-Take Space comprised of Suite 200 located at the 1301 Harbor Bay Building, containing 31,933 square feet of rentable area (the "**Third Amendment Must-Take Space**"), to Tenant. Landlord and Tenant desire to amend the Existing Lease to reflect the addition of the Third Amendment Must-Take Space to the Premises, all pursuant to the terms and conditions more fully set forth herein. This Third Amendment is being executed and delivered by Landlord and Tenant in accordance with clause (e) of Section 1.4 of the Original Lease.

NOW, THEREFORE, in consideration of the recitals set forth above, the covenants and agreements contained herein, and other good and valuable consideration, the receipt, adequacy and total sufficiency of which are hereby acknowledged, Landlord and Tenant hereby agree as follows:

1. Recitals/Terms. All recitals to this Third Amendment set forth above are hereby incorporated herein. All capitalized terms used but not otherwise defined herein shall have the meanings set forth for such terms in the Existing Lease.

2. Addition of Third Amendment Must Take Space. Effective as of the Third Amendment Effective Date, the Premises will be deemed to be increased by the addition of the Third Amendment Must-Take Space, and the rentable area of the Premises will be deemed increased from 185,360 rentable square feet to 217,293 rentable square feet. From and after the Third Amendment Effective Date, all references in the Existing Lease to the "Premises" shall be deemed to refer collectively to the Premises (as defined in the Existing Lease) and the Third Amendment Must Take Space. The Third Amendment Effective Date shall be deemed to be the "Must-Take Space Commencement Date" with respect to the Third Amendment Must-Take Space.

3. Base Rent for Third Amendment Must Take Space. Effective as of the Third Amendment Effective Date Tenant shall pay Base Rent to Landlord in the amount set forth in the column entitled

“New Total Rent with Must Take Space” set forth in Exhibit K of the Second Amendment, which, for the sake of convenience, is reattached hereto for reference (but, for the avoidance of doubt, the Exhibit K attached hereto is not intended to modify, amend, restate or supersede in any respect the Base Rent payable with respect to the Premises (including the Third Amendment Must Take Space)). Pursuant to Section 2(c) of the Second Amendment, Tenant shall be entitled to one hundred fifty (150) days of Base Rent abatement, subject to the terms and conditions of the Lease.

4 . Tenant’s Building Percentage and Tenant’s Common Area Building Percentage . Effective as of the Third Amendment Effective Date:

(a) Tenant’s Building Percentage with respect to the 1301 Harbor Bay Building is 100% (i.e., 68,886/68,886); and

(b) Tenant’s Common Area Building Percentage is 100% (i.e., 217,293/217,293).

5. Maximum Parking Allocation. Effective as of the Third Amendment Effective Date, Tenant’s Maximum Parking Allocation is 717 spaces.

6 . Tenant Improvement Allowance . Tenant is entitled to a Tenant Improvement Allowance in the amount of $105.07 per rentable square foot of the Third Amendment Must-Take Space (i.e., $3,355,200.31) pursuant to Section 2(d) of the Second Amendment. In connection therewith, the Tenant Improvements to be constructed by Tenant in the Third Amendment Must-Take Space shall be performed and undertaken in accordance with, and shall in all respects (inclusive of the process for disbursement of any Tenant Improvement Allowance described above, as set forth in Section 2.2.2 of Exhibit C attached to the Original Lease) be subject to the terms and conditions of, Exhibit C attached to the Original Lease (except to the extent such terms expressly and specifically conflict with this Section 2(c) of the Second Amendment, in which case the terms of said Section 2(c) shall control), provided that Tenant will not be required to use union-affiliated labor or any Landlord-specified contractor or vendor in the performance of any such Tenant Improvements. Notwithstanding the terms of the Lease, Landlord agrees that the Outside Allowance Date for the Tenant Improvement Allowance attributable to the Third Amendment Must-Take Space will be the date that is two (2) years after the Third Amendment Effective Date (i.e., October 1, 2025).

7 . Confirmation. Except as expressly modified by the terms and provisions of this Third Amendment, all of the terms and provisions of the Existing Lease are unchanged and continue in full force and effect and all rights, remedies, liabilities and obligations evidenced by the Existing Lease are hereby acknowledged by Tenant to be valid and subsisting and to be continued in full force and effect. The Existing Lease, as modified and amended hereby, is hereby ratified and confirmed by Landlord and Tenant, and every provision, covenant, condition, obligation, right, term and power contained in and under the Existing Lease, as modified and amended hereby, shall continue in full force and effect. All references to the Lease in the Existing Lease shall mean the Existing Lease as modified and amended by this Third Amendment. Tenant represents and warrants to Landlord that, as of the Third Amendment Effective Date: (i) Tenant is not in default under the Existing Lease and, to Tenant’s knowledge, no event or condition exists which, with the giving of notice or the passage of time or both, would give rise to a default by Tenant under the Existing Lease, (ii) Tenant has no knowledge of a right or claim of set off, discount, deduction, defense or counterclaim or any claim that could be asserted in any action brought to enforce the Existing Lease or otherwise asserted against Landlord in connection with the Existing Lease, and (iii) there is no default by Landlord under the Existing Lease; the foregoing representations in clauses (ii) and (iii) notwithstanding, Landlord acknowledges that Tenant has not yet exercised the audit

right set forth in Section 5.4 of the Existing Lease and reserves the right to make claims based on such exercise if Tenant does exercise such audit rights.

8. Costs and Expenses. Landlord shall be responsible for and shall pay all costs and expenses incurred by Landlord in connection with the preparation, negotiation, execution and delivery of this Third Amendment and any necessary amendment to the Memorandum of Lease, including the legal fees and expenses of Landlord. Tenant shall be responsible and shall pay for all costs and expenses incurred by Tenant in connection with the preparation, negotiation, execution and delivery of this Third Amendment and any necessary amendment to the Memorandum of Lease, including the legal fees and expenses of Tenant.

9. Brokers. Tenant represents and warrants to Landlord that it has been represented on an exclusive basis by Tenant's Broker in negotiation of this Third Amendment. Landlord acknowledges that a brokerage fee is due the Tenant's Broker from Landlord for this Third Amendment pursuant to the Tenant's Broker Commission Agreement attached to the Existing Lease as Exhibit Q. The Broker Commission Agreement attached to the Existing Lease as Exhibit Q remains in full force and effect. Except for amounts owing to Tenant's Broker as described therein, each party hereby agrees to indemnify and hold the other party harmless of and from any and all damages, losses, costs, or expenses (including, without limitation, all attorneys' fees and disbursements) by reason of any claim of or liability to any other broker or other person claiming through the indemnifying party and arising out of or in connection with the negotiation, execution, and delivery of this Third Amendment.

10. Representations and Warranties. Tenant hereby reaffirms in their entirety all of the representations and warranties set forth in the Existing Lease and this Third Amendment, as of the Third Amendment Effective Date, except for any such representations or warranties that were made as of a specific date.

11. No Other Modifications. Landlord and Tenant hereby acknowledge and agree that the Existing Lease has not been modified, amended, canceled, terminated, released, superseded or otherwise rendered of no force or effect except as described herein.

12. Parties Bound. This Third Amendment shall be binding upon the parties hereto and their respective permitted successors and assigns.

13. Counterparts. This Third Amendment may be executed in counterparts, each of which shall be an original but all of which together shall constitute one agreement, binding on all of the parties hereto notwithstanding that all of the parties hereto are not signatories to the same counterpart. For purposes of this Third Amendment, each of the parties hereto agrees that a facsimile copy of the signature of the person executing this Third Amendment on either party's behalf shall be effective as an original signature and legally binding and effective as an execution counterpart hereof. Each of the undersigned parties authorizes the assembly of one or more original copies of this Third Amendment through the combination of the several executed counterpart signature pages with one or more bodies of this Third Amendment including the Exhibits, if any, to this Third Amendment, such that this Third Amendment shall consist of the body of this Third Amendment, counterpart signature pages which collectively will contain the signatures of the undersigned parties hereto, and the Exhibits, if any, to this Third Amendment. Each such compilation of this Third Amendment shall constitute one original of this Third Amendment.

14. Signor's Warranty. Each individual executing and delivering this Third Amendment on behalf of the party hereby warrants and represents to the other party solely in his or her capacity as an

officer of the applicable signatory that he or she has been duly authorized and has the power to make such execution and delivery.

15. Captions. Article, Section and/or paragraph headings used herein are for convenience of reference only and shall not affect the construction of any provision hereof.

(This space is intentionally left blank; signature page follows)

IN WITNESS WHEREOF the parties have executed this Third Amendment as of the Third Amendment Effective Date.

LANDLORD:

HARBOR BAY NLA LLC,
a Delaware limited liability company

By: /s/ Barclay Jones
Name: Barclay Jones
Title: Authorized Person

TENANT:

PENUMBRA, INC.,
a Delaware corporation

By: /s/ Adam Elsesser
Name Adam Elsesser
Title: CEO and President

Exhibit 10.19

EQUITY AWARD AGREEMENT AMENDMENT

This Equity Award Agreement Amendment (this "Amendment") is dated as of January 4, 2023, by and between Penumbra, Inc., a Delaware corporation (the "Company"), and Johanna Roberts ("Participant").

RECITALS

WHEREAS, the Company and Participant are parties to those certain equity award agreements, dated as of May 15, 2019, April 15, 2021 and November 15, 2021 and attached hereto as Exhibit A (each, an "Award Agreement" and, collectively, the "Award Agreements"), pursuant to which the Company granted Participant certain equity awards under the Company's Amended and Restated 2014 Equity Incentive Plan (the "Plan"). Capitalized terms used but not defined herein shall have the respective meanings given to such terms in the applicable Award Agreement or the Plan, as applicable; and

WHEREAS, the Company and Participant desire to amend the Award Agreements as set forth herein.

AMENDMENT

NOW, THEREFORE, in consideration of the mutual covenants and agreements set forth herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Company and Participant agree as follows:

1. Award Vesting upon a Change in Control. The following language in the Award Agreements, in the section entitled "Notice of Restricted Stock Unit Grant," shall be deleted in its entirety:

In the event Participant ceases to be a Service Provider for any or no reason before Participant vests in the Restricted Stock Units, the Restricted Stock Units and Participant's right to acquire any Shares hereunder will immediately terminate.

The deleted language shall be replaced with the following language:

In the event of a Change in Control, and subject to Participant continuing to be a Service Provider through the date of such Change in Control, the Participant will fully vest in all of the RSUs granted under this Agreement.

2. No Other Changes. Except as expressly modified hereby, all provisions of the Award Agreements shall remain in full force and effect.

3. Counterparts. This Amendment may be executed in counterparts (and by different parties hereto in different counterparts), each of which shall constitute an original, but all of which when taken together shall constitute a single contract.

4. Governing Law. This Amendment is governed by the internal substantive laws, but not the choice of law rules, of California. For purposes of litigating any dispute that arises under this Amendment, the parties hereby submit to and consent to the jurisdiction of the State of California, and agree that such litigation will be conducted in the courts of Santa Clara County,

California, or the United States federal courts for the Northern District of California, and no other courts, where this Amendment is made and/or to be performed.

5. Entire Agreement. The Plan, the Award Agreements (including the appendices and exhibits referenced therein) and this Amendment constitute the entire agreement of the parties with respect to the subject matter hereof and supersede in their entirety all prior undertakings and agreements of the Company and Participant with respect to the subject matter hereof, and may not be modified adversely to Participant's interest except by means of a writing signed by the Company and Participant.

[*Signature page follows*]

IN WITNESS WHEREOF, Participant and the Company have executed this Amendment as of the date first set forth above.

PARTICIPANT PENUMBRA, INC.

/s/ Johanna Roberts /s/ Maggie Yuen
Signature Signature

Johanna Roberts Maggie Yuen
Print Name Print Name

Chief Financial Officer
Title

Exhibit 10.20

EQUITY AWARD AGREEMENT AMENDMENT

This Equity Award Agreement Amendment (this "Amendment") is dated as of January 4, 2023, by and between Penumbra, Inc., a Delaware corporation (the "Company"), and Maggie Yuen ("Participant").

RECITALS

WHEREAS, the Company and Participant are parties to those certain equity award agreements, dated as of December 16, 2019 and November 15, 2021 and attached hereto as Exhibit A (each, an "Award Agreement" and, collectively, the "Award Agreements"), pursuant to which the Company granted Participant certain equity awards under the Company's Amended and Restated 2014 Equity Incentive Plan (the "Plan"). Capitalized terms used but not defined herein shall have the respective meanings given to such terms in the applicable Award Agreement or the Plan, as applicable; and

WHEREAS, the Company and Participant desire to amend the Award Agreements as set forth herein.

AMENDMENT

NOW, THEREFORE, in consideration of the mutual covenants and agreements set forth herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Company and Participant agree as follows:

1. Award Vesting upon a Change in Control

   a. In the Award Agreements that represent awards of restricted stock units under the Plan, in the section entitled "Notice of Restricted Stock Unit Grant," the following language shall be deleted in its entirety:

In the event Participant ceases to be a Service Provider for any or no reason before Participant vests in the Restricted Stock Units, the Restricted Stock Units and Participant's right to acquire any Shares hereunder will immediately terminate.

The deleted language shall be replaced with the following language:

In the event of a Change in Control, and subject to Participant continuing to be a Service Provider through the date of such Change in Control, the Participant will fully vest in all of the RSUs granted under this Agreement.

   b. In the Award Agreements that represent awards of stock options under the Plan, in the section entitled "Notice of Stock Option Grant," the following language shall be deleted in its entirety:

In the event Participant ceases to be a Service Provider for any or no reason before Participant vests in the Options, the Options and Participant's right to acquire any Shares or cash hereunder will immediately terminate.

The deleted language shall be replaced with the following language:

Notwithstanding the foregoing, in the event of a Change in Control, and subject to Participant continuing to be a Service Provider through the date of such Change in Control, Participant will fully vest in and have the right to exercise all of the Shares subject to this Option. The Administrator will notify Participant in writing or electronically that this Option will be exercisable for a period of time determined by the Administrator in its sole discretion, and, to the extent the Administrator determines, terminate upon or immediately prior to the effectiveness of the Change in Control.

2. No Other Changes. Except as expressly modified hereby, all provisions of the Award Agreements shall remain in full force and effect.

3. Counterparts. This Amendment may be executed in counterparts (and by different parties hereto in different counterparts), each of which shall constitute an original, but all of which when taken together shall constitute a single contract.

4. Governing Law. This Amendment is governed by the internal substantive laws, but not the choice of law rules, of California. For purposes of litigating any dispute that arises under this Amendment, the parties hereby submit to and consent to the jurisdiction of the State of California, and agree that such litigation will be conducted in the courts of Santa Clara County, California, or the United States federal courts for the Northern District of California, and no other courts, where this Amendment is made and/or to be performed.

5. Entire Agreement. The Plan, the Award Agreements (including the appendices and exhibits referenced therein) and this Amendment constitute the entire agreement of the parties with respect to the subject matter hereof and supersede in their entirety all prior undertakings and agreements of the Company and Participant with respect to the subject matter hereof, and may not be modified adversely to Participant's interest except by means of a writing signed by the Company and Participant.

[*Signature page follows*]

IN WITNESS WHEREOF, Participant and the Company have executed this Amendment as of the date first set forth above.

PARTICIPANT PENUMBRA, INC.

/s/ Maggie Yuen /s/ Adam Elsesser
Signature Signature

Maggie Yuen Adam Elsesser
Print Name Print Name

Chief Executive Officer
Title

Exhibit 10.21

EQUITY AWARD AGREEMENT AMENDMENT

This Equity Award Agreement Amendment (this "Amendment") is dated as of January 4, 2023, by and between Penumbra, Inc., a Delaware corporation (the "Company"), and Lambert Shiu ("Participant").

RECITALS

WHEREAS, the Company and Participant are parties to that certain equity award agreement, dated as of November 15, 2021 and attached hereto as Exhibit A (the "Award Agreement"), pursuant to which the Company granted Participant certain equity awards under the Company's Amended and Restated 2014 Equity Incentive Plan (the "Plan"). Capitalized terms used but not defined herein shall have the respective meanings given to such terms in the Award Agreement or the Plan, as applicable; and

WHEREAS, the Company and Participant desire to amend the Award Agreement as set forth herein.

AMENDMENT

NOW, THEREFORE, in consideration of the mutual covenants and agreements set forth herein, and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Company and Participant agree as follows:

1. Award Vesting upon a Change in Control. The following language in the Award Agreement, in the section entitled "Notice of Restricted Stock Unit Grant," shall be deleted in its entirety:

In the event Participant ceases to be a Service Provider for any or no reason before Participant vests in the Restricted Stock Units, the Restricted Stock Units and Participant's right to acquire any Shares hereunder will immediately terminate.

The deleted language shall be replaced with the following language:

In the event of a Change in Control, and subject to Participant continuing to be a Service Provider through the date of such Change in Control, the Participant will fully vest in all of the RSUs granted under this Agreement.

2. No Other Changes. Except as expressly modified hereby, all provisions of the Award Agreement shall remain in full force and effect.

3. Counterparts. This Amendment may be executed in counterparts (and by different parties hereto in different counterparts), each of which shall constitute an original, but all of which when taken together shall constitute a single contract.

4. Governing Law. This Amendment is governed by the internal substantive laws, but not the choice of law rules, of California. For purposes of litigating any dispute that arises under this Amendment, the parties hereby submit to and consent to the jurisdiction of the State of California, and agree that such litigation will be conducted in the courts of Santa Clara County, California, or the United States federal courts for the Northern District of California, and no other courts, where this Amendment is made and/or to be performed.

5. Entire Agreement. The Plan, the Award Agreement (including the appendices and exhibits referenced therein) and this Amendment constitute the entire agreement of the parties with respect to the subject matter hereof and supersede in their entirety all prior undertakings and agreements of the Company and Participant with respect to the subject matter hereof, and may not be modified adversely to Participant's interest except by means of a writing signed by the Company and Participant.

[*Signature page follows*]

IN WITNESS WHEREOF, Participant and the Company have executed this Amendment as of the date first set forth above.

PARTICIPANT PENUMBRA, INC.

/s/ Lambert Shiu /s/ Maggie Yuen
Signature Signature

Lambert Shiu Maggie Yuen
Print Name Print Name

Chief Financial Officer
Title

[Equity Award Agreement Amendment Signature Page]

Exhibit 21.1

SUBSIDIARIES OF PENUMBRA, INC.

Name of Subsidiary	Jurisdiction of Organization
Penumbra Europe GmbH	Germany
Penumbra Neuro Australia Pty Ltd	Australia
Penumbra Neuro Canada Inc.	Canada
Penumbra Latin America Distribuidora de Equipamentos e Produtos Médicos Ltda.	Brazil
Crossmed S.p.A.	Italy
Penumbra Interventional Therapies UK Ltd.	United Kingdom
Penumbra Singapore Pte. Ltd.	Singapore
Penumbra France SAS	France
Penumbra Japan GK	Japan
Penumbra Israel Ltd	Israel
Penumbra Sweden AB	Sweden
Penumbra Denmark ApS	Denmark
Xtract Medical, Inc.	Delaware

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in Registration Statements No. 333-269970 on Form S-3ASR and Nos. 333-207007, 333-213068, 333-216681 and 333-224000 on Form S-8 of our reports dated February 22, 2024, relating to the consolidated financial statements of Penumbra, Inc. and subsidiaries (the "Company") and the effectiveness of the Company's internal control over financial reporting, appearing in this Annual Report on Form 10-K of Penumbra, Inc. for the year ended December 31, 2023.

/s/ Deloitte & Touche LLP

San Francisco, California

February 22, 2024

Exhibit 31.1

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

I, Adam Elsesser, certify that:

1. I have reviewed this Annual Report on Form 10-K of Penumbra, 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: February 22, 2024

/s/ Adam Elsesser

Adam Elsesser

Chairman, Chief Executive Officer and President

Exhibit 32.1

PENUMBRA, INC.

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

In connection with the Annual Report of Penumbra, Inc. (the "Company") on Form 10-K for the fiscal year ended December 31, 2023, as filed with the Securities and Exchange Commission (the "Report"), Adam Elsesser, Chairman, Chief Executive Officer and President of the Company, and Maggie Yuen, Chief Financial Officer of the Company, respectively, do each hereby certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

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

/s/ Adam Elsesser

Adam Elsesser

Chairman, Chief Executive Officer and President

/s/ Maggie Yuen

Maggie Yuen

Chief Financial Officer

Date: February 22, 2024

Exhibit 31.2

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

I, Maggie Yuen, certify that:

1. I have reviewed this Annual Report on Form 10-K of Penumbra, 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: February 22, 2024

/s/ Maggie Yuen

Maggie Yuen

Chief Financial Officer

Exhibit 97.1

PENUMBRA, INC.

COMPENSATION RECOUPMENT POLICY
Adopted October 30, 2023

This Penumbra, Inc. Compensation Recoupment Policy (this "**Policy**") has been adopted by the Board of Directors (the "**Board**") of Penumbra, Inc. (the "**Company**") on October 30, 2023. This Policy provides for the recoupment of certain executive compensation in the event of an accounting restatement resulting from material noncompliance with financial reporting requirements under U.S. federal securities laws in accordance with the terms and conditions set forth herein. This Policy is intended to comply with the requirements of Section 10D of the Exchange Act (as defined below) and Section 303A.14 of the NYSE Listed Company Manual.

1. Definitions. For the purposes of this Policy, the following terms shall have the meanings set forth below. Capitalized terms used but not defined in this Policy shall have the meanings set forth in the Company's Amended and Restated 2014 Equity Incentive Plan (as may be amended from time to time, the "**2014 Plan**").

(a) "**Committee**" means the compensation committee of the Board or any successor committee thereof. If there is no compensation committee of the Board, references herein to the Committee shall refer to the Company's committee of independent directors that is responsible for executive compensation decisions, or in the absence of such a committee, the independent members of the Board.

(b) "**Covered Compensation**" means any Incentive-based Compensation "received" by a Covered Executive during the applicable Recoupment Period; *provided* that:

(i) such Covered Compensation was received by such Covered Executive (A) after the Effective Date, (B) after he or she commenced service as an Executive Officer and (C) while the Company had a class of securities publicly listed on a United States national securities exchange; and

(ii) such Covered Executive served as an Executive Officer at any time during the performance period applicable to such Incentive-based Compensation.

For purposes of this Policy, Incentive-based Compensation is "**received**" by a Covered Executive during the fiscal period in which the Financial Reporting Measure applicable to such Incentive-based Compensation (or portion thereof) is attained, even if the payment or grant of such Incentive-based Compensation is made thereafter.

(c) "**Covered Executive**" means any (i) current or former Executive Officer and (ii) any other employee of the Company and its subsidiaries designated by the Board as subject to this Policy from time to time.

(d) "**Effective Date**" means October 2, 2023.

(e) "**Exchange Act**" means the U.S. Securities Exchange Act of 1934, as amended.

(f) "**Executive Officer**" means, with respect to the Company, (i) its president, (ii) its principal financial officer, (iii) its principal accounting officer (or if there is no such accounting officer, its

controller), (iv) any vice-president in charge of a principal business unit, division or function (such as sales, administration or finance), (v) any other officer who performs a policy-making function for the Company (including any officer of the Company's parent(s) or subsidiaries if they perform policy-making functions for the Company) and (vi) any other person who performs similar policy-making functions for the Company. Policy-making function is not intended to include policy-making functions that are not significant. The determination as to an individual's status as an Executive Officer shall be made by the Board and such determination shall be final, conclusive and binding on such individual and all other interested persons.

(g) "**Financial Reporting Measure**" means any (i) measure that is determined and presented in accordance with the accounting principles used in preparing the Company's financial statements, (ii) stock price measure or (iii) total shareholder return measure (and any measures that are derived wholly or in part from any measure referenced in clause (i), (ii) or (iii) above). For the avoidance of doubt, any such measure does not need to be presented within the Company's financial statements or included in a filing with the U.S. Securities and Exchange Commission to constitute a Financial Reporting Measure.

(h) "**Financial Restatement**" means a restatement of the Company's financial statements due to the Company's material noncompliance with any financial reporting requirement under U.S. federal securities laws that is required in order to correct:

(i) an error in previously issued financial statements that is material to the previously issued financial statements; or

(ii) an error that would result in a material misstatement if (A) the error were corrected in the current period or (B) left uncorrected in the current period.

For purposes of this Policy, a Financial Restatement shall not be deemed to occur in the event of a revision of the Company's financial statements due to an out-of-period adjustment (i.e., when the error is immaterial to the previously issued financial statements and the correction of the error is also immaterial to the current period) or a retrospective (1) application of a change in accounting principles; (2) revision to reportable segment information due to a change in the structure of the Company's internal organization; (3) reclassification due to a discontinued operation; (4) application of a change in reporting entity, such as from a reorganization of entities under common control; or (5) revision for stock splits, reverse stock splits, stock dividends or other changes in capital structure.

(j) "**Incentive-based Compensation"** means any compensation (including, for the avoidance of doubt, any cash or equity or equity-based compensation, whether deferred or current) that is granted, earned and/or vested based wholly or in part upon the achievement of a Financial Reporting Measure. For purposes of this Policy, "Incentive-based Compensation" shall also be deemed to include any amounts which were determined based on (or were otherwise calculated by reference to) Incentive-based Compensation (including, without limitation, any amounts under any long-term disability, life insurance or supplemental retirement or severance plan or agreement or any notional account that is based on Incentive-based Compensation, as well as any earnings accrued thereon).

(k) "**NYSE**" means the New York Stock Exchange, or any successor thereof.

(l) "**Recoupment Period**" means the three fiscal years completed immediately preceding the date of any applicable Recoupment Trigger Date. Notwithstanding the foregoing, the Recoupment Period additionally includes any transition period (that results from a change in the Company's fiscal year) within or immediately following those three completed fiscal years, provided that a transition period

between the last day of the Company's previous fiscal year end and the first day of its new fiscal year that comprises a period of nine (9) to twelve (12) months would be deemed a completed fiscal year.

(m) "**Recoupment Trigger Date**" means the earlier of (i) the date that the Board (or a committee thereof or the officer(s) of the Company authorized to take such action if Board action is not required) concludes, or reasonably should have concluded, that the Company is required to prepare a Financial Restatement, and (ii) the date on which a court, regulator or other legally authorized body directs the Company to prepare a Financial Restatement.

2. Recoupment of Erroneously Awarded Compensation.

(a) In the event of a Financial Restatement, if the amount of any Covered Compensation received by a Covered Executive (the "**Awarded Compensation**") exceeds the amount of such Covered Compensation that would have otherwise been received by such Covered Executive if calculated based on the Financial Restatement (the "**Adjusted Compensation**"), the Company shall reasonably promptly recover from such Covered Executive an amount equal to the excess of the Awarded Compensation over the Adjusted Compensation, each calculated on a pre-tax basis (such excess amount, the "**Erroneously Awarded Compensation**").

(b) If (i) the Financial Reporting Measure applicable to the relevant Covered Compensation is stock price or total shareholder return (or any measure derived wholly or in part from either of such measures) and (ii) the amount of Erroneously Awarded Compensation is not subject to mathematical recalculation directly from the information in the Financial Restatement, then the amount of Erroneously Awarded Compensation shall be determined (on a pre-tax basis) based on the Company's reasonable estimate of the effect of the Financial Restatement on the Company's stock price or total shareholder return (or the derivative measure thereof) upon which such Covered Compensation was received.

(c) For the avoidance of doubt, the Company's obligation to recover Erroneously Awarded Compensation is not dependent on (i) if or when the restated financial statements are filed or (ii) any fault of any Covered Executive for the accounting errors or other actions leading to a Financial Restatement.

(d) Notwithstanding anything to the contrary in Sections 2(a) through (c) hereof, the Company shall not be required to recover any Erroneously Awarded Compensation if both (x) the conditions set forth in either of the following clauses (i) or (ii) are satisfied and (y) the Committee has determined that recovery of the Erroneously Awarded Compensation would be impracticable:

(i) the direct expense paid to a third party to assist in enforcing the recovery of the Erroneously Awarded Compensation under this Policy would exceed the amount of such Erroneously Awarded Compensation to be recovered; *provided* that, before concluding that it would be impracticable to recover any amount of Erroneously Awarded Compensation pursuant to this Section 2(d), the Company shall have first made a reasonable attempt to recover such Erroneously Awarded Compensation, document such reasonable attempt(s) to make such recovery and provide that documentation to the NYSE; or

(ii) recovery of the Erroneously Awarded Compensation would likely cause an otherwise tax-qualified retirement plan, under which benefits are broadly available to employees of the Company, to fail to meet the requirements of Sections 401(a)(13) or 411(a) of the U.S. Internal Revenue Code of 1986, as amended (the "**Code**").

(e) The Company shall not indemnify any Covered Executive, directly or indirectly, for any losses that such Covered Executive may incur in connection with the recovery of Erroneously Awarded

Compensation pursuant to this Policy, including through the payment of insurance premiums or gross-up payments.

(f) The Board shall determine, in its sole discretion, the manner and timing in which any Erroneously Awarded Compensation shall be recovered from a Covered Executive in accordance with applicable law, including, without limitation, by (i) requiring reimbursement of Covered Compensation previously paid in cash; (ii) seeking recovery of any gain realized on the vesting, exercise, settlement, sale, transfer or other disposition of any equity or equity-based awards; (iii) offsetting the Erroneously Awarded Compensation amount from any compensation otherwise owed by the Company or any of its affiliates to the Covered Executive; (iv) cancelling outstanding vested or unvested equity or equity-based awards; and/or (v) taking any other remedial and recovery action permitted by applicable law. For the avoidance of doubt, except as set forth in Section 2(d), in no event may the Company accept an amount that is less than the amount of Erroneously Awarded Compensation; *provided* that, to the extent necessary to avoid any adverse tax consequences to the Covered Executive pursuant to Section 409A of the Code, any offsets against amounts under any nonqualified deferred compensation plans (as defined under Section 409A of the Code) shall be made in compliance with Section 409A of the Code.

3. Administration. This Policy shall be administered by the Board and, with respect to any determination pursuant to Section 2(d) of this Policy, the Committee. All decisions of the Board and, with respect to any determination pursuant to Section 2(d) of this Policy, the Committee, shall be final, conclusive and binding upon the Company and the Covered Executives, their beneficiaries, executors, administrators and any other legal representative. The Board (and, with respect to any determination pursuant to Section 2(d) of this Policy, the Committee) shall have full power and authority to (i) administer and interpret this Policy, (ii) correct any defect, supply any omission and reconcile any inconsistency in this Policy and (iii) make any other determination and take any other action that the Board (and, with respect to any determination pursuant to Section 2(d) of this Policy, the Committee) deems necessary or desirable for the administration of this Policy and to comply with applicable law (including Section 10D of the Exchange Act) and applicable stock market or exchange rules and regulations. Notwithstanding anything to the contrary contained herein, to the extent permitted by Section 10D of the Exchange Act and Section 303A.14 of the NYSE Listed Company Manual, the Board may, in its sole discretion, at any time and from time to time, delegate to any committee of the Board the authority to administer this Policy in the same manner as the Board.

4. Amendment/Termination. Subject to Section 10D of the Exchange Act and Section 303A.14 of the NYSE Listed Company Manual, this Policy may be amended or terminated by the Board at any time. To the extent that any applicable law or stock market or exchange rules, listing standards or regulations require recovery of Erroneously Awarded Compensation in circumstances in addition to those specified herein, nothing in this Policy shall be deemed to limit or restrict the right or obligation of the Company to recover Erroneously Awarded Compensation to the fullest extent required by such applicable law or stock market or exchange rules, listing standards or regulations. Unless otherwise required by applicable law, this Policy shall no longer be effective from and after the date that the Company no longer has a class of securities publicly listed on a United States national securities exchange.

5. Interpretation. Notwithstanding anything to the contrary herein, this Policy is intended to comply with the requirements of Section 10D of the Exchange Act and Section 303A.14 of the NYSE Listed Company Manual (and any applicable regulations, administrative interpretations or stock market or exchange rules and regulations adopted in connection therewith). The provisions of this Policy shall be interpreted in a manner that satisfies such requirements and this Policy shall be administered accordingly. If any provision of this Policy would otherwise frustrate or conflict with this intent, the provision shall be interpreted and deemed amended so as to avoid such conflict.

6. Other Compensation Recoupment Rights. Any right of recoupment under this Policy is in addition to, and not in lieu of, any other remedies, rights or requirements with respect to the recoupment of any compensation that may be available to the Company pursuant to the terms of any other recoupment policy of the Company (or any of its affiliates) that may be in effect from time to time, any provisions in any employment agreement, offer letter, equity plan, equity award agreement or similar plan or agreement, or any other legal remedies available to the Company, as well as applicable law or stock market or exchange rules, listing standards or regulations; *provided*, *however*, that any amounts recouped under any other policy, plan or agreement that would be recoupable under this Policy shall count toward any required recoupment under this Policy and vice versa.

7. Exempt Compensation. Notwithstanding anything to the contrary herein, the Company has no obligation to seek recoupment of amounts paid to a Covered Executive which are granted, vested or earned based solely upon the occurrence or non-occurrence of nonfinancial events. Such exempt compensation includes, without limitation, base salary, time-vesting awards, compensation awarded on the basis of the achievement of metrics that are not Financial Reporting Measures or compensation awarded solely at the discretion of the Committee or the Board, *provided* that such amounts are in no way contingent on, and were not in any way granted on the basis of, the achievement of any Financial Reporting Measure performance goal.

8. Miscellaneous.

(a) Any applicable award agreement or other document setting forth the terms and conditions of any compensation covered by this Policy shall be deemed to include the restrictions imposed herein and incorporate this Policy by reference and, in the event of any inconsistency, the terms of this Policy will govern. For the avoidance of doubt, this Policy applies to all compensation that is received on or after the Effective Date, regardless of the date on which the award agreement or other document setting forth the terms and conditions of the Covered Executive's compensation became effective, including, without limitation, compensation received under the 2014 Plan and any successor plan thereto.

(b) This Policy shall be binding and enforceable against all Covered Executives and their beneficiaries, heirs, executors, administrators or other legal representatives.

(c) All issues concerning the construction, validity, enforcement and interpretation of this Policy and all related documents, including, without limitation, any employment agreement, offer letter, equity award agreement or similar agreement, shall be governed by, and construed in accordance with, the laws of the State of Delaware, without giving effect to any choice of law or conflict of law rules or provisions (whether of the State of Delaware or any other jurisdiction) that would cause the application of the laws of any jurisdiction other than the State of Delaware.

(d) The Covered Executives, their beneficiaries, executors, administrators and any other legal representative and the Company shall initially attempt to resolve all claims, disputes or controversies arising under, out of or in connection with this Policy by conducting good faith negotiations amongst themselves. To ensure the timely and economical resolution of disputes that arise in connection with this Policy, the federal and state courts sitting within the State of Delaware shall be the sole and exclusive forums for any and all disputes, claims, or causes of action arising from or relating to the enforcement, performance or interpretation of this Policy. The Covered Executives, their beneficiaries, executors, administrators and any other legal representative and the Company, shall not commence any suit, action or other proceeding arising out of or based upon this Agreement except in the United States District Court for the District of Delaware or any Delaware court, and hereby waive, and agree not to assert, by way of motion, as a defense or otherwise, in any such suit, action or proceeding, any claim that such party is not subject to the jurisdiction of the above-named courts, that its property is exempt or immune from

attachment or execution, that the suit, action or proceeding is brought in an inconvenient forum, that the venue of the suit, action or proceeding is improper or that this Policy or the subject matter hereof may not be enforced in or by such courts. To the fullest extent permitted by law, the Covered Executives, their beneficiaries, executors, administrators, and any other legal representative, and the Company, shall waive (and shall hereby be deemed to have waived) the right to resolve any such dispute through a trial by jury.

(e) If any provision of this Policy is determined to be unenforceable or invalid under any applicable law, such provision will be applied to the maximum extent permitted by applicable law and shall automatically be deemed amended in a manner consistent with its objectives to the extent necessary to conform to any limitations required under applicable law.