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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, 2021

☐ **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 001-36569

LANTHEUS HOLDINGS, INC.

(Exact name of registrant as specified in its charter)

Delaware	**35-2318913**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
331 Treble Cove Road, North Billerica, MA	**01862**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (978) 671-8001

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

Title of Each Class	Trading Symbol(s)	Name of Each Exchange on Which Registered
Common Stock, $0.01 par value per share	LNTH	NASDAQ Global Market

Securities registered pursuant to 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 ☐ No ☑

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 ☐ No ☑

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

Indicate by check mark whether the registrant has submitted every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☑ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See 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	☑	Accelerated filer	☐
Non-accelerated filer	☐	Smaller reporting company	☐
		Emerging growth company	☐

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

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. ☑

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

The aggregate market value of the registrant's common stock held by non-affiliates of the registrant on June 30, 2021 was approximately $1,849.9 million based on the last reported sale price of the registrant's common stock on the NASDAQ Global Market on June 30, 2021 of $27.64 per share.

As of February 18, 2022 the registrant had 67,753,459 shares of common stock, $0.01 par value, issued and outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Listed hereunder are the documents, portions of which are incorporated by reference, and the parts of this Form 10-K into which such portions are incorporated:

The Registrant's Definitive Proxy Statement for use in connection with the Annual Meeting of Stockholders to be held on April 28, 2022, portions of which are incorporated by reference into Parts II and III of this Form 10-K. The 2022 Proxy Statement will be filed with the Securities and Exchange Commission no later than 120 days after the close of our year ended December 31, 2021.

LANTHEUS HOLDINGS, INC.
ANNUAL REPORT ON FORM 10-K
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CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

Unless the context requires otherwise, references to "Lantheus," "the Company," "our company," "we," "us" and "our" refer to Lantheus Holdings, Inc. and, as the context requires, its direct and indirect subsidiaries, references to "Lantheus Holdings" refer to Lantheus Holdings, Inc., references to "LMI" refer to Lantheus Medical Imaging, Inc., a wholly-owned subsidiary, references to "Progenics" refer to Progenics Pharmaceuticals, Inc., a wholly-owned subsidiary of LMI, and references to "EXINI" refer to EXINI Diagnostics AB, a wholly-owned subsidiary of Progenics.

Some of the statements contained in this Annual Report on Form 10-K are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the "Securities Act"), and Section 21E of the Securities Exchange Act of 1934, as amended (the "Exchange Act"). These forward-looking statements, including, in particular, statements about our plans, strategies, prospects and industry estimates are subject to risks and uncertainties. These statements identify prospective information and can generally be identified by words such as "anticipates," "believes," "can," "could," "estimates," "expects," "hopes," "intends," "launch," "may," "pipeline," "plans," "predicts," "seeks," "should," "target," "will," "would" and similar expressions, or by express or implied discussions regarding potential marketing approvals or new indications for the collaborations, products candidates or approved products described in this Annual Report on Form 10-K, or regarding potential future revenues from such collaborations, product candidates and products. Examples of forward-looking statements include statements we make relating to our outlook and expectations including, without limitation, in connection with: (i) continued market expansion and penetration for our established commercial products, particularly DEFINITY, in the face of segment competition and potential generic competition, including as a result of patent and regulatory exclusivity expirations; (ii) our ability to successfully launch PYLARIFY as a commercial product, including (A) our ability to obtain United States Food and Drug Administration ("FDA") approval for additional positron emission tomography ("PET") manufacturing facilities ("PMFs") to manufacture PYLARIFY, (B) the ability of PMFs to manufacture PYLARIFY, (C) our ability to sell PYLARIFY to customers, and (D) our ability to obtain and maintain adequate coding, coverage and payment for PYLARIFY; (iii) the global Molybdenum-99 ("Mo-99") supply; (iv) our ability to use in-house manufacturing capacity; (v) our ability to successfully launch PYLARIFY AI as a commercial product; (vi) our ability to have products manufactured at Jubilant HollisterStier ("JHS") and our modified formulation of DEFINITY ("DEFINITY RT") at Samsung Biologics ("SBL"); (vii) the continuing impact of the global COVID-19 pandemic on our business, financial conditions and prospects; (viii) the efforts and timing for clinical development of our product candidates and new clinical applications for our products, in each case, that we may develop, including 1095 and LMI 1195, or that our strategic partners may develop, including flurpiridaz fluorine-18 ("F 18"); and (ix) the potential reclassification by the FDA of certain of our products and product candidates from drugs to devices with the expense, complexity and potentially more limited competitive protection such reclassification could cause. Forward-looking statements are based on our current expectations and assumptions regarding our business, the economy and other future conditions. Because forward-looking statements relate to the future, such statements are subject to inherent uncertainties, risks and changes in circumstances that are difficult to predict. Our actual results may differ materially from those contemplated by the forward-looking statements. These statements are neither statements of historical fact nor guarantees or assurances of future performance. The matters referred to in the forward-looking statements contained in this Annual Report on Form 10-K may not in fact occur. We caution you, therefore, against relying on any of these forward-looking statements. These forward-looking statements are subject to a number of risks, uncertainties and assumptions, including those described in Part I, Item 1A, "Risk Factors" in this Annual Report on Form 10-K.

Any forward-looking statement made by us in this Annual Report on Form 10-K speaks only as of the date on which it is made. Factors or events that could cause our actual results to differ may emerge from time to time, and it is not possible for us to predict all of them. We undertake no obligation to publicly update any forward-looking statement, whether as a result of new information, future developments or otherwise, except as may be required by law.

Trademarks

We own or have the rights to various trademarks, service marks and trade names, including, among others, the following: AZEDRA®, AZEDRA Service Connection®, Cardiolite®, DEFINITY®, DEFINITY RT™, EXINI®, Find, Fight and Follow®, Find > Fight > Follow™, Lantheus®, Lantheus Medical Imaging®, LUMINITY®, Molecular Insight®, NEUROLITE®, Progenics®, Progenics Pharmaceuticals®, PYLARIFY®, PYLARIFY AI™, TechneLite®, VIALMIX®, and VIALMIX RFID® referred to in this Annual Report on Form 10-K. Solely for convenience, we refer to trademarks and service marks in this Annual Report on Form 10-K without the TM, SM and ® symbols. Those references are not intended to indicate, in any way, that we will not assert, to the fullest extent permitted under applicable law, our rights to our trademarks and service marks. Each trademark, trade name or service mark of any other company appearing in this Annual Report on Form 10-K is, to our knowledge, owned by that other company.

PART I

Item 1. Business

Overview

We are an established leader and fully integrated provider committed to innovative imaging diagnostics, targeted therapeutics, and artificial intelligence solutions to Find, Fight and Follow serious medical conditions. We classify our products in three categories: precision diagnostics, radiopharmaceutical oncology, and strategic partnerships and other revenue. Our leading precision diagnostic products assist healthcare professionals ("HCPs") Find and Follow diseases in non-oncologic conditions. Our radiopharmaceutical oncology diagnostics and therapeutics help HCPs Find, Fight and Follow cancer. Our strategic partnerships focus on facilitating precision medicine through the use of biomarkers, digital solutions and radiotherapeutic platforms, and also includes our license of RELISTOR to Bausch Health Companies, Inc. ("Bausch").

Our commercial products are used by cardiologists, internal medicine physicians, nuclear medicine physicians, oncologists, radiologists, sonographers, technologists and urologists working in a variety of clinical settings. We believe that our diagnostic products provide improved diagnostic information that enables HCPs to better detect and characterize, or rule out, disease, with the potential to achieve better patient outcomes, reduce patient risk and limit overall costs for payors and throughout the healthcare system.

We produce and market our products throughout the United States (the "United States" or the "U.S."), selling primarily to clinics, group practices, hospitals, integrated delivery networks, and radiopharmacies. We sell our products outside the U.S. through a combination of direct distribution in Canada and third party distribution relationships in Europe, Canada, Australia, Asia-Pacific, Central America and South America.

Our headquarters are located in North Billerica, MA, with additional offices in Somerset, NJ; Montreal, Canada and Lund, Sweden.

In the first quarter of 2021, we completed the evaluation of our operating and reporting structure, including the impact on our business of the acquisition of Progenics and the sale of our Puerto Rico subsidiary, which resulted in a change in our operating segments to one reportable business segment.

On May 27, 2021, we announced that the FDA had approved PYLARIFY, an F 18-labeled PET imaging agent targeting prostate-specific membrane antigen ("PSMA"). PYLARIFY is a product in our radiopharmaceutical oncology product category. We commercially launched PYLARIFY in the U.S. in June 2021.

During 2021, we announced that our subsidiary, EXINI, was granted 510(k) clearance by the FDA in the U.S. and a CE marking in Europe for aPROMISE. We commercially launched aPROMISE under the name PYLARIFY AI in the U.S. in November 2021.

Our Portfolio of Commercial Products

Precision Diagnostics

Our commercial products in our precision diagnostics category include the following:

- DEFINITY is an injectable microbubble ultrasound enhancing agent with perflutren-containing lipid microspheres that is used in ultrasound exams of the heart, also known as echocardiography exams. DEFINITY requires refrigerated storage and is indicated in the U.S. for use in patients with suboptimal echocardiograms to assist in imaging the left ventricular chamber and left endocardial border of the heart in ultrasound procedures. DEFINITY RT is a modified formulation of DEFINITY that allows both storage and shipment at room temperature and provides clinicians an additional choice for greater utility of this formulation in broader clinical settings. We believe we are currently the leading worldwide provider of ultrasound microbubble enhancing agents.
- TechneLite is a Technetium ("Tc-99m") generator that provides the essential nuclear material used by radiopharmacies to radiolabel NEUROLITE, Cardiolite and other Tc-99m-based radiopharmaceuticals used in nuclear medicine procedures. TechneLite uses Mo-99 as its active ingredient.
- NEUROLITE is an injectable, Tc-99m-labeled imaging agent used with single-photon emission computed tomography ("SPECT") technology to identify the area within the brain where blood flow has been blocked or reduced due to stroke. Although NEUROLITE's patents and market exclusivity have expired, we are not currently aware of any generic competitors.

- Xenon-133 (“Xenon”) is a radiopharmaceutical gas that is inhaled and used to assess pulmonary function and also to image cerebral blood flow. Our Xenon is manufactured by a third party as a bi-product of Mo-99 production and is processed and finished by us.
- Cardiolite, also known by its generic name sestamibi, is an injectable, Tc-99m-labeled imaging agent used in myocardial perfusion imaging (“MPI”) procedures to assess blood flow to the muscle of the heart using SPECT. Cardiolite was approved by the FDA in 1990 and its market exclusivity expired in July 2008. Included in Cardiolite revenues are branded Cardiolite and generic sestamibi revenues.
- Gallium-67 (“Gallium”) is an injectable radiopharmaceutical imaging agent used to detect certain infections and cancerous tumors, especially lymphoma. We manufacture Gallium using cyclotron technology.
- Thallium-201 (“Thallium”) is an injectable radiopharmaceutical imaging agent used in MPI studies to detect cardiovascular disease. We manufacture Thallium using cyclotron technology.

Radiopharmaceutical Oncology

Our commercial products in our radiopharmaceutical oncology category include the following:

- PYLARIFY (also known as piflufolastat F 18, 18F-DCFPyL or PyL) is an F 18-labelled PSMA-targeted PET imaging agent used with PET/computed tomography (“CT”) technology that enables visualization of lymph nodes, bone and soft tissue metastases to determine the presence or absence of recurrent and/or metastatic prostate cancer. PYLARIFY is indicated in the U.S. for PET imaging of PSMA-positive lesions in men with prostate cancer with suspected metastasis who are candidates for initial definitive therapy and in men with suspected recurrence based on elevated serum prostate-specific antigen (“PSA”) levels.
- AZEDRA (iobenguane I 131) is a radiotherapeutic, approved for the treatment of adult and pediatric patients 12 years and older with iobenguane scan positive, unresectable, locally advanced or metastatic pheochromocytoma or paraganglioma who require systemic anticancer therapy. AZEDRA is the first and only FDA-approved therapy for this indication.

Strategic Partnerships and Other Revenue

Our commercial products in our strategic partnerships and other revenue product category include the following:

- RELISTOR (methylnaltrexone bromide) is a treatment for opioid-induced constipation (“OIC”) that decreases the constipating side effects induced by opioid pain medications such as morphine and codeine without diminishing their ability to relieve pain. RELISTOR is approved in two forms: a subcutaneous injection and an oral tablet. We have licensed RELISTOR to Bausch, and we collect quarterly royalties based on RELISTOR sales.
- Automated Bone Scan Index (“aBSI”) calculates the disease burden of prostate cancer by quantifying the hotspots on bone scans and automatically calculating the bone scan index value, representing the disease burden of prostate cancer shown on the bone scan. The Japanese rights to the stand-alone aBSI have been transferred and sold to FUJIFILM Toyama Chemical Co. Ltd. (“FUJIFILM”) under the name BONENAVI®.
- PYLARIFY AI, which we also refer to as aPROMISE, is an artificial intelligence medical device software designed to allow healthcare professionals and researchers to perform standardized quantitative assessment of PSMA PET/CT images in prostate cancer, including those images obtained by using PYLARIFY.

Additional Information about our Product Categories

Precision Diagnostics

Anticipated Continued Growth of DEFINITY and Expansion of Our Ultrasound Microbubble Franchise

DEFINITY is the leading ultrasound enhancing agent based on revenue and usage in the U.S., and is indicated for use in patients with suboptimal echocardiograms. Numerous patient conditions can decrease the quality of images of the left ventricle, the primary pumping chamber of the heart. The term DEFINITY includes its activated and non-activated forms.

DEFINITY is a clear, colorless, sterile liquid that requires refrigerated storage, and which, upon activation in a VIALMIX apparatus, a medical device specifically designed for DEFINITY, becomes a homogenous, opaque, milky white injectable suspension of perflutren-containing lipid microspheres. After activation and intravenous injection, DEFINITY opacifies the left ventricular chamber and improves the delineation of the left ventricular endocardial border, or innermost layer of tissue that lines the chamber of the left ventricle. Better visualization of the left ventricle allows clinicians to make more informed decisions about disease status.

Based on estimates from third party sources, we believe there were approximately 25 to 32 million echocardiograms performed in the U.S. in 2020 (the latest time period for which full year data is available and which also included the estimated impacts of COVID-19 on procedure volumes). Assuming that between 20% and 30% of echocardiograms produce suboptimal images, as stated in the clinical literature, we estimate that approximately 5 to 10 million echocardiograms in 2020 produced suboptimal images.

Since its launch in 2001, DEFINITY has been used in imaging procedures in more than 18.0 million studies throughout the world. We estimate that DEFINITY had over 80% share of the U.S. segment for ultrasound enhancing agents in echocardiography procedures as of December 2021. DEFINITY currently competes with Optison, a GE Healthcare product, Lumason, a Bracco Diagnostics Inc. ("Bracco") product, as well as echocardiography without ultrasound enhancing agents and non-echocardiography imaging modalities. DEFINITY, Optison and Lumason all carry an FDA-required boxed warning, which has been modified over time, to notify physicians and patients about potentially serious safety concerns or risks posed by the products. See Part I, Item 1A. "Risk Factors-Ultrasound enhancing agents may cause side effects which could limit our ability to sell DEFINITY."

As we continue to pursue expanding our microbubble franchise, our activities include:

- *Patents* - We continue to actively pursue additional patents in connection with DEFINITY and DEFINITY RT, both in the U.S. and internationally. In the U.S. for DEFINITY, we have four Orange Book-listed method of use patents, one of which expires in 2035 and three of which expire in 2037, as well as additional manufacturing patents that are not Orange Book-listed expiring in 2023 and 2037. In the U.S. for DEFINITY RT, we have five Orange Book-listed patents, including a composition of matter patent which expires in 2035. Outside of the U.S., we are currently pursuing additional DEFINITY and DEFINITY RT patents to obtain similar patent protection as in the U.S. The Orange Book-listed patents include a patent on the use of VIALMIX RFID (see below) which expires in 2037; we have submitted additional VIALMIX RFID patent applications in major markets throughout the world.
- *Hatch-Waxman Act* - Even though our longest duration Orange Book-listed DEFINITY patent extends until March 2037, because our Orange Book-listed composition of matter patent expired in June 2019, we may face generic DEFINITY challengers in the near to intermediate term. Under the Hatch-Waxman Act, the FDA can approve Abbreviated New Drug Applications ("ANDAs") for generic versions of drugs if the ANDA applicant demonstrates, among other things, that (i) its generic candidate is the same as the innovator product by establishing bioequivalence and providing relevant chemistry, manufacturing and product data, and (ii) either the marketing of that generic candidate does not infringe the Orange Book-listed patent(s) or the Orange Book-listed patent(s) is invalid. Similarly, the FDA can approve a Section 505(b)(2) NDA from an applicant that relies on some of the information required for marketing approval from studies which the applicant does not own or have a legal right of reference. With respect to the Orange Book-listed patent(s) covering an innovator product, the ANDA or Section 505(b)(2) applicant (if relying on studies related to the innovator product) (each, the "Applicant") must give a notice (a "Notice") to the innovator of its certification that its generic candidate will not infringe the innovator's Orange Book-listed patent(s) or that the Orange Book-listed patent(s) is invalid. The innovator can then file suit against the Applicant within 45 days of receiving the Notice, and FDA approval to commercialize the generic candidate will be stayed (that is, delayed) for up to 30 months (measured from the date on which a Notice is received) while the patent dispute between the innovator and the Applicant is resolved in court. The 30-month stay could potentially expire sooner if the courts determine that no infringement had occurred or that the challenged Orange Book-listed patent is invalid or if the parties otherwise settle their dispute.

  As of the date of filing of this Annual Report on Form 10-K, we have not received any Notice from an Applicant. If we were to (i) receive any such Notice in the future, (ii) bring a patent infringement suit against the Applicant within 45 days of receiving that Notice, and (iii) successfully obtain the full 30-month stay, then the Applicant would be precluded from commercializing a generic version of DEFINITY prior to the expiration of that 30-month stay period and, potentially, thereafter, depending on how the patent dispute is resolved. Solely by way of example and not based on any knowledge we currently have, if we received a Notice from an Applicant in March 2022 and the full 30-month stay were obtained, then the Applicant would be precluded from commercialization until at least September 2024. If we received a Notice some number of months in the future and the full 30-month stay were obtained, the commercialization date would roll forward in the future by the same number of months. In the event a 505(b)(2) applicant does not rely on studies related to the innovator product, the 30-month stay would not apply, but additional clinical studies may be required.
- *DEFINITY RT* - DEFINITY RT became commercially available in the fourth quarter of 2021. A modified formulation of DEFINITY that allows both storage and shipment at room temperature, DEFINITY RT provides clinicians an additional choice and allows for greater utility of this formulation in broader clinical settings. Given its physical characteristics, we believe DEFINITY RT is also well-suited for inclusion in kits requiring microbubbles for other indications and applications (including in kits developed by third parties of the type described in the paragraph entitled *Microbubble Franchise* below).
- *VIALMIX RFID* - VIALMIX RFID, our next-generation activation device designed specifically for both DEFINITY and DEFINITY RT, became commercially available in the fourth quarter of 2021. The activation rate and time are controlled by VIALMIX RFID through the use of radio-frequency identification technology ("RFID") to ensure reproducible activation of

DEFINITY and DEFINITY RT. The RFID tag, which is affixed to the vial label, enables the DEFINITY or DEFINITY RT vial to be appropriately activated with the VIALMIX RFID activation device.

- *In-House Manufacturing* - We have constructed a specialized in-house manufacturing facility at our North Billerica campus for purposes of producing DEFINITY and, potentially, other sterile vial products. On February 22, 2022, we received FDA approval of our supplemental new drug application ("sNDA"), authorizing commercial manufacturing of DEFINITY at our new facility. As of February 23, 2022, DEFINITY manufactured at this facility is commercially available. We believe this investment will allow us to better manage DEFINITY manufacturing and inventory, reduce our costs in a potentially more price competitive environment, and provide us with supply chain redundancy.

See Part I, Item 1A. "Risk Factors" for information regarding certain risks associated with DEFINITY and see Part II, Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations - Comparison of the Periods Ended December 31, 2021 and 2020 and Comparison of the Periods Ended December 31, 2020 and 2019 - Revenues" for further information on total revenue contributed by DEFINITY in each of our last three fiscal years.

TechneLite

TechneLite is a self-contained system or generator of Tc-99m, a radioactive isotope with a six hour half-life, used by radiopharmacies to prepare various nuclear imaging agents. Tc-99m results from the radioactive decay of Mo-99, itself a radioisotope with a 66-hour half-life produced in nuclear research reactors around the world from enriched uranium. The TechneLite generator is a little larger than a coffee can in size, and the self-contained system houses a vertical glass column at its core that contains Mo-99. During our manufacturing process, Mo-99 is added to the column within the generator where it is adsorbed onto alumina powder. The column is sterilized, enclosed in a lead shield and further sealed in a cylindrical plastic container, which is then immediately shipped to our radiopharmacy customers. Because of the short half-lives of Mo-99 and Tc-99m, radiopharmacies typically purchase TechneLite generators on a weekly basis pursuant to standing orders.

The Tc-99m produced by our TechneLite generator is the medical radioisotope that can be attached to a number of imaging agents, including our own NEUROLITE and Cardiolite products, during the radiolabeling process. To radiolabel a Tc-99m-based radiopharmaceutical, a vial of sterile saline and a vacuum vial are each affixed to the top of a TechneLite generator. The sterile saline is pulled through the generator where it attracts Tc-99m resulting from the radioactive decay of Mo-99 within the generator column. The Tc-99m-containing radioactive saline is then pulled into the vacuum vial and subsequently combined by a radiopharmacist with the applicable imaging agent, and individual patient-specific radiolabeled imaging agent doses are then prepared. When administered, the imaging agent binds to specific tissues or organs for a period of time, enabling the Tc-99m to illuminate the functional health of the imaged tissues or organs in a diagnostic image. Our ability to produce and market TechneLite is highly dependent on our supply of Mo-99. See "Raw Materials and Supply Relationships—Molybdenum-99" below.

TechneLite is currently marketed primarily in North America, Central America and South America, largely to radiopharmacies that prepare unit doses of radiopharmaceutical imaging agents and ship these preparations directly to hospitals for administration to patients. In the U.S., we have supply contracts with large radiopharmacy groups, including Cardinal Health ("Cardinal"), PharmaLogic Holdings Corp ("PharmaLogic"), RLS (USA) Inc. (previously GE Healthcare) ("RLS") and United Pharmacy Partners ("UPPI"). We also supply generators on a purchase order basis to other customers. We estimate that TechneLite had approximately one third of the U.S. generator market as of December 31, 2021, competing primarily with Tc-99m-based generators produced by Curium and NorthStar Medical Radioisotopes, LLC ("Northstar"). Outside of the U.S., we sell generators through supply agreements with radiopharmacy chains, through distributors or to separate customers.

The Mo-99 used in our TechneLite generators can be produced using targets made of either highly-enriched uranium ("HEU") or low-enriched uranium ("LEU"). LEU consists of uranium that contains less than 20% of the uranium-235 isotope. HEU is considered weapons grade material, with 20% or more of uranium-235. The American Medical Isotopes Production Act of 2012 encourages the domestic production of LEU Mo-99 and provides for the eventual prohibition of the export of HEU from the U.S. Although Medicare generally does not provide separate payment to hospitals for the use of diagnostic radiopharmaceuticals administered in an outpatient setting, since 2013, the Centers for Medicare and Medicaid Services ("CMS"), the federal agency responsible for administering the Medicare program, has provided an add-on payment of $10 under the hospital outpatient prospective payment system for every Tc-99m diagnostic dose produced from non-HEU sourced Mo-99, to cover the marginal cost for radioisotopes produced from non-HEU sources. Our LEU TechneLite generator satisfies the reimbursement requirements under the applicable CMS rules.

We believe that our substantial capital investments in our highly automated TechneLite production line, which we have made over the years, and our extensive experience in complying with the stringent regulatory requirements for the handling of nuclear materials, create significant and sustainable competitive advantages for us in generator manufacturing and distribution. Given our significant know-how and trade secrets associated with the methods of manufacturing and assembling the TechneLite generator, we believe we have a substantial amount of valuable and defensible proprietary intellectual property associated with the product. In addition, TechneLite has patent protection in the U.S. and various foreign countries on certain component technology currently expiring in 2029, and we are pursuing additional patent protection in the U.S. and world-wide on other component technology that, if granted, would expire in 2040.

See Part II, Item 7. “Management’s Discussion and Analysis of Financial Condition and Results of Operations - Comparison of the Periods Ended December 31, 2021 and 2020 and Comparison of the Periods Ended December 31, 2020 and 2019 - Revenues” for further information on total revenue contributed by TechneLite in each of our last three fiscal years.

Radiopharmaceutical Oncology

PYLARIFY Approval and Commercial Launch

PYLARIFY is a radioactive diagnostic agent indicated for PET imaging of PSMA-positive lesions in men with prostate cancer with suspected metastasis who are candidates for initial definitive therapy and in men with suspected recurrence based on elevated PSA levels. PYLARIFY works by binding to PSMA, a protein that is overexpressed on the surface of more than 90% of primary and metastatic prostate cancer cells. PYLARIFY works with PET/CT technology to produce a combined PET/CT scan that enables the reader of the PET/CT scan to detect and locate the disease.

According to the American Cancer Society, prostate cancer is the second most common cancer in American men - one in eight American men will be diagnosed with prostate cancer in their lifetimes and over 3.1 million American men are living with prostate cancer today. Based on estimates from third party sources regarding the incidence of prostate cancer in men in the U.S., we believe the potential market size for PSMA PET imaging agents could be up to 220,000 annual scans, comprised of 90,000 scans for patients with intermediate, unfavorable or high/very high risk of suspected metastases of prostate cancer and 130,000 scans for patients with suspected recurrence of prostate cancer. Because we are in the process of launching this imaging agent, we can give no assurance as to how clinical practice may evolve or what our ultimate market penetration may be.

The approval of PYLARIFY was based on data from two Company-sponsored pivotal studies (“OSPREY” and “CONDOR”) designed to establish the safety and diagnostic performance of PYLARIFY across the prostate cancer disease continuum. Results from OSPREY (Cohort A) demonstrated improvement in specificity and positive predictive value of PYLARIFY PET imaging over conventional imaging in men at risk for metastatic prostate cancer prior to initial definitive therapy. CONDOR studied men with biochemical recurrent prostate cancer. In patients with biochemical recurrent prostate cancer and non-informative baseline imaging, PYLARIFY demonstrated high correct localization and detection rates, including in patients with early recurrent disease with low but rising PSA blood levels (median PSA 0.8 ng/mL).

Upon commercial launch in June 2021, PYLARIFY was immediately available in select parts of the U.S. Over the course of the remainder of 2021, PYLARIFY availability expanded into additional regions and is now broadly available nationwide. We continue to expand our geographic coverage, customer contracting and market access coverage to serve our customers and the U.S. prostate cancer community.

The commercial launch of PYLARIFY is complex and expensive. During 2021, we hired additional employees to assist us with the commercialization of PYLARIFY, including in sales, marketing, reimbursement, quality and medical affairs. To manufacture PYLARIFY, we assembled and are qualifying a nationwide network of PMFs with radioisotope-producing cyclotrons that make F 18, which has a 110-minute half-life, so PYLARIFY is manufactured and distributed rapidly to end-users. After being made on a cyclotron at a PMF, the F 18 is then combined with certain chemical ingredients in specially designed chemistry synthesis boxes to manufacture PYLARIFY. The finished PYLARIFY is then quality control tested and transferred to a radiopharmacist who prepares and dispenses patient-specific doses of the final product. Because each of the PMFs manufacturing these products is deemed by the FDA to be a separate manufacturing site, each has to be approved by the FDA. Although PYLARIFY is now broadly available nationwide and we continue to qualify additional PMFs, we can give no assurance that the FDA will continue to approve PMFs in accordance with our planned roll-out schedule. If FDA approval of manufacturing sites is delayed or withdrawn, our future business, results of operations, financial condition and cash flows could be adversely affected.

In addition to our network of PMFs, we have also been working with academic medical centers in the U.S. that have radioisotope-producing cyclotrons and which have expressed an interest in manufacturing PYLARIFY. Under this initiative, we would enter into a fee-for-service arrangement under which the academic medical center’s PMF would manufacture and supply batches of PYLARIFY, and its radiopharmacy would prepare patient-ready unit doses, in each case for and on behalf of us. We would then sell

those unit doses to the academic medical center's hospitals and clinics, and in some instances, to additional customers in the academic medical center's geographic area, in each case, under separate purchase agreements. The academic medical center's PMF's ability to manufacture and supply batches of PYLARIFY will be subject to FDA approval, and we can give no assurance that the FDA will approve such PMFs in accordance with our planned roll-out schedule.

Our commercial launch also required us to obtain adequate coding, coverage and payment for PYLARIFY, including not only coverage from Medicare, Medicaid and other government payors, as well as private payors, but also appropriate payment levels to adequately cover our customers' costs of using PYLARIFY in PET/CT imaging procedures. We received notification that our Healthcare Procedure Coding System ("HCPCS") code, which enables streamlined billing, went into effect as of January 1, 2022. In addition, effective January 1, 2022, CMS granted Transitional Pass-Through Payment Status in the hospital outpatient setting ("TPT Status") for PYLARIFY, enabling traditional Medicare to provide an incremental payment to our customers for PET/CT scans performed with PYLARIFY in that setting. TPT Status for PYLARIFY is expected to expire December 31, 2024. After TPT Status expires, under current Medicare rules, PYLARIFY, similar to other diagnostic radiopharmaceuticals, would not be separately reimbursed in the hospital outpatient setting but rather would be included as part of the facility fee a hospital otherwise receives for a PET/CT imaging procedure, and the facility fee does not always cover the cost of a drug used in the procedure. We can give no assurance that any CMS reimbursement in the hospital outpatient setting that follows the expiration of TPT Status will be adequate to cover the cost of PYLARIFY used in a PET/CT imaging procedure.

We actively pursue patents in connection with PYLARIFY, both in the U.S. and internationally. In the U.S. for PYLARIFY, we have four Orange Book-listed patents, including composition of matter patents, which expire in 2030 and 2037. Outside of the U.S., we are currently pursuing additional PYLARIFY patents to obtain similar patent protection as in the U.S.

See Part I, Item 1A. "Risk Factors" for information regarding certain risks associated with PYLARIFY and see Part II, Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations - Comparison of the Periods Ended December 31, 2021 and 2020 and Comparison of the Periods Ended December 31, 2020 and 2019 - Revenues" for further information on total revenue contributed by PYLARIFY since its approval.

Strategic Partnerships and Other Revenue

We continue to seek ways to further expand our portfolio of products and product candidates and how best to optimize the value of our current assets, evaluating a number of different opportunities to collaborate with others or acquire or in-license additional products, product candidates, businesses and technologies to drive our future growth. To the extent a strategic partnership relates to an approved product or potential new indication of an approved product, we report our revenue generated by that strategic partnership under the applicable product category.

Oncology

As we continue to pursue expanding our strategic partnerships, our Pharma Services activities and strategic partnerships in oncology include:

- *Prostate Cancer* – We collaborate with pharmaceutical companies developing therapies and diagnostics in prostate cancer.
    - **Bayer Agreements** – Under Progenics' April 2016 agreement with a subsidiary of Bayer HealthCare Pharmaceuticals Inc. ("Bayer") granting Bayer exclusive worldwide rights to develop and commercialize products using our PSMA antibody platform, in combination with Bayer's alpha-emitting radionuclides, Progenics received an upfront payment of $4.0 million and milestone payments totaling $5.0 million. We could receive up to an additional $44.0 million in potential clinical and development milestones under this agreement. We are also entitled to single-digit royalties on net sales, and potential net sales milestone payments up to an aggregate of $130.0 million. In addition, in October 2020, we entered into a clinical supply agreement with Bayer to include piflufolastat F 18 in Bayer's clinical trial for prostate cancer. Bayer will use piflufolastat F 18 to assess PSMA expression levels at baseline and during treatment.
    - **Curium Agreement** – We have licensed exclusive rights to Curium to develop and commercialize piflufolastat F 18 in Europe. Under the terms of the collaboration, Curium is responsible for the development, regulatory approvals and commercialization of piflufolastat F 18 in Europe, and we are entitled to double-digit royalties on net sales of piflufolastat F 18. Curium is currently conducting a Phase 3 registration trial in Europe for piflufolastat F 18.
    - **FUJIFILM Agreements** – In June 2019, EXINI entered into a transfer agreement with FUJIFILM for the rights to aBSI in Japan for use under the name BONENAVI. Under the terms of the transfer agreement, FUJIFILM acquired, by a combination of purchase and license, the Japanese software, source code, supporting data and all Japanese patents associated with aBSI from EXINI for use in Japan. In exchange, EXINI received $4.0 million in an upfront payment and FUJIFILM agreed to pay EXINI support and service fees for aBSI and other AI products over the next three years in Japan. BONENAVI had been licensed to FUJIFILM for use in Japan since 2011. In addition, in

February 2021, EXINI entered into a transfer agreement with FUJIFILM for the heart myocardial perfusion analysis software, cREPO, in Japan.

- **POINT Biopharma Agreement –** In December 2020, we entered into a clinical supply agreement with POINT Biopharma US Inc. ("POINT Biopharma") under which we will supply piflufolastat F 18 to POINT Biopharma as an imaging agent to evaluate and follow subjects for a Phase 3 clinical study of POINT Biopharma's PSMA-targeted metastatic castrate-resistant prostate cancer ("mCRPC") therapeutic candidate.
- **Prostate Cancer Clinical Trial Consortium Agreement** – In January 2022, we announced a collaboration with the Prostate Cancer Clinical Trial Consortium ("PCCTC"), a premier multicenter clinical research organization that specializes in prostate cancer research. The intent of the strategic collaboration is to integrate our AI platform into PCCTC studies to advance the development and validation of novel AI-enabled biomarkers.
- **RefleXion Agreement** – In September 2021, we entered into a development and commercialization collaboration with RefleXion Medical, Inc. to evaluate the use of piflufolastat F 18 to enable real-time therapeutic guidance of biology-guided radiotherapy in prostate cancer using the RefleXion X1™ platform. Under the terms of the agreement, we will contribute to the cost of RefleXion's registrational program and will share in any upside created by this collaboration.
- **Regeneron Agreement** – In June 2020, we entered into a clinical supply agreement with Regeneron Pharmaceuticals, Inc. ("Regeneron") under which we will supply piflufolastat F 18 to Regeneron as an imaging agent to evaluate and follow subjects for a Phase 1/2 clinical study of Regeneron's anti-PSMAxCD28-targeted mCRPC therapeutic candidate. In July 2021, we entered into a second agreement with Regeneron under which we will supply piflufolastat F 18 to Regeneron as an imaging agent to evaluate and follow subjects for a Phase 1/2 clinical study of Regeneron's anti-PSMAxCD3 Bispecific Antibody in mCRPC patients.
- **ROTOP Agreement** – In May 2019, Progenics entered into an exclusive license agreement with ROTOP Pharmaka GmbH ("ROTOP"), a Germany-based developer of radiopharmaceuticals for nuclear medicine diagnostics, to develop, manufacture and commercialize 1404 in Europe. Under the terms of the license, ROTOP is responsible for the development, regulatory approvals and commercialization of 1404 in Europe while we are entitled to double-digit, tiered royalties on net sales of 1404 in Europe.

- *Immuno-Oncology* - In May 2019, we commenced an initiative to build out our Pharma Services capabilities, which reside in our strategic partnerships and other revenue product category, by entering into a strategic collaboration and license agreement with NanoMab Technology Limited ("NanoMab"), a privately-held biopharmaceutical company focused on the development of next generation radiopharmaceuticals for cancer precision medicine.
- *Pan-Oncology* - In March 2021, we acquired from Ratio Therapeutics LLC ("Ratio") (previously Noria Therapeutics, Inc.) exclusive, worldwide rights to NTI-1309, an innovative imaging biomarker that targets fibroblast activation protein, an emerging target with broad potential imaging applicability and use in oncology. Under the terms of this agreement, Ratio will drive the early clinical development of NTI-1309. We are integrating NTI-1309 into our portfolio of imaging biomarkers as part of our Pharma Services offering. Upon further clinical development, we will assess options to bring NTI-1309 to market as a diagnostic or potentially a therapeutic agent.

Microbubble Franchise

In addition, we continue to seek to optimize our microbubble platform through new collaborations. In April 2021, we announced a strategic collaboration with Allegheny Health Network ("AHN") which will use our microbubbles in combination with AHN's ultrasound-assisted non-viral gene transfer technology for the development of a proposed treatment of xerostomia. Xerostomia is a lack of saliva production leading to dry mouth and has a variety of causes, including radiotherapy and chemotherapy, the chronic use of drugs and rheumatic and dysmetabolic diseases. Prior to 2021, we entered into microbubble collaborations with the following parties: (i) Cerevast Medical, Inc. ("Cerevast"), in which our microbubbles will be used in connection with Cerevast's ocular ultrasound device to improve blood flow in occluded retinal veins in the eye; (ii) CarThera SAS ("CarThera"), for the use of our microbubbles in combination with SonoCloud, a proprietary implantable device in development for the treatment of recurrent glioblastoma; and (iii) Insightec Ltd. ("Insightec"), which will use our microbubbles in connection with the development of Insightec's transcranial guided focused ultrasound device for the treatment of glioblastoma as well as other neurodegenerative conditions.

In March 2012, we entered into a development and distribution arrangement with China Resources Double-Crane ("Double-Crane") for DEFINITY in China, Hong Kong and Macau. Double-Crane has conducted on our behalf three confirmatory clinical trials in pursuit of cardiac, liver and kidney imaging indications, as well as one small pharmacokinetic study. In March 2020, we filed an Import Drug License application with the National Medical Products Administration ("NMPA") for the use of DEFINITY for the echocardiography indication. Double-Crane is also in the process of analyzing the clinical results relating to liver and kidney indications and will also work with us to prepare an Import Drug License application for those indications, as appropriate.

RELISTOR

- **Bausch Agreement** -- Under its agreement with Salix Pharmaceuticals, Inc., a wholly-owned subsidiary of Bausch, Progenics received a $40.0 million development milestone upon U.S. marketing approval for subcutaneous RELISTOR in non-cancer pain patients in 2014, a $50.0 million development milestone for the U.S. marketing approval of an oral formulation of RELISTOR in July 2016, and a $10.0 million sales milestone for RELISTOR achieving U.S. net sales in excess of $100.0 million in 2019. We are also eligible to receive additional one-time sales milestone payments upon achievement of specified U.S. net sales targets, including:

U.S. Net Sales Levels in any Single Calendar Year	Payment ($)
	(In thousands)
In excess of $150 million	15,000
In excess of $200 million	20,000
In excess of $300 million	30,000
In excess of $750 million	50,000
In excess of $1 billion	75,000

Each sales milestone payment is payable one time only, regardless of the number of times the condition is satisfied, and all five remaining payments could be made within the same calendar year. We are also eligible to receive royalties from Bausch and its affiliates based on the following royalty scale: 15% on worldwide net sales up to $100.0 million, 17% on the next $400.0 million in worldwide net sales, and 19% on worldwide net sales over $500.0 million each calendar year, and 60% of any upfront, milestone, reimbursement or other revenue (net of costs of goods sold, as defined, and territory-specific research and development expense reimbursement) Bausch receives from sublicensees outside the U.S.

aBSI

- aBSI calculates the disease burden of prostate cancer by quantifying the hotspots on bone scans and automatically calculating the bone scan index value, representing the disease burden of prostate cancer shown on the bone scan. The Japanese rights to the stand-alone aBSI have been transferred and sold to FUJIFILM Toyama Chemical Co. Ltd. (“FUJIFILM”) under the name BONENAVI®. The cloud based aBSI was made available for clinical use in the U.S. on August 5, 2019. In February 2020, Progenics received CE marking for the standalone workstation model of aBSI, meeting the quality standards set by the European Economic Area. In September 2020, the FDA granted 510(k) clearance for the use of aBSI as software-as-a-medical device on a GE Healthcare imaging system.

PYLARIFY AI

- PYLARIFY AI, which we also refer to as aPROMISE, is an artificial intelligence medical device software designed to allow healthcare professionals and researchers to perform standardized quantitative assessment of PSMA PET/CT images in prostate cancer, including those images obtained by using PYLARIFY. PYLARIFY AI has demonstrated improved consistency, accuracy and efficiency in quantitative assessment of PSMA PET/CT. The technology automatically analyzes the PET/CT image to segment anatomical regions – 51 bones and 12 soft tissue organs. This image segmentation enables automated localization, detection and quantification of potential PSMA-avid lesions in the PET/CT image, which is incorporated into a standardized report for physicians. PYLARIFY AI can be deployed either as a secure web cloud application or within the secure firewall of the institution on a local server. Once deployed, the adaptive application can be integrated into an institution’s existing clinical workflow, delivering a unique combination of clinical utility and technical flexibility. We believe that PYLARIFY AI when used with PYLARIFY will provide us an important competitive advantage in what we expect will be a highly competitive PET PSMA diagnostic imaging agent market, although we can give no assurances to that effect. Our subsidiary, EXINI, was granted 510(k) clearance by the FDA in the U.S. and received a CE marking in Europe for aPROMISE. We commercially launched aPROMISE under the name PYLARIFY AI in the U.S. in November 2021.

FLURPIRIDAZ F 18

- **GE Healthcare Agreement –** In April 2017, we announced entering into a definitive, exclusive Collaboration and License Agreement with GE Healthcare for the continued Phase 3 development and worldwide commercialization of flurpiridaz F 18, a fluorine 18-based PET MPI agent designed to assess blood flow to the heart in patients suspected of coronary artery disease. Under our agreement, GE Healthcare will complete the development of flurpiridaz F 18, pursue worldwide regulatory approvals, and, if successful, lead a worldwide launch and commercialization of the agent, with us collaborating on both development and commercialization through a joint steering committee. We also have the right to co-promote the

agent in the U.S. GE Healthcare's development plan initially focuses on obtaining regulatory approval in the U.S., Japan, Europe and Canada. Under the agreement, we received an upfront cash payment of $5.0 million and are eligible to receive up to $60.0 million in regulatory and sales milestone payments, tiered double-digit royalties on U.S. sales, and mid-single digit royalties on sales outside of the U.S. GE Healthcare is conducting a second Phase 3 trial and expects to complete enrollment in 2022 and, assuming completion of the Phase 3 trial and regulatory approval, begin commercialization in 2024, although completion, approval and that timing cannot be assured.

LERONLIMAB

- **CytoDyn Agreement –** Progenics entered into an agreement with CytoDyn Inc. ("CytoDyn") in 2012 to sell Progenics' rights in leronlimab (PRO 140), an investigational humanized monoclonal antibody targeting the CCR5 receptor. CCR5 appears to act as a human immunodeficiency virus ("HIV") entry inhibitor and may play a broader role in tumor metastasis and immune-mediated illnesses. The sale included milestone and royalty payment obligations to Progenics. Under the agreement, CytoDyn is responsible for all development, manufacturing and commercialization efforts. Pursuant to such agreement, Progenics received $5.0 million in upfront and milestone payments, and has the right to receive an additional $5.0 million upon the first U.S. or E.U. approval for the sale of the drug, and a 5% royalty on the net sales of approved products.

See Part I, Item 1A. "Risk Factors" for information regarding certain risks associated with our strategic activities.

Our Clinical Development Candidates

In addition to our commercial products and strategic partnerships with third parties, we also have ongoing clinical development programs that we are currently funding and managing ourselves:

- **1095** (also known as I-131-1095) is a PSMA-targeted iodine-131 labeled small molecule that is designed to deliver a dose of beta radiation directly to prostate cancer cells with minimal impact on the surrounding healthy tissues. Progenics initiated eleven clinical sites in the U.S. along with the six active sites in Canada to support enrollment in our multicenter, randomized, controlled, ARROW Phase 2 study in mCRPC. During 2020, the study was paused to minimize risk to subjects and healthcare providers during the COVID-19 pandemic, and new enrollment in that study restarted in October 2020. In the fourth quarter of 2021, we completed an interim analysis of the ARROW Phase 2 study. The Independent Data Monitoring Committee recommended the study continue without modifications. We currently expect to complete enrollment in the ARROW Phase 2 study later in 2022.
- **LMI 1195** is a fluorine 18-based PET imaging agent for the norepinephrine pathway. We have commenced a Phase 3 clinical trial for the use of LMI 1195 for the diagnosis and management of neuroblastoma tumors in pediatric and adult populations. We expect to initiate approximately 20 clinical sites in the U.S. to enroll approximately 100 patients with known or suspected neuroblastoma. The FDA has granted an Orphan Drug designation for the use of LMI 1195 in the management indication. We have also received notice of eligibility for a rare pediatric disease priority review voucher for a subsequent human drug application so long as LMI 1195 is approved by the FDA for its rare pediatric disease indication. Pursuant to federal legislation passed and signed into law in late 2020, the expiration date of the rare pediatric disease priority review voucher program was extended from September 30, 2022 to September 30, 2026.

For the years ended December 31, 2021, 2020 and 2019, we invested $45.0 million, $32.8 million and $20.0 million in research and development ("R&D"), respectively, primarily related to our clinical development candidates. In addition to our clinical development group, our R&D team also includes our Medical Affairs and Medical Information functions, which educate physicians on the scientific aspects of our commercial products and the approved indications.

See Part I, Item 1A. "Risk Factors" for information regarding certain risks associated with our strategic partnerships and clinical development programs.

Distribution, Marketing and Sales

The following table sets forth certain key market information for each of our commercial pharmaceutical products within each product category:

Product	Approved Markets
Precision Diagnostics	
DEFINITY (or LUMINITY)	Australia, Canada, European Union, European Economic Area, India, Israel, Mexico, New Zealand, Singapore, South Korea, Taiwan, United States
TechneLite	Australia, Brazil, Canada, Colombia, Costa Rica, New Zealand, Panama, South Korea, Taiwan, United States
NEUROLITE	Australia, Austria, Belgium, Canada, Costa Rica, Denmark, France, Germany, Hong Kong, Italy, Japan, Luxembourg, New Zealand, Philippines, Slovenia, South Korea, Spain, Taiwan, Thailand, United States
Xenon	Canada, United States
Cardiolite	Australia, Canada, Costa Rica, Hong Kong, Israel, Japan, New Zealand, Panama, Philippines, South Korea, Taiwan, Thailand, United States
Gallium	Australia, Canada, Colombia, Costa Rica, New Zealand, Pakistan, Panama, South Korea, Taiwan, United States
Thallium	Australia, Canada, Colombia, New Zealand, Pakistan, Panama, South Korea, Taiwan, United States
Radiopharmaceutical Oncology	
PYLARIFY	United States
AZEDRA	United States
Strategic Partnerships and Other Revenue	
RELISTOR (Solution for Injection 12 mg/0.6 mL vial)	Austria, Belgium, Bulgaria, Canada, Switzerland, Cypress, Czechia, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Iceland, Italy, Liechtenstein, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Sweden, Slovenia, Slovakia, United Kingdom, United States
RELISTOR (Solution for Injection in pre-filled syringe 8mg and pre-filled syringe 12 mg)	Austria, Belgium, Bulgaria, Canada, Cypress, Czechia, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Iceland, Italy, Liechtenstein, Lithuania, Luxembourg, Latvia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Sweden, Slovenia, Slovakia, United Kingdom, United States
RELISTOR (methylnaltrexone bromide) Oral Tablet 140 mg	United States

With respect to our other products:

- Progenics received CE marking for the standalone workstation model of aBSI, meeting the quality standards set by the European Economic Area. In September 2020, the FDA granted 510(k) clearance for the use of aBSI as software-as-a-medical device on a GE Healthcare imaging system.
- EXINI was granted 510(k) clearance by the FDA in the U.S. and received CE marking in Europe for aPROMISE. We launched aPROMISE under the name PYLARIFY AI in the U.S.

Sales of our microbubble ultrasound enhancing agent, DEFINITY, are generated in the U.S. through a DEFINITY direct sales team. While a small portion of our nuclear imaging product sales in the U.S. are generated through our direct sales force to hospitals and clinics that maintain their own in-house radiopharmaceutical preparation capabilities, we primarily sell our nuclear imaging products, including TechneLite, NEUROLITE, Xenon, and Cardiolite, to commercial radiopharmacies as described below. PYLARIFY sales are generated in the U.S. through a PYLARIFY direct sales team and a sales team at some of our PMF partners. PYLARIFY AI sales leads are generated in the U.S. through a direct sales team with sales generated through distributors and other strategic partners. AZEDRA sales are generated in the U.S. through an AZEDRA direct sales team. We have licensed RELISTOR to Bausch, and we collect quarterly royalties based on sales generated by Bausch.

As noted above, in the U.S., we have supply contracts with large radiopharmacy groups, and we sell a majority of our radiopharmaceutical products in our precision diagnostics category to five of these groups—namely Cardinal, Jubilant Radiopharma, formerly known as Triad Isotopes, Inc. (“Jubilant Radiopharma”), PharmaLogic, RLS and UPPI. Our contractual arrangements with these radiopharmacy customers generally specify pricing levels and requirements to purchase minimum percentages of certain products during certain periods. The agreements are generally multi-year arrangements that may be terminated upon the occurrence of specified events, including a material breach by the other party and certain force majeure events.

Seasonality

We have some modest seasonality for our products as patients may seek to schedule diagnostic imaging and other procedures less frequently during the summer vacation months and over the year-end holidays.

Customers

No customer accounted for greater than 10% of revenues for the year ended December 31, 2021.

Backlog

Our backlog consists of orders for which a delivery schedule within the next twelve months has been specified. Orders included in backlog may be canceled or rescheduled by customers at any time with the exception of TechneLite orders. For TechneLite, customers must provide us with four weeks advanced notice to cancel an order. We do not believe that our backlog at any particular time is meaningful because it has historically been immaterial relative to our consolidated revenues and is not necessarily indicative of future revenues for any given period.

Competition

We believe that our key product characteristics, such as proven efficacy, reliability and safety, coupled with our core competencies, such as our efficient manufacturing processes, our established distribution network, our experienced field sales organization and our customer service focus, are important factors that distinguish us from our competitors.

The markets for our products are highly competitive and continually evolving. Our principal competitors for our current commercial products and leading clinical development candidates include large, global companies that are more diversified than we are and that have substantial financial, manufacturing, sales and marketing, distribution and other resources.

- For DEFINITY, our competitors currently include GE Healthcare and Bracco.
- For a number of our SPECT radiopharmaceutical commercial products, our competitors currently include Curium, GE Healthcare, Bracco and Jubilant Life Sciences, an affiliate of JHS and Jubilant Radiopharma, as well as other competitors, including NorthStar and potentially BWXT Medical.
- For PYLARIFY, our competitors currently include Telix Pharmaceuticals Limited's Illuccix (gallium-68 PSMA-11 injection), a PSMA PET imaging agent approved by the FDA for commercialization in December 2021, and Bracco's Axumin (fluciclovine F 18), a PET imaging agent. In addition, the University of California, San Francisco and the University of California, Los Angeles have approved NDAs for a gallium-68 PSMA-11 injection for PSMA PET imaging, which we believe will primarily be used within their hospital systems. We also face potential competition from Novartis AG, which has a gallium-68 PSMA-11 kit for PET imaging currently under review with the FDA, and Bracco, which has an F 18 PSMA PET imaging agent in late stage clinical development; we believe that one or both of the Novartis and Bracco PSMA agents could be approved by the FDA for commercialization later in 2022 or in 2023.
- For RELISTOR, our principal competitors include RedHill Biopharma Inc.; Cubist Pharmaceuticals, a subsidiary of Merck & Co., Inc.; Mallinckrodt plc, in collaboration with Takeda Pharmaceutical Company Limited; and BioDelivery Sciences International, Inc.; together with other prescription, as well as over-the-counter, laxatives used as first line therapy for OIC.
- For AZEDRA, there are currently no other FDA approved anticancer treatments in the U.S. for malignant, recurrent, and/or unresectable pheochromocytoma and paraganglioma.

The markets into which any of our product candidates would be launched, if approved, are also highly competitive and continually evolving.

- For 1095, our principal competitors in the field of mCRPC for radiopharmaceutical therapeutics may include Novartis AG; POINT Biopharma; Telix Pharmaceuticals Limited; and Bayer HealthCare Pharmaceuticals Inc., each of which have product candidates in development.
- For LMI 1195, our principal competitors may include GE Healthcare's iobenguane 123 injection.
- For flurpiridaz, our principal competitors may include rubidium generators from Bracco and Jubilant Radiopharma.

We cannot anticipate the actions of our current or future competitors in the same or competing diagnostic modalities, such as significant price reductions on products that are comparable to our own, development of new products or other technologies that are more cost-effective or have superior performance than our current products or the introduction of generic versions after our proprietary products lose their patent protection. In addition, distributors of our products could attempt to shift end-users to competing diagnostic

modalities and products, or bundle the sale of a portfolio of products, to the detriment of our specific products. Our current or future products could be rendered obsolete or uneconomical as a result of these activities.

Further, the radiopharmaceutical and biopharmaceutical industry continues to evolve strategically, with several market participants either recently sold or for sale. In addition, the supply-demand dynamics of the industry are complex because of large market positions of some participants, legacy businesses, government subsidies (in particular, relating to the manufacture of radioisotopes), and group purchasing arrangements. We cannot predict what impact new owners and new operators may have on the strategic decision-making of our competitors, customers and suppliers.

Raw Materials and Supply Relationships

We rely on certain raw materials and supplies to produce our products. Due to the specialized nature of our products and the limited, and sometimes intermittent, supply of raw materials available in the market, we have established relationships with several key suppliers. For the year ended December 31, 2021, our largest suppliers of raw materials and supplies were Institute for Radioelements ("IRE"), the Australian Nuclear Science and Technology Organisation ("ANSTO") and NTP Radioisotopes ("NTP"), which, in the aggregate, accounted for approximately 21% of our total purchases.

Molybdenum-99

Our TechneLite, Cardiolite and NEUROLITE products all rely on Mo-99, the radioisotope which is produced by bombarding uranium with neutrons in research reactors. With a 66-hour half-life, Mo-99 decays into, among other things, Tc-99m, another radioisotope with a half-life of six hours. Tc-99m is the isotope that is attached to radiopharmaceuticals, including our own NEUROLITE and Cardiolite, during the labeling process and is the most common radioisotope used for medical diagnostic imaging purposes.

We currently purchase finished Mo-99 from three of the four main processing sites in the world, namely IRE in Belgium, NTP in South Africa and ANSTO in Australia. These processing sites provide us Mo-99 from five of the six main Mo-99-producing reactors in the world, namely BR2 in Belgium, LVR-15 in the Czech Republic, HFR in The Netherlands, SAFARI in South Africa and OPAL in Australia.

Our agreement with IRE (the "IRE Agreement") contains minimum percentage volume requirements and unit pricing. The IRE Agreement also requires IRE to provide certain favorable allocations of Mo-99 during periods of supply shortage or failure. The IRE Agreement also provides for an increased supply of Mo-99 derived from LEU targets upon IRE's completion of its ongoing conversion program to modify its facilities and processes in accordance with Belgian nuclear security commitments. The IRE Agreement allows for termination upon the occurrence of certain events, including failure by IRE to provide our required amount of Mo-99, material breach of any provision by either party, bankruptcy by either party or force majeure events. The IRE Agreement expires on December 31, 2023, and automatically renews on an annual basis thereafter, subject to prior notice of non-renewal by either party.

Our agreement with NTP (the "NTP Agreement"), with NTP acting for itself and on behalf of its subcontractor ANSTO, specifies our percentage purchase requirements and unit pricing, and provides for the supply of Mo-99 derived from LEU targets from NTP and ANSTO. The NTP Agreement allows for termination upon the occurrence of certain events, including failure by NTP to provide our required amount of Mo-99, material breach of any provision by either party, bankruptcy by either party or force majeure events. The NTP Agreement expires on March 31, 2022, and we are actively negotiating an extension.

Despite our globally diverse Mo-99 suppliers, we still face supplier and logistical challenges in our Mo-99 supply chain. The NTP processing facility had periodic outages in 2017, 2018 and 2019. When NTP was not producing, we relied on Mo-99 supply from both IRE and ANSTO to limit the impact of the NTP outages. In 2019 and 2020, ANSTO experienced multiple facility issues that resulted in ANSTO outages and volume limitations, during which time we relied on IRE and NTP to limit the impact of those outages and limitations. Because of the COVID-19 pandemic, we experienced challenges receiving regularly scheduled orders of Mo-99 from our global suppliers, particularly in the second quarter of 2020. We continue to manage these various supply chain challenges. Depending on reactor and processor schedules and operations, at times we have not been able to fill some or all of the demand for our TechneLite generators on certain manufacturing days. A prolonged disruption of service from one of our three Mo-99 processing sites or one of their main Mo-99-producing reactors could have a substantial negative effect on our business, results of operations, financial condition and cash flows.

To augment our current supply of Mo-99, we entered into a strategic arrangement with SHINE Medical Technologies LLC ("SHINE") for the future supply of Mo-99. Under the terms of the supply agreement, entered into in November 2014, SHINE will provide Mo-99 produced using its proprietary LEU-solution technology for use in our TechneLite generators once SHINE's facility becomes operational and receives all necessary regulatory approvals, which SHINE now estimates will occur in 2023. The term of this arrangement provides for three years of supply of Mo-99. However, we cannot assure you that our arrangement with SHINE will

result in commercial quantities of Mo-99 for our business, or that SHINE together with our current suppliers will be able to deliver a sufficient quantity of Mo-99 to meet our needs.

Xenon

Xenon is a by-product of the Mo-99 production process. Under a strategic agreement entered into in 2021, we receive from IRE bulk unprocessed Xenon, which we process and finish for our customers at our North Billerica, Massachusetts manufacturing facility. That contract runs through December 31, 2023, with auto-renewal provisions and terminable upon notice of non-renewal. Until we can qualify an additional source of bulk unprocessed Xenon, we will rely on IRE as a sole source provider.

Iodine 131

Iodine 131 is also a by-product of the Mo-99 production process, and it is the active radioisotope ingredient in both AZEDRA and 1095. We receive Iodine 131 from IRE in Belgium and we are in the process of securing a secondary source. We use Iodine 131 at our Somerset facility to manufacture and produce AZEDRA. We also rely on Center for Probe Development and Commercialization ("CPDC") in Canada for our clinical supply requirements for 1095. CPDC sources Iodine 131 from IRE in Belgium and NTP in South Africa.

Other Materials

We have additional supply arrangements for active pharmaceutical ingredients, excipients, packaging materials and other materials and components, none of which are exclusive, but a number of which are sole source, and all of which we currently believe are either in good standing or replaceable without any material disruption to our business.

See Part I, Item 1A. "Risk Factors" for information regarding certain risks associated with our raw materials and supply arrangements.

Manufacturing

We maintain manufacturing operations at our North Billerica, Massachusetts facility. We manufacture TechneLite on a highly automated production line, Thallium and Gallium and certain radiochemicals using our cyclotron technology, and we process and finish Xenon on a hot cell line. We also operate a manufacturing facility at Somerset, NJ, using a hot cell line for AZEDRA. During 2021, we increased the manufacturing staff at our Somerset facility to help maintain an adequate supply of AZEDRA. We also began constructing an additional manufacturing suite at Somerset which, if approved by the FDA, could provide redundancy for AZEDRA manufacturing as well as increased overall future capacity for 1095, if approved by the FDA or other iodine-based products.

We have constructed a specialized in-house manufacturing facility at our North Billerica campus for purposes of producing DEFINITY and, potentially, other sterile vial products. On February 22, 2022, we received FDA approval of our sNDA, authorizing commercial manufacturing of DEFINITY at our new facility. DEFINITY manufactured at this facility became commercially available on February 23, 2022. We believe this investment will allow us to better manage DEFINITY manufacturing and inventory, reduce our costs in a potentially more price competitive environment, and provide us with supply chain redundancy.

We manufacture, finish and distribute our radiopharmaceutical products on a just-in-time basis, and supply our customers with these products either by next day delivery services or by either ground or air custom logistics. We believe that our substantial capital investments in our highly automated generator production line, our cyclotrons and our other manufacturing assets, which we have made over the years, and our extensive experience in complying with the stringent regulatory requirements for the handling of nuclear materials and operations in a highly regulated environment, create significant and sustainable competitive advantages for us.

In addition to our in-house manufacturing capabilities, a substantial portion of our products are manufactured by third party contract manufacturing organizations, and in certain instances, we rely on them for sole source manufacturing. To ensure the quality of the products that are manufactured by third parties, the key raw materials used in those products are first sent to our North Billerica, Massachusetts facility, where we test them prior to the third party manufacturing of the final product. After the final products are manufactured, they are sent back to us for final quality control testing, and then we ship them to our customers. We have expertise in the design, development and validation of complex manufacturing systems and processes, and our strong execution and quality control culture supports the just-in-time manufacturing model at our manufacturing facilities.

The commercial manufacture of PYLARIFY required us to create a field-based network of specialized PMFs with radioisotope-producing cyclotrons. The radioisotope used in PYLARIFY is F 18, which has a 110 minute half-life, requiring that this agent be manufactured and distributed rapidly to end-users. After being made on a cyclotron at a PMF, the F 18 is then combined with certain chemical ingredients in specially designed chemistry synthesis boxes to manufacture PYLARIFY. The finished PYLARIFY is then quality control tested and transferred to a radiopharmacist who prepares and dispenses patient-specific doses from the final product. Because each of the PMFs manufacturing PYLARIFY is deemed by the FDA to be a separate manufacturing site, each requires separate FDA approval, and we can give no assurance that the FDA will continue to approve PMFs in accordance with our planned roll-out schedule for PYLARIFY, particularly given ongoing challenges of the COVID-19 pandemic. Flurpiridaz F 18, if approved by the FDA, will have a manufacturing and PMF approval process similar to PYLARIFY.

Manufacturing and Supply Arrangements

We currently have the following technology transfer and manufacturing and supply agreements in place for some of our major products:

- *DEFINITY, Cardiolite and NEUROLITE*—In February 2022, we entered into a new Manufacturing and Supply Agreement with JHS, for the manufacture of DEFINITY, Cardiolite, NEUROLITE and evacuation vials. The new agreement, which superseded all of our prior agreements with JHS for those products, expires on December 31, 2027 and can be renewed upon mutual consent. The agreement allows for termination upon the occurrence of certain events such as a material breach or default by either party, or bankruptcy by either party. The agreement also requires us to order from JHS a specified minimum percentage of our requirements for DEFINITY and fixed quantities of Cardiolite and NEUROLITE each year during the contract term. Based on our current projections, we believe that we will have sufficient supply of DEFINITY from JHS and our in-house manufacturing facility and sufficient supply of Cardiolite and NEUROLITE products from JHS to meet expected demand.
- *PYLARIFY*—The commercial manufacture of PYLARIFY required us to create a field-based network of specialized PMFs with radioisotope-producing cyclotrons. In preparation for our commercial launch, we entered into commercial supply agreements with different radiopharmacy networks. Under our supply agreements, the PMF manufactures the radioisotope F 18 on a cyclotron, and then combines the F 18 with certain chemical ingredients in specially designed chemistry synthesis boxes to manufacture PYLARIFY. The finished PYLARIFY is then quality control tested and transferred to the PMF's radiopharmacist who prepares and dispenses patient-specific doses from the final product. Our agreements with our PMF networks allow for the termination upon the occurrence of specified events, including material breach or bankruptcy by either party, and have various termination dates generally terminating in 2025 and subject to renewal provisions.

See Part I, Item 1A. "Risk Factors" for information regarding certain risks associated with our manufacturing and supply relationships.

Intellectual Property

Patents, trademarks and other intellectual property rights, both in the U.S. and foreign countries, are very important to our business. We also rely on trade secrets, manufacturing know-how, technological innovations, licensing agreements and confidentiality agreements to maintain and improve our competitive position. We review third party proprietary rights, including patents and patent applications, as available, in an effort to develop an effective intellectual property strategy, avoid infringement of third party proprietary rights, identify licensing opportunities and monitor the intellectual property owned by others. Our ability to enforce, defend and protect our intellectual property rights may be limited in certain countries outside the U.S., which could make it easier for competitors to capture market position in those countries by utilizing technologies that are similar to those developed or licensed by us. Competitors also may harm our sales by designing products that mirror the capabilities of our products or technology without infringing our intellectual property rights. If we do not obtain sufficient protection for our intellectual property, or if we are unable to effectively enforce or defend our intellectual property rights, our competitiveness could be impaired, which would limit our growth and future revenue.

Trademarks, Service Marks and Trade Names

We own various trademarks, service marks and trade names, including, among others, AZEDRA, AZEDRA Service Connection, Cardiolite, DEFINITY, DEFINITY RT, EXINI, Find, Fight and Follow, Find > Fight > Follow, Lantheus, Lantheus Medical Imaging, LUMINITY, Molecular Insight, NEUROLITE, Progenics, Progenics Pharmaceuticals, PYLARIFY, PYLARIFY AI, TechneLite, VIALMIX and VIALMIX RFID. We have registered these trademarks, as well as others, in the U.S. and/or numerous foreign jurisdictions.

Patents

We actively seek to protect the proprietary technology that we consider important to our business, including chemical species, compositions and formulations, their methods of use and processes for their manufacture, as new intellectual property is developed. In addition to seeking patent protection in the U.S., we file patent applications in numerous foreign countries in order to further protect the inventions that we consider important to the development of our international business. We also rely upon trade secrets and contracts to protect our proprietary information.

We have patent protection on certain of our commercial products and on all of our clinical development candidates. We typically seek patent protection in major markets around the world, including, among others, the U.S., Canada, Western Europe, Asia, Central America and South America. All patent terms described below are presented without giving effect to any applicable patent term adjustments or regulatory extensions.

DEFINITY - We continue to actively pursue additional patents in connection with DEFINITY and DEFINITY RT, both in the U.S. and internationally. In the U.S. for DEFINITY, we have four Orange Book-listed method of use patents, one of which expires in 2035 and three of which expire in 2037, as well as additional manufacturing patents that are not Orange Book-listed expiring in 2023 and 2037. In the U.S. for DEFINITY RT, we have five Orange Book-listed patents, including a composition of matter patent which expires in 2035. Outside of the U.S., we are currently pursuing additional DEFINITY and DEFINITY RT patents to obtain similar patent protection as in the U.S. The Orange Book-listed patents include a patent on the use of VIALMIX RFID which expires in 2037; additional VIALMIX RFID patent applications have been submitted in major markets throughout the world.

Even though our longest duration Orange Book-listed DEFINITY patent extends until March 2037, because our Orange Book-listed composition of matter patent expired in June 2019, we may face generic DEFINITY challengers in the near to intermediate term. Under the Hatch-Waxman Act, the FDA can approve Abbreviated New Drug Applications (“ANDAs”) for generic versions of drugs if the ANDA applicant demonstrates, among other things, that (i) its generic candidate is the same as the innovator product by establishing bioequivalence and providing relevant chemistry, manufacturing and product data, and (ii) either the marketing of that generic candidate does not infringe the Orange Book-listed patent(s) or the Orange Book-listed patent(s) is invalid. Similarly, the FDA can approve a Section 505(b)(2) NDA from an applicant that relies on some of the information required for marketing approval to come from studies which the applicant does not own or have a legal right of reference. With respect to the Orange Book-listed patent(s) covering an innovator product, the ANDA applicant or the Section 505(b)(2) applicant (if relying on studies related to the innovator product) (together, the “Applicant”) must give a notice (a “Notice”) to the innovator of its certification that its generic candidate will not infringe the innovator’s Orange Book-listed patent(s) or that the Orange Book-listed patent(s) is invalid. The innovator can then file suit against the Applicant within 45 days of receiving the Notice, and FDA approval to commercialize the generic candidate will be stayed (that is, delayed) for up to 30 months (measured from the date on which a Notice is received) while the patent dispute between the innovator and the Applicant is resolved in court. The 30-month stay could potentially expire sooner if the courts determine that no infringement had occurred or that the challenged Orange Book-listed patent is invalid or if the parties otherwise settle their dispute. We can give no assurance that we would have grounds to file a patent infringement suit, that we would obtain the full 30 month stay, that we would be successful on the merits asserting that an Applicant infringes our Orange Book-listed patent, or that we would be successful defending the validity or enforceability of our Orange Book-listed patent in court or in a USPTO adversarial proceeding.

As of the date of filing of this Annual Report on Form 10-K, we have not received any Notice from an Applicant. If we were to (i) receive any such Notice in the future, (ii) bring a patent infringement suit against the Applicant within 45 days of receiving that Notice, and (iii) successfully obtain the full 30-month stay, then the Applicant would be precluded from commercializing a generic version of DEFINITY prior to the expiration of that 30-month stay period and, potentially, thereafter, depending on how the patent dispute is resolved. Solely by way of example and not based on any knowledge we currently have, if we received a Notice from an Applicant in March 2022 and the full 30-month stay were obtained, then the Applicant would be precluded from commercialization until at least September 2024. If we received a Notice some number of months in the future and the full 30-month stay were obtained, the commercialization date would roll forward in the future by the same number of months. In the event a 505(b)(2) applicant does not rely on studies related to the innovator product, the 30-month stay would not apply, but additional clinical studies may be required.

TechneLite - We currently own patents in the U.S. and various foreign countries on certain component technology expiring in 2029, and we are pursuing additional patent protection in the U.S. and world-wide on other component technology that, if granted, would expire in 2040. In addition, given the significant know-how and trade secrets associated with the methods of manufacturing and assembling the TechneLite generator, we believe we have a substantial amount of valuable and defensible proprietary intellectual property associated with the product.

PYLARIFY - We actively pursue patents in connection with PYLARIFY, both in the U.S. and internationally. In the U.S. for PYLARIFY, we have four Orange Book-listed patents, including composition of matter patents which expire in 2030 and 2037. Outside of the U.S., we are currently pursuing additional PYLARIFY patents to obtain similar patent protection as in the U.S.

PYLARIFY AI - U.S. Patents and pending patent applications worldwide relating to automated medical image analysis, have expiration ranges from 2037 to 2041.

Other Nuclear Products - Neither Cardiolite nor NEUROLITE is covered any longer by patent protection in either the U.S. or the rest of the world. Xenon, Thallium and Gallium have no patent protection; however, we have patent protection in the U.S. that expires in October 2035 for an improved container for Xenon, and are pursuing similar patent protection outside the U.S.

RELISTOR - Although the composition of matter patent for the active ingredient, methylnaltrexone, has expired, there are additional patents and pending patent applications covering various inventions relating to the product. There are eight Orange Book listed patents that cover the subcutaneous RELISTOR product, which have expiration dates ranging from 2024 to 2030, and there are nine Orange Book listed patents that cover the RELISTOR tablet product, which have expiration dates ranging from 2029 to 2031.

Progenics has entered into three separate settlement agreements that have granted non-exclusive limited licenses with respect to certain RELISTOR subcutaneous injection applications. The non-exclusive limited licenses with two parties are currently effective on January 1, 2028 and the third non-exclusive limited license is currently effective on July 1, 2028, in each case, subject to potential acceleration clauses in those agreements. Four Canadian patents (two expiring in 2024, one in 2027 and one in 2029) have been listed with Health Canada relating to subcutaneous RELISTOR.

AZEDRA - The AZEDRA technology patent family was licensed from the University of Western Ontario (“UWO”). While certain of those patents, and associated license, have already expired, a patent relating to alternative approaches for preparing AZEDRA (not currently implemented) expires worldwide in 2022 and 2024. In addition, we own pending applications worldwide for manufacturing improvements, and the resulting compositions which, if issued, would expire in 2035.

aBSI - We own patents relating to automated detection of bone cancer metastases. The patents on this technology expire in the U.S. in 2032 and outside of the U.S. in 2028. Patent applications are pending in the U.S. and worldwide relating to aBSI improvements which, if issued, will expire in 2040.

1095 - We own patents relating to 1095 that expire from 2027 to 2031, with the composition of matter as well as radiolabeled forms in the U.S. and Europe expiring in 2027. Additional U.S. patents for stable compositions and radiolabeling processes expire, respectively, in 2030 and 2031.

LMI 1195 - We own patents and patent applications in numerous jurisdictions covering composition, use, and manufacturing, including in the U.S. a composition of matter patent expiring in 2030, a method of use patent expiring in 2027, and manufacturing-related patents expiring in 2031 and 2032, and patent applications which, if granted, will expire in 2027 and in 2031.

flurpiridaz F 18 - We own patents and patent applications in numerous jurisdictions covering composition, use, formulation and manufacturing, including in the U.S. a composition of matter patent expiring in 2026, a formulation patent expiring in 2032, a method of use patent expiring in 2028, and manufacturing-related patents expiring in 2031 and 2033, and various patent applications, some of which, if granted, will expire in 2033.

1404 - We own patents relating to composition of matter, as well as technetium-99 labeled forms of 1404 expiring in the U.S. from 2029 to 2030, and expiring worldwide in 2029. In-licensed patents relating to reagents for radiolabeling expire in the U.S. in 2022.

PSMA TTC - We own and in-license composition of matter patents on PSMA antibodies expiring in the U.S. in 2022 and 2023 and outside of the U.S. in 2022.

In addition to patents, we rely, where necessary, upon unpatented trade secrets and know-how, proprietary information and continuing technological innovation to develop and maintain our competitive position. We seek to protect our proprietary information, in part, using confidentiality agreements with our collaborators, employees, consultants and other third parties and invention assignment agreements with our employees. These confidentiality agreements may not prevent unauthorized disclosure of trade secrets and other proprietary information, and we cannot provide assurances that an employee or an outside party will not make an unauthorized disclosure of our trade secrets, other technical know-how or proprietary information. We may not have adequate monitoring abilities to discover, or adequate remedies for, any unauthorized disclosure. This might happen intentionally or inadvertently. It is possible that a competitor will make use of such information, and that our competitive position will be compromised, in spite of any legal action we might take against persons making such unauthorized disclosures. In addition, our trade secrets may otherwise become known or be independently discovered by competitors. To the extent that our collaborators, employees and consultants use intellectual property owned by others in their work for us, disputes may arise as to the rights in related or resulting know-how and inventions.

In addition, we license third party technologies and other intellectual property rights that are incorporated into some elements of our drug discovery and development efforts. Some of these licenses are material to our business – for example, the licenses on the PYLARIFY patent family from Johns Hopkins University (“JHU”) and on the patent rights on RELISTOR from Wyeth LLC.

See Part I, Item 1A. “Risk Factors” for information regarding certain risks associated with our intellectual property.

Regulatory Matters

Food and Drug Laws

The development, manufacture and commercialization of our products are subject to comprehensive governmental regulation both within and outside the U.S. A number of factors substantially increase the time, difficulty and costs incurred in obtaining and maintaining the approval to market newly developed and existing products. These factors include governmental regulation, such as detailed inspection of and controls over research and laboratory procedures, clinical investigations, manufacturing, marketing, sampling, distribution, import and export, record keeping and storage and disposal practices, together with various post-marketing requirements. Governmental regulatory actions can result in the seizure or recall of products, suspension or revocation of the authority necessary for their production and sale as well as other civil or criminal sanctions.

Our activities related to the development, manufacture, packaging or repackaging of our products subject us to a wide variety of laws and regulations. We are required to register for permits and/or licenses with, seek approvals from and comply with operating and security standards of, the FDA, the U.S. Nuclear Regulatory Commission (“NRC”), the U.S. Department of Health and Human Services (“HHS”), Health Canada, the European Medicines Agency (“EMA”), the U.K. Medicines and Healthcare Products Regulatory Agency (“MHRA”), the NMPA and various state and provincial boards of pharmacy, state and provincial controlled substance agencies, state and provincial health departments and/or comparable state and provincial agencies, as well as foreign agencies, and certain accrediting bodies depending upon the type of operations and location of product distribution, manufacturing and sale.

The FDA and various state regulatory authorities regulate the research, testing, manufacture, safety, labeling, storage, recordkeeping, premarket approval, marketing, advertising and promotion, import and export, and sales and distribution of pharmaceutical products in the U.S. Prior to marketing a pharmaceutical product, we must first receive FDA approval. In the U.S., the FDA regulates drugs under the Federal Food, Drug, and Cosmetic Act (“FDCA”) and implementing regulations. The process of obtaining regulatory approvals and compliance with appropriate federal, state, local, and foreign statutes and regulations requires the expenditure of substantial time and financial resources. Currently, the process required by the FDA before a drug product may be marketed in the U.S. generally involves the following:

- Completion of preclinical laboratory tests, animal studies and formulation studies according to current Good Laboratory Practices regulations;
- Submission to the FDA of an investigational new drug application (“IND”) which must become effective before human clinical studies may begin, including review and approval by any institutional review board (“IRB”), serving any of the institutions participating in the clinical studies;
- Performance of adequate and well-controlled human clinical studies according to current Good Clinical Practices and other requirements, to establish the safety and efficacy of the proposed drug product for its intended use;
- Submission to the FDA of a new drug application (“NDA”) for a new drug;
- Satisfactory completion of an FDA inspection of the manufacturing facility or facilities at which the drug product is produced to assess compliance with current Good Manufacturing Practices (“cGMPs”) regulations; and
- FDA review and approval of the NDA.

The testing and approval process requires substantial time, effort, and financial resources, and we cannot be certain that any approvals for our agents in development will be granted on a timely basis, if at all. Once a pharmaceutical agent is identified for development, it enters the preclinical testing stage. Preclinical tests include laboratory evaluations of product chemistry, toxicity, formulation, and stability, as well as animal studies to assess its potential safety and efficacy. This testing culminates in the submission of the IND to the FDA.

Once the IND becomes effective, including review and approval by any IRB serving any of the institutions participating in the clinical trial, the clinical trial program may begin. Each new clinical trial protocol must be submitted to the FDA before the study may begin. Human clinical studies are typically conducted in three sequential phases that may overlap or be combined:

- *Phase 1.* The agent is initially introduced into healthy human subjects and tested for safety, dosage tolerance, absorption, metabolism, distribution and excretion. In the case of some products for severe or life-threatening diseases, especially when the agent may be too inherently toxic to ethically administer to healthy volunteers, the initial human testing is often conducted in patients with those diseases.

- *Phase 2.* Involves studies in a limited patient population to identify possible adverse effects and safety risks, to evaluate preliminarily the efficacy of the agent for specific targeted diseases and to determine dosage tolerance and optimal dosage and schedule.
- *Phase 3.* Clinical studies are undertaken to further evaluate dosage, clinical efficacy and safety in an expanded patient population at geographically dispersed clinical study sites. These studies are intended to collect sufficient safety and efficacy data to support the NDA for FDA approval.

Progress reports detailing the results of the clinical studies must be submitted at least annually to the FDA and safety reports must be submitted to the FDA and the investigators for serious and unexpected adverse events. Submissions must also be made to inform the FDA of certain changes to the clinical trial protocol. Federal law also requires the sponsor to register the trials on public databases when they are initiated, and to disclose the results of the trials on public databases upon completion. Phase 1, Phase 2 and Phase 3 testing may not be completed successfully within any specified period, if at all. The FDA or the clinical trial sponsor may suspend or terminate a clinical study at any time on various grounds, including a finding that the research subjects or patients are being exposed to an unacceptable health risk. Similarly, any IRB serving any of the institutions participating in the clinical trial can suspend or terminate approval of a clinical study at a relevant institution if the clinical study is not being conducted in accordance with the IRB's requirements or if the agent has been associated with unexpected serious harm to patients. Failure to register a clinical trial or disclose study results within the required time periods could result in penalties, including civil monetary penalties.

Concurrent with clinical studies, companies usually complete additional animal studies and must also develop additional information about the chemistry and physical characteristics of the product and finalize a process for manufacturing the product in commercial quantities in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the agent and, among other things, the manufacturer must develop methods for testing the identity, strength, quality and purity of the final product. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the agent does not undergo unacceptable deterioration over its shelf life.

The results of product development, preclinical studies and clinical studies, along with descriptions of the manufacturing process, analytical tests conducted on the drug product, proposed labeling, and other relevant information, are submitted to the FDA as part of an NDA for a new drug, requesting approval to market the agent. The submission of an NDA is subject to the payment of a substantial user fee. A waiver of that fee may be obtained under certain limited circumstances. The approval process is lengthy and difficult, and the FDA may refuse to approve an NDA if the applicable regulatory criteria are not satisfied. The FDA has substantial discretion in the product approval process, and it is impossible to predict whether and when the FDA will grant marketing approval. The FDA may on occasion require the sponsor of an NDA to conduct additional clinical studies or to provide other scientific or technical information about the product, and these additional requirements may lead to unanticipated delay or expense. Even if such data and information are submitted, the FDA may ultimately decide that the NDA does not satisfy the criteria for approval. Data obtained from clinical studies are not always conclusive, and the FDA may interpret data differently than we interpret the same data.

If a product receives regulatory approval, the approval may be significantly limited to specific diseases and dosages or the indications for use may otherwise be limited, which could restrict the commercial value of the product. Further, the FDA may require that certain contraindications, warnings or precautions be included in the product labeling. In addition, the FDA may require Phase 4 testing which involves clinical studies designed to further assess a drug product's safety and effectiveness after NDA approval. The FDA also may impose one or more Risk Evaluation and Mitigation Strategies ("REMS") to ensure that the benefits of a product outweigh its risks. A REMS could add training requirements for healthcare professionals, safety communications efforts and limits on channels of distribution, among other things. The sponsor would be required to evaluate and monitor the various REMS activities and adjust them if need be. Whether a REMS would be imposed on any of our products and any resulting financial impact is uncertain at this time.

Under the Orphan Drug Act, the FDA may designate a product as an Orphan Drug if it is a drug intended to treat a rare disease or condition, which is generally defined as a patient population of fewer than 200,000 individuals annually in the United States, or a patient population greater than 200,000 in the United States where there is no reasonable expectation that the cost of developing the drug will be recovered from sales in the United States. AZEDRA currently has the Orphan Drug designation in the United States.

In the United States, Orphan Drug designation entitles a party to financial incentives such as opportunities for grant funding towards clinical trial costs, tax advantages and user-fee waivers. In addition, if a product that has Orphan Drug designation subsequently receives the first FDA approval for the disease for which it has such designation, the product is entitled to Orphan Drug exclusivity, which means the FDA may not approve any other application to market the same drug for the same indication for a period of seven years, except in limited circumstances, such as a showing of clinical superiority over the product with orphan exclusivity or where the manufacturer is unable to assure sufficient product quantity.

Under Section 529 of the FDCA, companies that develop new drugs for the prevention and treatment of certain rare pediatric diseases may be eligible for a rare pediatric disease priority review voucher for a subsequent human drug application. The voucher is only granted if the drug is approved for the rare pediatric disease, but once granted, the voucher can either be used by the recipient or sold to a third party, typically a large pharmaceutical or related company that seeks priority review for an unrelated drug it expects will generate substantial revenue. Pursuant to federal legislation passed and signed into law in late 2020, the expiration date of the rare pediatric disease priority review voucher program was extended from September 30, 2022 to September 30, 2026.

Any drug products for which we receive FDA approvals are subject to continuing regulation by the FDA, including, among other things, record-keeping requirements, reporting of adverse experiences with the product, providing the FDA with updated safety and efficacy information, product sampling and distribution requirements, complying with certain electronic records and signature requirements, and complying with FDA promotion and advertising requirements. The FDA strictly regulates labeling, advertising, promotion and other types of information on drug products that are placed on the market. Drugs may be promoted only for the approved indications and consistent with the provisions of the approved label and promotional claims must be appropriately balanced with important safety information and otherwise be adequately substantiated. Further, manufacturers of drugs must continue to comply with cGMP requirements, which are extensive and require considerable time, resources and ongoing investment to ensure compliance. In addition, changes to the manufacturing process generally require prior FDA approval before being implemented, and other types of changes to the approved product, such as adding new indications and additional labeling claims, are also subject to further FDA review and approval.

Drug product manufacturers and other entities involved in the manufacturing and distribution of approved drugs products are required to register their establishments with the FDA and certain state agencies, and are subject to periodic unannounced inspections by the FDA and certain other agencies for compliance with cGMP and other laws. The cGMP requirements apply to all stages of the manufacturing process, including the production, processing, sterilization, packaging, labeling, storage and shipment of the drug product. Manufacturers must establish validated systems to ensure that products meet specifications and regulatory standards, and test each product batch or lot prior to its release. In addition, manufacturers of commercial PET products such as PYLARIFY, including radiopharmacies, hospitals and academic medical centers, are required to submit either an NDA or ANDA in order to produce PET drugs for clinical use, or produce the drugs under an IND.

The FDA also regulates the preclinical and clinical testing, design, manufacture, safety, efficacy, labeling, storage, record keeping, sales and distribution, post-market adverse event reporting, import/export and advertising and promotion of any medical devices that we distribute pursuant to the FDCA and FDA's implementing regulations. The Federal Trade Commission shares jurisdiction with the FDA over the promotion and advertising of certain medical devices. The FDA can also impose restrictions on the sale, distribution or use of medical devices at the time of their clearance or approval, or subsequent to marketing. Currently, medical devices comprise only a small portion of our revenues.

The FDA may withdraw marketing authorization for a product if compliance with regulatory standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously-unknown problems with a product may result in restrictions on the product or even complete withdrawal of the product from the market. Further, the failure to maintain compliance with regulatory requirements may result in administrative or judicial actions, such as fines, civil monetary penalties, warning letters, holds on clinical studies, product recalls or seizures, product detention or refusal to permit the import or export of products, refusal to approve pending applications or supplements, restrictions on marketing or manufacturing, injunctions, or civil or criminal penalties.

Regulations are subject to change as a result of legislative, administrative or judicial action, which may also increase our costs or reduce sales or otherwise adversely impact our products. For example, on April 16, 2021 in the case Genus Medical Technologies LLC v. Food and Drug Administration, the U.S. Court of Appeals for the D.C. Circuit held that a product (other than a combination product) that meets the definitions of both "drug" and "device" under the FDCA must be regulated as a device. On August 9, 2021, the FDA announced that, as part of its implementation of this court decision, the FDA intended to regulate products that meet both the device and drug definition as devices, except where Congress intended a different classification. The FDA further indicated that it intended to bring previously classified products into line with the court decision and would reexamine whether individual imaging agents meet the device definition. In connection with its announcement, the FDA requested comments from the industry on five topics: categories of products implicated by the court decision; the transition process; the transition timing; user fee transitions; and determining drug or device status. We submitted comments to the FDA in response to its request for comments. While we question whether the FDA has authority to make this change, we believe that pre-existing law already establishes that a broad spectrum of imaging agents have already been established by Congress to be "drugs", and do not believe that any of our imaging agents meets the definition of a "device" under the FDCA. We can give no assurance that the FDA will agree with our position. In addition, if the FDA determines that one or more of our imaging agents meet the definition of a "device", we do not know when such reclassification would be effective, how any transition rules would be formulated or applied, and whether or not the legal framework provided by the Hatch-Waxman Act described below would be preserved for some time after such reclassification. A reclassification of one or more of our imaging agents as a "device" could have a material adverse effect on our business, results of operations, financial condition and cash flows.

Because our operations include the manufacture and distribution of medical radioisotopes and other medical products, we are subject to regulation by the NRC and the departments of health of each state in which we operate and the applicable state boards of pharmacy. In addition, the FDA is also involved in the regulation of cyclotron facilities where PET products are produced in compliance with cGMP requirements and U.S. Pharmacopeia requirements for PET drug compounding.

Drug laws also are in effect in many of the non-U.S. markets in which we or our partners conduct business. These laws range from comprehensive drug approval requirements to requests for product data or certifications. In addition, inspection of and controls over manufacturing, as well as monitoring of adverse events, are components of most of these regulatory systems. Most of our business is subject to varying degrees of governmental regulation in the countries in which we or our partners operate, and the general trend is toward increasingly stringent regulation. The exercise of broad regulatory powers by the FDA continues to result in increases in the amount of testing and documentation required for approval or clearance of new drugs and devices, all of which add to the expense of product introduction. Similar trends also are evident in major non-U.S. markets, including Canada, the European Union, Australia and Japan.

To assess and facilitate compliance with applicable FDA, NRC and other state, federal and foreign regulatory requirements, we regularly review our quality systems to assess their effectiveness and identify areas for improvement. As part of our quality review, we perform assessments of our suppliers of the raw materials that are incorporated into products and conduct quality management reviews designed to inform management of key issues that may affect the quality of our products. From time to time, we may determine that products we manufactured or marketed do not meet our specifications, published standards, such as those issued by the International Standards Organization, or regulatory requirements. When a quality or regulatory issue is identified, we investigate the issue and take appropriate corrective action, such as withdrawal of the product from the market, correction of the product at the customer location, notice to the customer of revised labeling and other actions.

Hatch-Waxman Act

The Hatch-Waxman Act added two pathways for FDA drug approval. First, the Hatch-Waxman Act permits the FDA to approve ANDAs for generic versions of drugs if the ANDA applicant demonstrates, among other things, that its product is bioequivalent to the innovator product and provides relevant chemistry, manufacturing and product data. See “Item 1. Business - Patents.” Second, the Hatch-Waxman Act created what is known as a Section 505(b)(2) NDA, which requires the same information as a full NDA (known as a Section 505(b)(1) NDA), including full reports of clinical and preclinical studies but allows some of the information from the reports required for marketing approval to come from studies which the applicant does not own or have a legal right of reference. A Section 505(b)(2) NDA permits a manufacturer to obtain marketing approval for a drug without needing to conduct or obtain a right of reference for all of the required studies. The Hatch-Waxman Act also provides for: (1) restoration of a portion of a product’s patent term that was lost during clinical development and application review by the FDA; and (2) statutory protection, known as exclusivity, against the FDA’s acceptance or approval of certain competitor applications.

Under U.S. law, patent term extension can compensate for time lost during product development and the regulatory review process by returning up to five years of patent life for a patent that covers a new product or its use. This period is generally one-half the time between the effective date of an IND and the submission date of an NDA, plus the time between the submission date of an NDA and the approval of that application. Patent term extensions, however, are subject to a maximum extension of five years, and the patent term extension cannot extend the remaining term of a patent beyond a total of 14 years. The application for patent term extension is subject to approval by the U.S. Patent and Trademark Office in conjunction with the FDA.

The Hatch-Waxman Act also provides for a period of statutory protection for new drugs that receive NDA approval from the FDA. If the FDA approves a Section 505(b)(1) NDA for a new drug that is a new chemical entity, meaning that the FDA has not previously approved any other new drug containing the same active moiety, then the Hatch-Waxman Act prohibits the submission or approval of an ANDA or a Section 505(b)(2) NDA for a period of five years from the date of approval of the NDA, except that the FDA may accept an application for review after four years under certain circumstances, specifically a patent challenge for one or more patents listed by the NDA holder in FDA’s publication, *Approved Drug Products with Therapeutic Equivalence Evaluations* (the “Orange Book”), submitted in a “Paragraph IV” Certification. The Hatch-Waxman Act will not prevent the filing or approval of a full NDA, as opposed to an ANDA or Section 505(b)(2) NDA, for any drug, but the competitor would be required to conduct its own clinical trials, and any use of the drug for which marketing approval is sought could not violate another NDA holder’s patent claims. The Hatch-Waxman Act provides for a three-year period of exclusivity for an NDA for a new drug containing an active moiety that was previously approved by the FDA, but also includes new clinical data (other than bioavailability and bioequivalence studies) to support an innovation over the previously-approved drug and those studies were conducted or sponsored by the applicant and were essential to approval of the application. This three-year exclusivity period does not prohibit the FDA from accepting an application from a third party for a drug with that same innovation, but it does prohibit the FDA from approving that application for the three-year period. The three-year exclusivity does not prohibit the FDA, with limited exceptions, from approving generic drugs containing the same active ingredient but without the new innovation.

Reimbursement

The successful commercialization of our products is also subject to the availability of appropriate third-party coding, coverage and payment for our customers. Third-party payors in the U.S. include commercial payors, including managed care providers, and State and Federal healthcare programs, such as Medicare and Medicaid. The process for determining whether a payor will provide coverage for a product may be separate from the process for setting the price or reimbursement rate that the payor will pay for the product. Coverage of a product does not ensure there will be an appropriate reimbursement amount for such product and the process to ensure appropriate reimbursement is outside our control. For commercial payors, coverage and reimbursement of our products vary from commercial payor to commercial payor. Many commercial payors, such as managed care providers, manage access to products, and may use medical policies (which may include specific coverage requirements such as prior authorization, re-authorization and achieving performance metrics under value-based contracts) to control utilization. Exclusion from or restriction in coverage can reduce product use. For government payors, we participate, as required, in the Federal Supply Schedule (FSS) and the PHS 340b program, which each require discounts for participation and may be subject to change. For Medicare, reimbursement to customers for our products is generally established through the rulemaking process or in discussion with Medicare Administrative Contractors (MACs). We have ongoing conversations with third-party payors to advocate for appropriate coding, coverage and payment for our portfolio of products, but we can give no assurance that adequate coding, coverage and payment can be obtained from such commercial or government payors.

Medicare Outpatient Pass-Through Payment Status

Part B of the Medicare program generally reimburses medical services and supplies, including drugs, provided to beneficiaries by physicians and other qualified healthcare professionals. Generally, drugs furnished “incident to” a physician’s service in the hospital outpatient setting of care are reimbursed at Average Sales Price (“ASP”) plus a certain additional percent, unless the product is treated as a “supply” in the performance of the procedure and “packaged” and paid as part of bundled payment for the procedure. Novel drugs, however, may apply for “pass-through status” in which case they are provided a separate payment at ASP plus a certain additional percent for two to three years, regardless of whether they would ordinarily be packaged.

PYLARIFY has received pass-through status effective January 1, 2022 through December 31, 2024, thereby providing separate reimbursement to customers using PYLARIFY in the hospital outpatient setting during this specified period. The reimbursement rate for PYLARIFY is based on the wholesale acquisition cost (WAC) plus three percent until CMS can establish an ASP for the product, which could take six months. Once CMS establishes an ASP, the add-on percentage applicable to PYLARIFY will likely vary.

PYLARIFY has been assigned Healthcare Common Procedure Coding System code A9595 (piflufolastat F 18, diagnostic, 1 millicurie) for identification in claims and can be used by both public and commercial payors. Under existing Medicare Part B payment policy, non-pass-through diagnostic radiopharmaceuticals are not separately paid and are instead packaged into payment for the underlying procedure. Therapeutic radiopharmaceuticals, however, continue to be eligible for separate payment even after expiration of pass-through status. We plan to continue our advocacy efforts with CMS and private insurers so that PYLARIFY customers will have appropriate and adequate reimbursement following the expiration of pass-through status, although we can give no assurances that we will be successful in those efforts.

Healthcare Reform and Other Laws Affecting Payment

We operate in a highly-regulated industry. The U.S. and state governments continue to propose and pass legislation that may affect the availability and cost of healthcare. For example, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act (collectively, the “Healthcare Reform Act”), substantially changes the way in which healthcare is financed by both governmental and private insurers and has a significant impact on the pharmaceutical industry. The Healthcare Reform Act contains a number of provisions that affect coverage, reimbursement and/or delivery of drug products and the medical imaging procedures in which our drug products are used. Key provisions that currently affect our business include the following:

- increasing the presumed utilization rate for imaging equipment costing $1.0 million or more in the physician office and free-standing imaging facility setting which reduces the Medicare per procedure medical imaging reimbursement; which rate was further increased by subsequent legislation effective January 1, 2014;
- increasing drug rebates paid to state Medicaid programs under the Medicaid Drug Rebate Program for brand name prescription drugs and extending those rebates to Medicaid managed care organizations;
- expanding access to the 340B program by allowing additional covered entities to participate in the program; and
- imposing a non-deductible annual fee on pharmaceutical manufacturers or importers who sell brand name prescription drugs to specified federal government programs.

The Healthcare Reform Act also amended the federal self-referral laws, requiring referring physicians to inform patients under certain circumstances that the patients may obtain services, including PET, CT, MRI and certain other diagnostic imaging services, from a provider other than that physician, another physician in his or her group practice, or another individual under direct supervision of the physician or another physician in the group practice. The referring physician must provide each patient with a written list of other suppliers who furnish those services in the area in which the patient resides. These requirements could have the effect of shifting where certain diagnostic medical imaging procedures are performed.

The Healthcare Reform Act has been subject to political and judicial challenges, but it has generally withstood such challenges, and the main provisions of the Healthcare Reform Act remain in effect.

Recently, there has been considerable public and government scrutiny of pharmaceutical pricing and proposals to address the perceived high cost of pharmaceuticals at both the federal and state levels. Efforts by government officials or legislators to implement measures to regulate prices or payment for pharmaceutical products could limit our flexibility in establishing prices for our products or otherwise adversely affect our business if implemented. For instance, Congress is currently considering the Build Back Better Act, which contains many drug pricing provisions that could adversely affect our business, including but not limited to authorization for Medicare to directly negotiate pricing for high-cost drugs, and inflation penalties for Part B and D drugs with price increases greater than the rate of inflation. To be clear, changes could occur at the federal level or state level and may be adopted by statute, rule, or sub-regulatory policies. Recent state legislative efforts seek to address drug costs and generally have focused on increasing transparency around drug costs or limiting drug prices. Some of those efforts have been subject to legal challenge.

General legislative cost control measures may also affect reimbursement for our products or services provided with our products. The Budget Control Act, as amended by the Bipartisan Budget Act of 2019, resulted in the imposition of 2% reductions in Medicare (but not Medicaid) payments to providers beginning in 2013 and will remain in effect through fiscal year 2030 unless additional Congressional action is taken. The Coronavirus Aid, Relief, and Economic Security (CARES) Act suspended the 2% payment adjustment for dates of service from May 1 through December 31, 2020, the Consolidated Appropriations Act 2021 subsequently extended this suspension until March 31, 2021, and Congress further extended the suspension through March 31, 2022. Any significant spending reductions affecting Medicare, Medicaid or other publicly funded or subsidized health programs that may be implemented and/or any significant taxes or fees that may be imposed on us could have an adverse impact on our business results of operations, financial condition and cash flows.

Healthcare Fraud and Abuse Laws

We are subject to various federal, state and local laws targeting fraud and abuse in the healthcare industry, including anti-kickback and false claims laws. Patient assistance programs, if not properly implemented, can implicate these laws. Violations of fraud and abuse laws may be punishable by criminal or civil sanctions, including fines and civil monetary penalties, and/or exclusion from federal health care programs (including Medicare and Medicaid). Federal and state authorities are paying increased attention to enforcement of these laws within the pharmaceutical industry, and private individuals have been active in alleging violations of the laws and bringing suits on behalf of the government under the federal False Claims Act (“FCA”). Violations of international fraud and abuse laws could result in similar penalties, including exclusion from participation in health programs outside the U.S. If we were subject to allegations concerning, or were convicted of violating, these laws, our business could be harmed.

The federal Anti-Kickback Statute generally prohibits, among other things, a pharmaceutical manufacturer from directly or indirectly soliciting, offering, receiving, or paying any remuneration in cash or in kind where one purpose is either to induce the referral of an individual for, or the purchase or prescription of a particular drug that is payable by a federal health care program, including Medicare or Medicaid. The Healthcare Reform Act clarifies the intent requirements of the federal Anti-Kickback Statute, providing that a person or entity does not need to have actual knowledge of the statute or a specific intent to violate the statute. Violations of the federal Anti-Kickback Statute can result in exclusion from Medicare, Medicaid or other governmental programs as well as civil and criminal fines and penalties of up to $104,330 per violation and three times the amount of the unlawful remuneration. In addition, the Healthcare Reform Act revised the FCA to provide that a claim arising from a violation of the Federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the FCA. The majority of states also have anti-kickback, false claims, and similar fraud and abuse laws and although the specific provisions of these laws vary, their scope is generally broad, and there may not be regulations, guidance or court decisions that apply the laws to particular industry practices. There is, therefore, a possibility that our practices might be challenged under the anti-kickback statutes or similar laws.

Federal and state false claims laws generally prohibit anyone from knowingly and willfully, among other activities, presenting, or causing to be presented for payment to third party payors (including Medicare and Medicaid) claims for drugs or services that are false or fraudulent (which may include claims for services not provided as claimed or claims for medically unnecessary services). As discussed, a claim arising from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the FCA. False or fraudulent claims for purposes of the FCA carry fines and civil penalties for violations ranging from $11,665 to $23,331 for each false claim, plus up to three times the amount of damages sustained by the federal government and, most critically, may provide the basis for exclusion from federally funded healthcare programs. There is also a criminal FCA statute by which individuals or entities that submit false claims can face criminal penalties. In addition, under the federal Civil Monetary Penalty Law, the Department of Health and Human Services Office of Inspector General has the authority to exclude from participation in federal health care programs or to impose civil penalties against any person who, among other things, knowingly presents, or causes to be presented, certain false or otherwise improper claims. Our activities relating to the sale and marketing of our products may be subject to scrutiny under these laws.

Laws and regulations have also been enacted by the U.S. federal government and various states, as well as by countries outside of the U.S., to regulate the sales and marketing practices of certain entities including pharmaceutical and device manufacturers. The laws and regulations generally limit financial interactions between manufacturers and health care providers; require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the U.S. federal government; and/or require disclosure by pharmaceutical and device manufacturers to the government and/or public of financial interactions or other financial relationships with health care providers and other entities such as teaching hospitals (so-called "sunshine laws"). The Healthcare Reform Act requires manufacturers to submit information to the FDA on the identity and quantity of drug samples requested and distributed by a manufacturer during each year. Many of these laws and regulations contain ambiguous requirements or require administrative guidance for implementation. The laws and regulations include requirements that can be unclear in their scope, nature, and required implementation by regulated entities. If we fail to comply with such laws and regulations, we could be subject to penalties and administrative actions under such laws and regulations.

Data Privacy, Security and Breach Notification

We are subject to data protection laws and regulations that set forth data privacy, security, and breach notification requirements. The legislative and regulatory landscape for data protection continues to evolve, and in recent years there has been an increasing focus on data protection and other data privacy and security issues. In the United States, numerous federal and state laws and regulations, including state data breach notification laws, state health information privacy laws and federal and state consumer protection laws govern the collection, use, disclosure and protection of health-related and other personal information. In addition to establishing restrictions on how personal information may be collected, used, and disclosed, these laws and regulations provide various rights to data subjects with respect to their personal information and establish requirements for how personal information must be secured. In addition, every state in the United States now has a data breach notification law that requires regulated entities to report certain security breaches to affected data subjects, regulators, or other entities. Failure to comply with data protection laws and regulations could result in government enforcement actions (which could include civil or criminal penalties and requirements to take corrective actions), private litigation (which may result in the award of damages against us), and/or adverse publicity, and could negatively affect our operating results, business, and reputation. In addition, we may obtain health information from third parties (e.g., healthcare providers who prescribe our products) that are themselves subject to privacy, security, and breach notification requirements under the Health Insurance Portability and Accountability Act of 1996, as amended by the Health Information Technology for Economic and Clinical Health Act (collectively, "HIPAA"). While we believe that we are neither a "covered entity" nor "business associate" subject directly to regulation under HIPAA, HIPAA's criminal provisions can apply to entities other than "covered entities" or "business associates" in certain circumstances. Accordingly, we could be subject to criminal penalties if we knowingly obtain or disclose individually identifiable health information from a HIPAA-covered entity in a manner that is not authorized or permitted.

In addition, a growing number of jurisdictions outside of the United States have enacted robust data protection laws. Certain of these laws have extraterritorial application. For example, the processing of personal data in the European Union is governed by the provisions of the General Data Protection Regulation, or GDPR, which came into effect on May 25, 2018. The GDPR applies to an entity established in the EU and extraterritorially to an entity outside of the EU that offers goods or services to, or monitors the behavior of, individuals located in the EU. Certain "special categories" of personal data, including data concerning health, are subject to enhanced protections under the GDPR. This regulation imposes several requirements on the controllers and processors of personal data, including the obligation to comply with various rights that individuals have with respect to their personal data and restrictions on the processing of personal data, and to provide notice of data processing obligations to the competent national data protection authorities. The GDPR also imposes strict rules on the transfer of personal data out of the European Union to the United States. Failure to comply with the requirements of the GDPR and the related national data protection laws of the European Union Member States may result in significant fines and other administrative penalties.

In the United States, several state legislatures are considering enacting new data privacy legislation. One example of such legislation that has already been passed is the California Consumer Privacy Act ("CCPA"), which took effect on January 1, 2020 and

imposes many requirements on certain for-profit businesses that process the personal information of California residents. Many of the CCPA's requirements are similar to those found in the GDPR, including requiring businesses to provide notice to data subjects regarding the information collected about them and how such information is used and shared, and providing data subjects various rights, such as the right to request access to their personal information and, in certain cases, request the erasure of such personal information. The CCPA also affords California residents the right to opt-out of the "sale" of their personal information. In addition, the CCPA requires regulated businesses to implement reasonable security procedures and practices to protect personal information. The CCPA contains significant penalties for companies that violate its requirements. It also provides California residents a private right of action, including the ability to seek statutory damages, in the event of a breach involving their personal information resulting from a business's failure to implement and maintain reasonable security procedures and practices. Compliance with the CCPA is a rigorous and time-intensive process that may increase the cost of doing business or require companies to change their business practices to ensure full compliance.

On November 3, 2020, California passed the California Privacy Rights Act ("CPRA") through a ballot initiative. The CPRA amends the CCPA and expands its protections for personal information, including by establishing a new California Privacy Protection Agency to enforce the CPRA and by providing California consumers various rights such as the right to restrict the processing of their "sensitive personal information." The CPRA's amendments to the CCPA take effect on January 1, 2023, and generally will apply to personal information collected by regulated businesses on or after January 1, 2022. The California Attorney General will have authority to begin enforcing the CPRA's amendments to the CCPA beginning on July 1, 2022.

Antitrust and Competition Laws

The federal government and most states have enacted antitrust laws that prohibit specific types of anti-competitive conduct, including price fixing, wage fixing, concerted refusals to deal, price discrimination and tying arrangements, as well as monopolization and acquisitions of competitors that have, or may have, a substantial adverse effect on competition. Violations of federal or state antitrust laws can result in various sanctions, including criminal and civil penalties. We believe we are in compliance with such federal and state laws, but courts or regulatory authorities may reach a determination in the future that could adversely affect our business, results of operations, financial condition and cash flows. In addition, we are subject to similar antitrust and anti-competition laws in foreign countries. We believe we are in compliance with such laws, however, any violation could create a substantial liability for us and also cause a loss of reputation in both foreign and domestic markets.

Laws Relating to Foreign Trade

We are subject to various federal and foreign laws that govern our international business practices with respect to payments to government officials. Those laws include the Foreign Corrupt Practices Act ("FCPA") which prohibits U.S. companies and their representatives from paying, offering to pay, promising, or authorizing the payment of anything of value to any foreign government official, government staff member, political party, or political candidate for the purpose of obtaining or retaining business or to otherwise obtain favorable treatment or influence a person working in an official capacity. In many countries, the healthcare professionals we regularly interact with may meet the FCPA's definition of a foreign government official. The FCPA also requires public companies to make and keep books and records that accurately and fairly reflect their transactions and to devise and maintain an adequate system of internal accounting controls.

Those laws also include the U.K. Bribery Act ("Bribery Act") which proscribes giving and receiving bribes in the public and private sectors, bribing a foreign public official, and failing to have adequate procedures to prevent employees and other agents from giving bribes. U.S. companies that conduct business in the United Kingdom generally will be subject to the Bribery Act. Penalties under the Bribery Act include potentially unlimited fines for companies and criminal sanctions for corporate officers under certain circumstances.

Our policies mandate compliance with these anti-bribery laws. Our operations reach many parts of the world that have experienced governmental corruption to some degree, and in certain circumstances strict compliance with anti-bribery laws may conflict 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 or agents.

We are also subject to trade control regulations and trade sanctions laws that restrict the movement of certain goods, currency, products, materials, services and technology to, and certain operations in, various countries or with certain persons. Our ability to transfer people and products among certain countries may be subjected to these laws and regulations.

Health and Safety Laws

We are also subject to various federal, state and local laws, regulations and recommendations, both in the U.S. and abroad, relating to safe working conditions, laboratory and manufacturing practices and the use, transportation and disposal of hazardous or potentially hazardous substances.

See Part I, Item 1A. “Risk Factors” for information regarding certain risks related to reimbursement and regulation.

Environmental Matters

We are subject to various federal, state and local laws and regulations relating to the protection of the environment, human health and safety in the U.S. and in other jurisdictions in which we operate. Our operations, like those of other medical product companies, involve the transport, use, handling, storage, exposure to and disposal of materials and wastes regulated under environmental laws, including hazardous and radioactive materials and wastes. If we violate these laws and regulations, we could be fined, criminally charged or otherwise sanctioned by regulators. We believe that our operations currently comply in all material respects with applicable environmental laws and regulations.

Certain environmental laws and regulations assess liability on current or previous owners or operators of real property for the cost of investigation, removal or remediation of hazardous materials or wastes at those formerly owned or operated properties or at third party properties at which they have disposed of hazardous materials or wastes. In addition to cleanup actions brought by governmental authorities, private parties could bring personal injury, property damage or other claims due to the presence of, or exposure to, hazardous materials or wastes. We currently are not party to any claims or any obligations to investigate or remediate any material contamination at any of our facilities.

We are required to maintain a number of environmental permits and nuclear licenses for our North Billerica, Massachusetts facility, which is our primary manufacturing, packaging and distribution facility. In particular, we must maintain a nuclear byproducts materials license issued by the Commonwealth of Massachusetts. This license requires that we provide financial assurance demonstrating our ability to cover the cost of decommissioning and decontaminating (“D&D”) the Billerica site at the end of its use as a nuclear facility. In addition, we have a radioactive production facility in Somerset, NJ where we must also maintain a number of environmental permits and nuclear licenses. We store low level radioactive waste at our facilities until the materials are below regulatory limits, as allowed by our licenses and permits. As of December 31, 2021, we currently estimate the D&D cost of all of our manufacturing sites (excluding our Puerto Rico radiopharmacy, which we sold on January 29, 2021) to be approximately $26.4 million. As of December 31, 2021 and 2020, we have a liability recorded associated with the fair value of the asset retirement obligations of $20.8 million and $14.0 million, respectively. We currently provide this financial assurance in the form of surety bonds.

We also actively monitor and seek to reduce our solid waste, energy and water usage, waste water discharge and greenhouse gas emissions. We generally contract with third parties for the disposal of wastes generated by our operations. In 2020, we developed a stormwater management operations and maintenance plan to minimize stormwater pollution from high impact activities. Improvements we made include (i) the regular inspection and cleaning of catch basins and piping to reduce sediment and debris wash out to adjacent wetlands; (ii) increasing street and parking lot cleaning to reduce pollutant run off; (iii) updating our snow removal plan at our North Billerica site to reduce the impact to adjacent wetlands; and (iv) using salt brine as a pretreatment for winter storms to reduce the amount of salt use and run off.

With respect to sustainability, in 2020, we developed a mechanism to track and monitor our energy use, water use and waste generation. We use an Energy Star Portfolio Manager to track energy and water use that we believe will help us calculate associated greenhouse gas emissions and compare the performance of our North Billerica buildings against a yearly baseline, national medians, and other similar buildings.

Environmental laws and regulations are complex, change frequently and have become more stringent over time. While we have budgeted for future capital and operating expenditures to maintain compliance with these laws and regulations, we cannot assure you that our costs of complying with current or future environmental protection, health and safety laws and regulations will not exceed our estimates or adversely affect our results of operations and financial condition. Further, we cannot assure you that we will not be subject to additional environmental claims for personal injury or cleanup in the future based on our past, present or future business activities. While it is not feasible to predict the future costs of ongoing environmental compliance, it is possible that there will be a need for future provisions for environmental costs that, in management’s opinion, are not likely to have a material effect on our financial condition, but could be material to the results of operations in any one accounting period.

See Part I, Item 1A. “Risk Factors” for information regarding certain risks associated with environmental matters.

Human Capital Management

As of December 31, 2021, we had 612 employees, of which 588 were located in the U.S. and 24 were located internationally. None of our employees are represented by a collective bargaining agreement, and we believe that our relationship with our employees is good. During 2021, we hired additional employees to assist us with the commercialization of PYLARIFY, including in sales, marketing, reimbursement, quality and medical affairs. In addition, we hired a Chief Human Resources Officer to help us attract, develop and retain leading and diverse talent in business-critical roles.

Diversity, Inclusion, Ethics and Compliance

We believe that supporting our local community and instilling a diverse, inclusive, ethical and compliant culture makes us an employer of choice, allows us to maintain good standing with the regulatory authorities and our customers, and benefits our stockholders in the long run.

We have a female Chief Executive Officer, over half of our Vice Presidents and above are women, and approximately 46% of our employees are women. We continue to strive to improve our diversity and inclusion with a strategic emphasis beyond gender, and we require recruiters working with us to present diversity candidates.

We are committed to promoting a culture of ethics and compliance. Our Code of Conduct and Ethics reflects our commitment to corporate integrity and the underlying business practices and principles of behavior that support this commitment. Each year our employees complete mandatory training that includes anti-bribery/anti-corruption rules, insider trading prohibitions, confidentiality obligations, as well as specialized training in healthcare industry marketing practices. We have a formal Ethics and Compliance Committee that develops, implements and oversees our ethics and compliance programs. We also have a Supplier Code of Conduct, and we seek to do business with minority-owned, female-owned and other diverse businesses and organizations (including those owned or operated by veterans and disabled veterans) that appropriately reflect the communities in which we operate and the customer base we serve.

Compensation and Benefits

We seek to provide pay, benefits, and services that are competitive to market and create incentives to attract and retain employees. Our compensation package includes, among other things, market-competitive pay, cash bonuses, healthcare and defined contribution plan benefits, paid time off and family leave, and restricted stock and other equity grants to certain levels of employees. We are focused on pay equity and regularly assess pay among similar roles and responsibilities throughout our organization and in comparison to our peer group.

Communication and Engagement

We believe that our success depends on employees understanding how their work contributes to our overall strategy. To this end, we utilize a variety of channels to facilitate open and direct communication, including: (i) quarterly town hall meetings for our entire company; (ii) regular ongoing update communications; and (iii) an externally administered whistleblower hotline and website that is prominently advertised to our employees, and a whistleblower's anonymity is protected, if so requested. We also established various employee recognition award programs to recognize and reward employees for specific outstanding accomplishments and to foster a positive employee relations climate.

Health, Wellness and Safety

We are committed to the health and safety of our employees, patients and other partners in the healthcare community. We work to promote an environment of awareness and shared responsibility for safety and regulatory compliance throughout the Company, in order to minimize risks of injury, exposure, or business impact.

With respect to the COVID-19 pandemic, we operated a "Pandemic Response Team" to implement and oversee appropriate precautions to minimize the spread of COVID-19 in our teams and communities. We continue to have all non-critical employees and contractors work-remotely and avoid non-essential work-related travel. Further, we established a "Return to Office" team to develop plans for employees to safely return to all our facilities.

Corporate History

Founded in 1956 as New England Nuclear Corporation, our medical imaging diagnostic business was purchased by E.I. du Pont de Nemours and Company ("DuPont") in 1981. Bristol Myers Squibb ("BMS") subsequently acquired our diagnostic medical imaging business as part of its acquisition of DuPont Pharmaceuticals in 2001. In January 2008, Avista Capital Partners, L.P., Avista Capital Partners (Offshore), L.P. and ACP-Lantern Co-Invest, LLC formed Lantheus Holdings and acquired our medical imaging business from BMS. On June 30, 2015, we completed an initial public offering of our common stock. We completed our acquisition of Progenics on June 19, 2020 (the "Progenics Acquisition"). Our common stock is traded on the NASDAQ Global Market under the symbol "LNTH".

Available Information

Our global Internet site is www.lantheus.com. We routinely make available important information, including copies of our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act, as soon as reasonably practicable after those reports are electronically filed with, or furnished to, the SEC, free of charge on our website at investor.lantheus.com. We recognize our website as a key channel of distribution to reach public investors and as a means of disclosing material non-public information to comply with our disclosure obligations under SEC Regulation FD. Information contained on our website shall not be deemed incorporated into, or to be part of this Annual Report on Form 10-K, and any website references are not intended to be made through active hyperlinks.

Our reports filed with, or furnished to, the SEC are also available on the SEC's website at www.sec.gov, and for Annual Reports on Form 10-K and Quarterly Reports on Form 10-Q, in an Inline Extensible Business Reporting Language ("iXBRL") format. iXBRL is an electronic coding language used to create interactive financial statement data over the Internet. The information on our website is neither part of nor incorporated by reference in this Annual Report on Form 10-K.

Item 1A. Risk Factors

You should carefully consider the following risks. The risks and uncertainties described below are not the only ones we face. Additional risks and uncertainties that we are unaware of, or that we currently believe are not material, may also become important factors that adversely affect our business. These risks could materially affect our business, results of operations or financial condition, cause the trading price of our outstanding common stock to decline materially or cause our actual results to differ materially from those expected or those expressed in any forward-looking statements made by us or on our behalf. See "Cautionary Note Regarding Forward-Looking Statements" and the risks of our businesses described elsewhere in this Annual Report on Form 10-K.

Risk Factor Summary

Our business is subject to a number of risks, including risks that may adversely affect our business, results of operations, cash flows, and prospects. These risks are discussed more fully below and include, but are not limited to, risks related to:

Risks Related to Our Portfolio of Commercial Products

- Our ability to continue to grow the appropriate use of DEFINITY in suboptimal echocardiograms in the face of segment competition from other echocardiography ultrasound enhancing agents and potential generic competition as a result of patent and regulatory exclusivity expirations.
- Our dependence upon third parties for the manufacture and supply of a substantial portion of our products, raw materials and components, including DEFINITY at JHS and DEFINITY RT at SBL.
- The instability of the global Mo-99 supply, including periodic supply outages and limitations at the NTP Radioisotopes ("NTP") processing facility in South Africa and the Australian Nuclear Science and Technology Organisation's ("ANSTO") processing facility in Australia, in each case resulting in our inability to fill some or all of the demand for our TechneLite generators on certain manufacturing days during the outage or limitation periods.
- Our ability to successfully launch PYLARIFY as a commercial product, including (A) our ability to obtain FDA approval for additional PMFs that could manufacture PYLARIFY, (B) the ability of those PMFs to supply PYLARIFY to customers, (C) our ability to sell PYLARIFY to customers, and (D) our ability to obtain and maintain adequate coding, coverage and payment for PYLARIFY.
- Our ability to successfully launch PYLARIFY AI as a commercial product.
- Risks related to RELISTOR, commercialized by Bausch, and that the revenues generated for us thereby may not meet expectations.
- Risks related to the commercialization of AZEDRA, including in connection with market acceptance and reimbursement, that may cause the product not to meet revenue or operating income expectations.
- Risks associated with our DEFINITY RT formulation, approved by the FDA in November 2020, including our ability to gain post-approval market acceptance and adequate coding, coverage and payment.

Risks Related to Reimbursement and Regulation

- The dependence of many of our customers upon third party healthcare payors and the uncertainty of third party coverage and reimbursement rates.

- Uncertainties regarding the impact of U.S. and state healthcare reform measures and proposals on our business, including measures and proposals related to reimbursement for our current and potential future products, controls over drug pricing, drug pricing transparency and generic drug competition.
- Our being subject to extensive government regulation and oversight, our ability to comply with those regulations and the costs of compliance.

Risks Related to our Business Operations and Financial Results

- The impact of the ongoing global COVID-19 pandemic on our business, financial condition or prospects, including: a decline in the volume of procedures and treatments using our products; potential delays and disruptions to global supply chains, manufacturing activities, logistics, operations, and clinical development programs; the business activities of our suppliers, distributors, customers and other business partners; the difficulty in recruiting and retaining employees and contractors; and the effects on worldwide economies, financial markets, social institutions, labor markets and healthcare systems.
- Our ability to hire or retain the number of qualified personnel, particularly scientific, medical and sales personnel, required for our business.
- Our ability to introduce new products and adapt to an evolving technology and medical practice landscape.
- Risks associated with our investment in and operation of our specialized manufacturing facility at our North Billerica, Massachusetts campus.

Risks Related to Our Portfolio of Clinical Development Candidates

- Risks associated with flurpiridaz F 18, which we out-licensed to GE Healthcare in 2017, including GE Healthcare's ability to (A) successfully complete the Phase 3 development program, including delays in enrollment that have resulted from the COVID-19 pandemic, (B) obtain FDA approval, and (C) gain post-approval market acceptance and adequate coding, coverage and payment.
- Risks associated with 1095, including delays in enrollment that have resulted from the COVID-19 pandemic and our ability to successfully complete the Phase 2 study in mCRPC.
- Risks associated with our clinical development candidate LMI 1195

Risks Related to our Capital Structure

- Risks related to our outstanding indebtedness and our ability to satisfy those obligations.
- Risks related to the ownership of our common stock.
- The contractual contingent value rights ("CVRs") we issued as part of the Progenics Acquisition may result in substantial future payments to holders of the CVRs.

Risks Related to Our Portfolio of Commercial Products

The near-term growth of our business is substantially dependent on our ability to continue to grow the appropriate use of DEFINITY in suboptimal echocardiograms in the face of increased segment competition from other existing echocardiography agents and potential generic competitors.

The growth of our business is substantially dependent on our ability to continue to grow the appropriate use of DEFINITY in suboptimal echocardiograms. DEFINITY currently competes with Optison, a GE Healthcare product, Lumason, a Bracco product, as well as echocardiography without ultrasound enhancing agents and other non-echocardiography agents.

We launched DEFINITY in 2001, and we continue to actively pursue additional patents in connection with DEFINITY and DEFINITY RT, both in the U.S. and internationally. In the U.S. for DEFINITY we have four Orange Book-listed method of use patents, one of which expires in 2035 and three of which expire in 2037, as well as additional manufacturing patents that are not Orange Book-listed expiring in 2021, 2023 and 2037. In the U.S. for DEFINITY RT, which became commercially available in the fourth quarter of 2021, we have five Orange Book-listed patents, including a composition of matter patent which expires in 2035. Outside of the U.S., we are currently pursuing additional DEFINITY and DEFINITY RT patents to obtain similar patent protection as in the U.S. The Orange Book-listed patents include a patent on the use of VIALMIX RFID, which expires in 2037; additional VIALMIX RFID patent applications have been submitted in major markets throughout the world.

Because our Orange Book-listed composition of matter patent expired in June 2019, we may face generic DEFINITY challengers in the near to intermediate term. Under the Hatch-Waxman Act, the FDA can approve ANDAs for generic versions of drugs before the expiration of an Orange Book-listed patent covering the innovator product if the ANDA applicant demonstrates,

among other things, that (i) its generic candidate is the same as the innovator product by establishing bioequivalence and providing relevant chemistry, manufacturing and product data, and (ii) either the marketing of that generic candidate does not infringe the Orange Book-listed patent(s) or the Orange Book-listed patent(s) is invalid. Similarly, the FDA can approve a Section 505(b)(2) NDA from an applicant that relies on some of the information required for marketing approval to come from studies which the applicant does not own or have a legal right of reference. The ANDA applicant or the Section 505(b)(2) applicant (if relying on studies related to the innovator product) (together, the "Applicant") must also give Notice to the innovator, which would then enable the innovator to file suit against the Applicant within 45 days of receiving the Notice. If the innovator challenges the Applicant in court in a timely manner, then FDA approval to commercialize the generic candidate will be stayed (that is, delayed) for up to 30 months while the dispute between the innovator and the Applicant is resolved in court. The 30 month stay can be shortened if the patent infringement suit is resolved in the Applicant's favor before the 30 month stay expires, and this may involve a successful challenge of the patent's validity in U.S. Patent and Trademark Office ("USPTO") proceedings and appeals process. In the event a 505(b)(2) applicant does not rely on studies related to the innovator product, the 30-month stay would not apply, but additional clinical studies may be required. We can give no assurance that we would have grounds to file a patent infringement suit, that we would obtain the full 30 month stay, that we would be successful on the merits asserting that an Applicant infringes our Orange Book-listed patent, or that we would be successful defending the validity of our Orange Book-listed patent in court or in a USPTO adversarial proceeding.

As of the date of filing of this Annual Report on Form 10-K, we have not received any such Notice from any Applicant, but we can give no assurance that we will not receive a Notice in the future. If we were to receive any such Notice in the future, we would review the Notice, evaluate the strength of any potential patent infringement claims, and be prepared to challenge the Applicant in a timely fashion, which would thereby trigger the stay of up to 30 months. We can give no assurance that we would have grounds to file a patent infringement suit, that we would obtain the full 30 month stay, that we would be successful on the merits asserting that an Applicant infringes our Orange Book-listed patent, or that we would be successful defending the validity of our Orange Book-listed patent in court or in a USPTO adversarial proceeding. In addition, as discussed in our risk factor "Our business and industry are subject to complex and costly regulations. If government regulations are interpreted or enforced in a manner adverse to us or our business, we may be subject to enforcement actions, penalties, exclusion and other material limitations on our operations." set forth below, if the FDA reclassified one or more of our imaging agents, such as DEFINITY, as a "device" rather than a "drug", we do not know when such reclassification would become effective, how any transition rules would be formulated or applied, and whether or not the legal framework provided by the Hatch-Waxman Act would be preserved for some time after such reclassification.

As part of our microbubble franchise strategy, (i) we have developed and received FDA approval for DEFINITY RT, a modified formulation of DEFINITY, (ii) we look for other opportunities to expand our microbubble franchise, including new applications beyond echocardiography and ultrasound enhancing agent imaging generally such as our strategic arrangements with Cerevast, CarThera, Insightec and AHN, and (iii) we have constructed a specialized in-house manufacturing facility at our North Billerica campus for purposes of producing DEFINITY and, potentially, other sterile vial products. On February 22, 2022, we received FDA approval of our sNDA, authorizing commerical manufacturing of DEFINITY at our new facility. However, we can give no assurance that our microbubble franchise strategy will be successful or that the modified formulation, new applications or new manufacturing capabilities will grow our microbubble franchise.

If we are not able to continue to (i) grow DEFINITY and DEFINITY RT sales, which depend on one or more of the growth of echocardiograms, the growth in the appropriate use of ultrasound enhancing agents in suboptimal echocardiograms, and our ability to sustain and grow our leading position in the U.S. echocardiography ultrasound enhancing agent market, or (ii) be successful with our microbubble franchise strategy, we may not be able to continue to grow the revenue and cash flow of our business, which could have a negative effect on our business, results of operations and financial condition.

Our dependence upon third parties for the manufacture and supply of a substantial portion of our products and certain key components and raw materials could prevent us from delivering our products to our customers in the required quantities, within the required timeframes, or at all, which could result in order cancellations and decreased revenues.

We obtain a substantial portion of our products from third party manufacturers and suppliers. We rely on JHS as a substantial supplier of DEFINITY, as well as our sole source manufacturer of NEUROLITE, Cardiolite and evacuation vials. We rely on SBL as our sole source manufacturer of DEFINITY RT. We rely on various other sole source suppliers for some of our key components and raw materials.

Based on our current estimates, we believe that we will have sufficient supply of DEFINITY, NEUROLITE, Cardiolite and evacuation vials from JHS (together with DEFINITY from our in-house manufacturing facility), and sufficient supply of saline from our sole manufacturer, to meet expected demand. However, we can give no assurances that JHS or our other manufacturing partner will be able to manufacture and distribute our products in a high quality and timely manner and in sufficient quantities to allow us to avoid product stock-outs and shortfalls.

PYLARIFY is manufactured by a nationwide network of PMFs with radioisotope-producing cyclotrons. The radioisotope in PYLARIFY is fluorine-18, which has a 110-minute half-life, so PYLARIFY is manufactured and distributed rapidly to end-users. Because each of the PMFs manufacturing PLYARIFY is deemed by the FDA to be a separate manufacturing site, each has to be separately approved by the FDA. Although we have qualified and continue to qualify additional PMFs, we can give no assurance that the FDA will continue to approve PMFs in accordance with our planned roll-out schedule or that the PMFs will not experience issues with their ability to manufacture and deliver PYLARIFY to our customers. If FDA approval of manufacturing sites is delayed or withdrawn or our PMF sites experience manufacturing issues, our future business, results of operations, financial condition and cash flows could be adversely affected.

Xenon is captured as a by-product of the Mo-99 production process. We receive bulk unprocessed Xenon from IRE resulting from highly-enriched uranium ("HEU") Mo-99 production, which we process and finish for our customers. We do not yet receive Xenon resulting from low-enriched uranium ("LEU") Mo-99 production at IRE and can give no assurances as to the timing of the availability of LEU Xenon. We believe we will have a sufficient supply of Xenon to meet our customers' needs. However, until IRE converts to LEU Xenon production or we can qualify an additional source of bulk unprocessed Xenon, we will rely on IRE as a sole source provider of HEU Xenon.

1095 is currently manufactured only at the CPDC in Ontario, Canada. Until December 2019, the CPDC was subject to an Import Alert by the FDA, which restricted the CPDC's ability to ship products to the U.S. Although the CPDC has since been cleared by the FDA to ship products to the U.S., there can be no guarantee that the CPDC, or any other ex-U.S. third party manufacturer that we may partner with in the future, will not be subject to similar restrictions in the future.

In addition to the products described above, for reasons of quality assurance or cost-effectiveness, we purchase certain components and raw materials from sole suppliers (including, for example, the lipid blend material and perflutren gas used in the manufacturing of DEFINITY, the specially designed chemistry synthesis boxes and consumables used in the manufacturing of PYLARIFY and the lead casing for our TechneLite generators). Because we do not control the actual production of many of the products we sell and many of the raw materials and components that make up the products we sell, we may be subject to delays caused by interruption in production based on events and conditions outside of our control.

If we or one of our manufacturing partners or suppliers experiences an event, including a supply chain disruption, shortage or delay, logistics issue, labor dispute, natural disaster, fire, power outage, machinery breakdown, security problem, failure to meet regulatory requirements, product quality issue, technology transfer issue, cybersecurity breach or other issue, we or one of our manufacturing partners or suppliers may be unable to manufacture the relevant products at previous levels or on the forecasted schedule, if at all. Due to the stringent regulations and requirements of the governing regulatory authorities regarding the manufacture of our products, we may not be able to quickly restart manufacturing at a third party or our own facility or establish additional or replacement sources for certain products, components or materials.

In addition to our existing manufacturing relationships, we are also pursuing new manufacturing relationships to establish and secure additional or alternative suppliers for our commercial products. We have also constructed a specialized in-house manufacturing facility at our North Billerica, Massachusetts campus for purposes of producing DEFINITY and, potentially, other sterile vial products. On February 22, 2022, we received FDA approval of our sNDA, authorizing commercial manufacturing of DEFINITY at our new facility. This project should deliver supply chain redundancy for our current portfolio and the opportunity for margin expansion. However, we cannot assure you that these activities or any of our additional supply activities will be successful or that we will be able to avoid or mitigate interim supply shortages before new sources of product are fully functional and qualified. In addition, we cannot assure you that our existing manufacturers or suppliers or any new manufacturers or suppliers can adequately maintain either their financial health, technical capabilities or regulatory compliance to allow continued production and supply. A reduction or interruption in manufacturing, or an inability to secure alternative sources of raw materials or components, could eventually have a material adverse effect on our business, results of operations, financial condition and cash flows.

The global supply of Mo-99 is fragile and not stable. Our dependence on a limited number of third party suppliers for Mo-99 could prevent us from delivering some of our products to our customers in the required quantities, within the required timeframe, or at all, which could result in order cancellations and decreased revenues.

A critical ingredient of TechneLite is Mo-99. We currently purchase finished Mo-99 from three of the four main processing sites in the world, namely IRE in Belgium, NTP in South Africa and ANSTO in Australia. These processing sites provide us Mo-99 from five of the six main Mo-99-producing reactors in the world, namely BR2 in Belgium, LVR-15 in the Czech Republic, HFR in The Netherlands, SAFARI in South Africa and OPAL in Australia.

Our agreement with NTP, acting for itself and on behalf of its subcontractor ANSTO, expires on March 31, 2022. We are actively negotiating a new supply agreement with NTP, although we can give no assurance that we will be able to reach an agreement on mutually acceptable terms or at all. In the event we are not able to enter into an agreement on mutually acceptable terms or at all,

we would expect to attempt to increase our purchases of Mo-99 from IRE and enter into a direct arrangement with ANSTO, but we can give no assurance that we would be able to increase our purchases from IRE or directly purchase from ANSTO or that there would be no disruption in our ability to fill some or all of the demand for our TechneLite generators on certain manufacturing days.

The NTP processing facility had periodic outages in 2017, 2018 and 2019. When NTP was not producing, we relied on Mo-99 supply from both IRE and ANSTO to limit the impact of the NTP outages. In 2019 and 2020, ANSTO experienced multiple facility issues that resulted in ANSTO outages and volume limitations, during which time we relied on IRE and NTP to limit the impact of those outages and limitations. Because of the COVID-19 pandemic, we experienced challenges receiving regularly scheduled orders of Mo-99 from our global suppliers, particularly in the second quarter of 2020. We continue to manage these various supply chain challenges, but depending on reactor and processor schedules and operations, at times we have not been able to fill some or all of the demand for our TechneLite generators on certain manufacturing days. A prolonged disruption of service from one of our three Mo-99 processing sites or one of their main Mo-99-producing reactors could have a substantial negative effect on our business, results of operations, financial condition and cash flows.

To augment our current supply of Mo-99, we entered into a strategic arrangement with SHINE for the future supply of Mo-99. Under the terms of the supply agreement, entered into in November 2014, SHINE will provide Mo-99 produced using its proprietary LEU-solution technology for use in our TechneLite generators once SHINE's facility becomes operational and receives all necessary regulatory approvals, which SHINE now estimates will occur in 2023. The term of this arrangement provides for three years of supply of Mo-99. However, we cannot assure you that our arrangement with SHINE will result in commercial quantities of Mo-99 for our business, or that SHINE together with our current suppliers will be able to deliver a sufficient quantity of Mo-99 to meet our needs.

U.S., Canadian and international governments have encouraged the development of a number of alternative Mo-99 production projects with existing reactors and technologies as well as new technologies. However, we cannot say when, or if, the Mo-99 produced from these projects will become available. As a result, there is a limited amount of Mo-99 available which could limit the quantity of TechneLite that we could manufacture, sell and distribute, resulting in a further substantial negative effect on our business, results of operations, financial condition and cash flows.

Most of the global suppliers of Mo-99 rely on Framatone-CERCA in France to fabricate uranium targets and in some cases fuel for research reactors from which Mo-99 is produced. Absent a new supplier, a supply disruption relating to uranium targets or fuel could have a substantial negative effect on our business, results of operations, financial condition and cash flows.

Our ability to successfully launch PYLARIFY as a commercial product is dependent on (A) our ability to obtain FDA approval for additional PMFs that could manufacture PYLARIFY, (B) the ability of those PMFs to supply PYLARIFY to customers, (C) our ability to sell PYLARIFY to customers, and (D) our ability to obtain and maintain adequate coding, coverage and payment for PYLARIFY.

The commercial launch of PYLARIFY is complex and expensive. To manufacture PYLARIFY, we assembled and qualified a nationwide network of PMFs with radioisotope-producing cyclotrons that make F 18, which has a 110-minute half-life, so PYLARIFY is manufactured and distributed rapidly to end-users. Because each of the PMFs manufacturing these products is deemed by the FDA to be a separate manufacturing site, each has to be separately approved by the FDA. Although we successfully qualified 21 PMFs in 2021 and continue to qualify additional PMFs in 2022, such that PYLARIFY is broadly available across the U.S. (including through our efforts to fly doses to certain markets ahead of PMF activation), we can give no assurance that the FDA will continue to approve PMFs in accordance with our planned roll-out schedule. If FDA approval of manufacturing sites is delayed or withdrawn, our future business, results of operations, financial condition and cash flows could be adversely affected.

PYLARIFY is sold in the U.S. to hospitals, independent imaging centers and government facilities and are generated through a PYLARIFY direct sales team and a sales team at some of our PMF partners. We generally do not use group purchasing arrangements to sell PYLARIFY and require contracts to be entered into directly with each customer. During 2021, we hired additional employees to assist us with this commercialization of PYLARIFY. Our ability to continue to successfully launch PYLARIFY depends, in part, on our ability to continue to enter into arrangements directly with the hospitals, independent imaging centers and government facilities that we serve. Any delay or inability to enter into these arrangements could have an adverse impact on our future business, results of operations, financial condition and cash flows.

In addition, obtaining adequate coding, coverage and payment for PYLARIFY is critical, including not only coverage from Medicare, Medicaid and other government payors, as well as private payors, but also appropriate payment levels to adequately cover our customers' costs of using PYLARIFY in PET/CT imaging procedures. We received notification that our HCPCS code, which enables streamlined billing, went into effect as of January 1, 2022. In addition, effective January 1, 2022, CMS granted Transitional Pass-Through Payment Status for PYLARIFY, enabling traditional Medicare to provide an incremental payment for PET/CT scans performed with PYLARIFY in the hospital outpatient setting. If other government payors or private payors do not provide adequate

reimbursement for the use of PYLARIFY, our future business, results of operations, financial condition and cash flows could be adversely affected.

The successful launch of PYLARIFY is also dependent on our ability to establish PYLARIFY as a leading PET diagnostic for men with prostate cancer in the approved indications. PYLARIFY currently competes with Telix Pharmaceuticals Limited's recently-approved Illuccix (gallium-68 PSMA-11 injection) and Bracco's Axumin (fluciclovine F 18). We also face potential competition from Novartis AG, which has a gallium-68 PSMA-11 kit for PET imaging currently under review with the FDA, and Bracco, which has an F 18 PSMA PET imaging agent in late stage clinical development. We believe that one or both of the Novartis and Bracco PSMA agents could be approved by the FDA for commercialization later in 2022 or in 2023. To the extent we are unsuccessful in establishing the use of PYLARIFY for approved indications or we lose market share to existing or future competitors, such lack of success or loss of market share could have an adverse impact on our future business, results of operations, financial condition and cash flows. In addition, because we are in the process of launching this imaging agent, we can give no assurance as to how clinical practice may evolve or what our ultimate market penetration may be.

We may not be able to successfully launch PYLARIFY AI as a commercial product.

We announced in November 2021 that PYLARIFY AI, our FDA-cleared medical device software, was commercially available in the United States. Our ability to successfully launch PYLARIFY AI as a commercial product depends in part on, among other things:

- the market receptivity to PYLARIFY AI as a new digital application for quantitative assessment of PSMA PET/CT images in prostate cancer;
- our ability, and our distributors' abilities, to secure customers' internal approvals and sell and deploy PYLARIFY AI at customer locations;
- interruptions or performance problems associated with our digital application, including a service outage; and
- a network or data security incident that allows unauthorized access to our network or data or our customers' data.

Although we believe that PYLARIFY AI when used with PYLARIFY will provide us an important competitive advantage in what we expect will be a highly competitive PET PSMA diagnostic imaging agent market, we can give no assurances to that effect.

We rely on Bausch to develop and commercialize RELISTOR, exposing us to significant risks.

We rely on Bausch to pursue and complete further development and obtain regulatory approvals for RELISTOR worldwide and to effectively commercialize the product and manage pricing, sales and marketing practices and inventory levels in the distribution channel. The revenue derived from royalty and milestone payments from our RELISTOR collaboration with Bausch can fluctuate significantly from period to period, and our past revenue is therefore not necessarily indicative of our future revenue. We are and will be dependent upon Bausch and any other business partners with which we may collaborate in the future to perform and fund development, including clinical testing of RELISTOR, making related regulatory filings and manufacturing and marketing products, including for new indications and in new formulations, in their respective territories. Revenue from the sale of RELISTOR depends entirely upon the efforts of Bausch and its sublicensees, which have significant discretion in determining the efforts and resources they apply to sales of RELISTOR. Bausch may not be effective in obtaining approvals for new indications or formulations, marketing existing or future products or arranging for necessary sublicense or distribution relationships. Our business relationships with Bausch and other partners may not be scientifically, clinically or commercially successful. For example, Bausch has a variety of marketed products and its own corporate objectives, which may not be consistent with our best interests, and may change its strategic focus or pursue alternative technologies in a manner that results in reduced or delayed revenue to us. Bausch may also have commercial and financial interests that are not fully aligned with ours in a given territory or territories, which may make it more difficult for us to fully realize the value of RELISTOR. We may have future disagreements with Bausch, which has significantly greater financial and managerial resources which it could draw upon in the event of a dispute. Such disagreements could lead to lengthy and expensive litigation or other dispute-resolution proceedings as well as extensive financial and operational consequences to us and have an adverse effect on our business, results of operations and financial condition. In addition, independent actions may be taken by Bausch concerning product development, marketing strategies, manufacturing and supply issues, and rights relating to intellectual property.

We are also dependent on Bausch for compliance with regulatory requirements as they apply to RELISTOR.

The RELISTOR commercialization program continues to be subject to risk.

Future developments in the commercialization of RELISTOR may result in Bausch taking independent actions concerning product development, marketing strategies or other matters, including termination of its efforts to develop and commercialize the drug.

Under our license agreement with Bausch, Bausch is responsible for obtaining supplies of RELISTOR, including contracting with contract manufacturing organizations ("CMOs") for supply of RELISTOR active pharmaceutical ingredient and subcutaneous and oral finished drug product. These arrangements may not be on terms that are advantageous and will subject us to risks that the counterparties may not perform optimally in terms of quality or reliability.

Bausch's ability to optimally commercialize either oral or subcutaneous RELISTOR in a given jurisdiction may be impacted by applicable labeling and other regulatory requirements. If clinical trials indicate, or regulatory bodies are concerned about, actual or possible serious problems with the safety or efficacy of RELISTOR, Bausch may stop or significantly slow further development or commercialization of RELISTOR. In such an event, we could be faced with either further developing and commercializing the drug on our own or with one or more substitute collaborators, either of which paths would subject us to the development, commercialization, collaboration and/or financing risks.

There has been growing public concern regarding the use of opioid drugs. Any efforts by the FDA or other governmental authorities to restrict or limit the use of opioids may negatively impact the market for RELISTOR. In addition, there is a substantial risk that the revenue targets for receiving additional RELISTOR milestone payments will not be met. As a result, there is no assurance that we will realize the potential revenue represented by future RELISTOR milestone payments.

Any such significant action adverse to the further development and commercialization of RELISTOR could have an adverse impact on our business.

Our AZEDRA commercialization program is subject to significant risk.

Progenics received FDA approval for AZEDRA in July 2018. Since then, the AZEDRA commercial program has faced numerous challenges, including, among other things:

- decisions by treating physicians and patients to defer treatment and by hospital facilities to limit access for our representatives until COVID-19 infection rates subside;
- challenges in securing I-131 supply and manufacturing patient-ready doses of AZEDRA;
- a small Orphan Drug patient population;
- reluctance by some potential hospital customers to invest in the necessary facility build-out to accommodate the administration of a highly radioactive therapeutic agent (including, among other things, the construction of lead-lined rooms to accommodate inpatients following AZEDRA's administration); and
- the high cost of the drug and reimbursement.

Because of these issues, we can give no assurance that AZEDRA will become a commercial success. After increased experience administering AZEDRA, clinicians may conclude that the complexity of administration and/or safety concerns with using a highly radioactive therapeutic agent may not justify AZEDRA's perceived clinical benefits. AZEDRA became eligible for new technology add-on payments (NTAP) under the Medicare Hospital Inpatient Prospective Payment System (IPPS) effective October 1, 2019. As required by statute, NTAP eligibility under the IPPS can continue for a period of at least two years, but not more than three years. Under the fiscal year 2022 IPPS Final Rule, published in September 2021, CMS finalized continuation of AZEDRA's NTAP for fiscal year 2022—i.e., from October 1, 2021 through September 30, 2022. AZEDRA's NTAP will most likely expire September 30, 2022. If post-pass-through payment levels impact market acceptance for AZEDRA, the drug may not generate enough revenue to make it economically viable. In addition, the market may react negatively to the high cost of AZEDRA, which could result in negative publicity and potentially reputational harm to us. Further, to the extent new Federal restrictions relating to drug pricing are implemented and apply to AZEDRA, the additional pricing pressure could further limit AZEDRA's economic viability.

If AZEDRA is determined to be challenging to administer, not economically viable or we are unable to successfully commercialize it, our business, results of operations, financial condition and cash flows could be adversely affected.

We may not be able to maintain Orphan Drug exclusivity for AZEDRA and, even if we do, that exclusivity may not prevent the FDA, from approving competing products.

Under the Orphan Drug Act, the FDA may designate a product as an Orphan Drug if it is a drug intended to treat a rare disease or condition, which is generally defined as a patient population of fewer than 200,000 individuals annually in the United States, or a patient population greater than 200,000 in the United States where there is no reasonable expectation that the cost of developing the drug will be recovered from sales in the United States. AZEDRA currently has the Orphan Drug designation in the United States.

In the United States, Orphan Drug designation entitles a party to financial incentives such as opportunities for grant funding towards clinical trial costs, tax advantages and user-fee waivers. In addition, if a product that has Orphan Drug designation

subsequently receives the first FDA approval for the disease for which it has such designation, the product is entitled to Orphan Drug exclusivity, which means the FDA may not approve any other application to market the same drug for the same indication for a period of seven years, except in limited circumstances, such as a showing of clinical superiority over the product with orphan exclusivity or where the manufacturer is unable to assure sufficient product quantity.

We may not be able to maintain Orphan Drug exclusivity for AZEDRA. In addition, exclusive marketing rights in the United States may be limited if we seek approval for an indication broader than the orphan-designated indication or may be lost if the FDA later determines that the request for designation was materially defective or if we are unable to assure sufficient quantities of the product to meet the needs of patients with the rare disease or condition. Even after an Orphan Drug is approved, the FDA can subsequently approve the same drug with the same active moiety for the same condition if the FDA concludes that the later drug is safer, more effective or makes a major contribution to patient care. A loss of the Orphan Drug exclusivity for AZEDRA may have an adverse impact on our ability to adequately commercialize AZEDRA.

Our just-in-time manufacturing of radiopharmaceutical products relies on the reliability of our equipment and processes and the timely receipt of radioactive raw materials and the timely shipment of finished goods, and any disruption of our supply or distribution networks could have a negative effect on our business.

At our North Billerica, Massachusetts facility, we manufacture TechneLite on a highly automated production line, as well as Thallium and Gallium using our older cyclotron technology and Xenon on a hot cell line. At our Somerset, New Jersey facility, we manufacture AZEDRA on a hot cell line. As with all manufacturing facilities, equipment and infrastructure age and become subject to increasing maintenance and repair. If we experience an event, including a labor dispute, natural disaster, fire, power outage, machinery breakdown, security problem, failure to meet regulatory requirements, product quality issue, technology transfer issue or other issue, we may be unable to manufacture the relevant products at previous levels or on the forecasted schedule, if at all. Due to the stringent regulations and requirements of the governing regulatory authorities regarding the manufacture of our products, we may not be able to quickly restart manufacturing at our facilities or establish additional or replacement sources for certain products, components or materials.

In addition, because a number of our radiopharmaceutical products, including our TechneLite generators, PYLARIFY and AZEDRA, rely on radioisotopes with limited half-lives, we or our partners must manufacture, finish and distribute these products on a just-in-time basis, because the underlying radioisotope is in a constant state of decay. For example, if we receive Mo-99 in the morning of a manufacturing day for TechneLite generators, then we will generally ship finished generators to customers by the end of that same business day. Shipment of generators may be by next day delivery services or by either ground or air custom logistics. Similarly, the radioisotope used in PYLARIFY is F 18, which has a 110 minute half-life, requiring that this product be manufactured and distributed within the same day to end-users. After being made on a cyclotron at a PMF, the F 18 is then combined with certain chemical ingredients in specially designed chemistry synthesis boxes to manufacture PYLARIFY. The finished PYLARIFY is then quality control tested and transferred to a radiopharmacist who prepares and dispenses patient-specific doses from the final product. Any delay in us receiving radioisotopes from suppliers or being able to have finished products delivered to customers because of weather or other unforeseen transportation issues could have a negative effect on our business, results of operations, financial condition and cash flows.

In the U.S., we are heavily dependent on a few large customers to generate a majority of our revenues for our nuclear medical imaging products in our precision diagnostic product category. Outside of the U.S., we rely primarily on distributors to generate a substantial portion of our revenue.

In the U.S., we have historically relied on a limited number of radiopharmacy customers, primarily Cardinal, Jubilant Radiopharma, PharmaLogic, RLS and UPPI, to purchase our current largest volume nuclear imaging products. Among the existing radiopharmacies in the U.S., continued consolidations, divestitures and reorganizations may have a negative effect on our business, results of operations, financial condition and cash flows. Our contractual arrangements with these radiopharmacy customers generally specify pricing levels and requirements to purchase minimum percentages of certain products during certain periods. The agreements generally are multi-year arrangements that may be terminated upon the occurrence of specified events, including a material breach by the other party and certain force majeure events. If these contracts are terminated prior to the expiration of their term, or are not renewed, or are renewed on terms that are less favorable to us, then such an event could have a material adverse effect on our business, results of operations, financial condition and cash flows.

For all of our medical imaging products, we continue to experience significant pricing pressures from our competitors, large customers and group purchasing organizations, and any significant, additional pricing pressures could lead to a reduction in revenue which could have a material adverse effect on our business, results of operations, financial condition and cash flows.

Outside of the U.S. and Canada, we have no sales force and, consequently, rely on third party distributors, either on a country-by-country basis or on a multi-country, regional basis, to market, sell and distribute our products. In Canada, we maintain our own direct sales force to generate sales of DEFINITY. In certain circumstances, distributors may also sell competing products to our own or products for competing diagnostic modalities and may have incentives to shift sales towards those competing products. As a result, we cannot assure you that our international distributors will increase or maintain current levels of unit sales or that we will be able to increase or maintain our current unit pricing, which, in turn, could have a material adverse effect on our business, results of operations, financial condition and cash flows.

We face significant competition in our business and may not be able to compete effectively.

The markets for our products are highly competitive and continually evolving. Our principal competitors for our current commercial products and leading clinical development candidates include large, global companies that are more diversified than we are and that have substantial financial, manufacturing, sales and marketing, distribution and other resources:

- For DEFINITY, our competitors currently include GE Healthcare and Bracco.
- For a number of our radiopharmaceutical commercial products, our competitors currently include Curium, GE Healthcare, Bracco and Jubilant Life Sciences, an affiliate of JHS and Jubilant Radiopharma, as well as other competitors, including NorthStar and potentially BWXT Medical.
- For PYLARIFY, our competitors currently include Telix Pharmaceuticals Limited and Bracco, and may in the future include Novartis AG, which has a gallium-68 PSMA-11 kit for PET imaging currently under review with the FDA, and Bracco, which has an F 18 PSMA PET imaging agent in late stage clinical development; we believe that one or both of the Novartis and Bracco PSMA agents could be approved by the FDA for commercialization later in 2022 or in 2023. In addition, the University of California, San Francisco and the University of California, Los Angeles have approved NDAs for a gallium-68 PSMA-11 injection for PSMA PET imaging, which we believe will primarily be used within their hospital systems.
- For RELISTOR, our principal competitors include Nektar Therapeutics, in collaboration with AstraZeneca PLC; Cubist Pharmaceuticals, a subsidiary of Merck & Co., Inc.; Mallinckrodt plc, in collaboration with Takeda Pharmaceutical Company Limited; and BioDelivery Sciences International, Inc.; together with other prescription, as well as over-the-counter, laxatives used as first line therapy for OIC.
- For AZEDRA, there are currently no approved anticancer treatments in the U.S. for malignant, recurrent, and/or unresectable pheochromocytoma and paraganglioma.
- For 1095, our principal competitors in the field of radiopharmaceutical therapeutics for mCRPC may include Novartis AG; POINT Biopharma; Telix Pharmaceuticals Limited; and Bayer HealthCare Pharmaceuticals Inc., each of which have product candidates in development.
- For LMI 1195, our principal competitors may include GE Healthcare’s iobenguane 123 injection.
- For flurpiridaz, our principal competitors may include rubidium generators from Bracco and Jubilant Radiopharma.

We cannot anticipate the actions of our current or future competitors in the same or competing diagnostic modalities, such as significant price reductions on products that are comparable to our own, development of new products that are more cost-effective or have superior performance than our current products or the introduction of generic versions after our proprietary products lose their patent protection. In addition, distributors of our products could attempt to shift end-users to competing diagnostic modalities and products, or bundle the sale of a portfolio of products, in either case to the detriment of our specific products. Our current or future products could be rendered obsolete or uneconomical as a result of these activities.

Further, the radiopharmaceutical industry continues to evolve strategically, with several market participants either recently sold or for sale. In addition, the supply-demand dynamics of the industry are complex because of large market positions of some participants, legacy businesses, government subsidies (in particular, relating to the manufacture of radioisotopes), and group purchasing arrangements. We cannot predict what impact new owners and new operators may have on the strategic decision-making of our competitors, customers and suppliers, and such decision-making could have a material adverse effect on our business, results of operations, financial condition and cash flows.

Ultrasound enhancing agents may cause side effects which could limit our ability to sell DEFINITY.

DEFINITY is an ultrasound enhancing agent based on perflutren lipid microspheres. In 2007, the FDA received reports of deaths and serious cardiopulmonary reactions following the administration of ultrasound micro-bubble enhancing agents used in echocardiography. Four of the 11 reported deaths were caused by cardiac arrest occurring either during or within 30 minutes following the administration of the ultrasound enhancing agent; most of the serious but non-fatal reactions also occurred in this time frame. As a result, in October 2007, the FDA requested that we and GE Healthcare, which distributes Optison, a competitor to DEFINITY, add a boxed warning to these products emphasizing the risk for serious cardiopulmonary reactions and that the use of these products was

contraindicated in certain patients. In a strong reaction by the cardiology community to the FDA's new position, a letter was sent to the FDA, signed by 161 doctors, stating that the benefit of these ultrasound enhancing agents outweighed the risks and urging that the boxed warning be removed. In May 2008, the FDA substantially modified the boxed warning. On May 2, 2011, the FDA held an advisory committee meeting to consider the status of ultrasound micro-bubble contrast agents and the boxed warning. In October 2011, we received FDA approval of further modifications to the DEFINITY label, including: further relaxing the boxed warning; eliminating the sentence in the Indication and Use section "The safety and efficacy of DEFINITY with exercise stress or pharmacologic stress testing have not been established" (previously added in October 2007 in connection with the imposition of the box warning); and including summary data from the post-approval CaRES (Contrast echocardiography Registry for Safety Surveillance) safety registry and the post-approval pulmonary hypertension study. Further, in January 2017, the FDA approved an additional modification to the DEFINITY label, removing the contraindication statement related to use in patients with a known or suspected cardiac shunt. Bracco's ultrasound enhancing agent, Lumason, has substantially similar safety labeling as DEFINITY and Optison. In April 2021, after reviewing certain adverse events that occurred in patients with a prior history of allergic reactions to polyethylene glycol ("PEG"), an inactive excipient in both DEFINITY and Lumason, the FDA and the marketing authorization holders of these products agreed to an additional contraindication for use of these products, including advising clinicians to assess patients for prior PEG hypersensitivity before administering these products. If additional safety issues arise (not only with DEFINITY but also potentially with Optison and Lumason), this may result in unfavorable changes in labeling or result in restrictions on the approval of our product, including removal of the product from the market. Lingering safety concerns about DEFINITY among some healthcare providers or future unanticipated side effects or safety concerns associated with DEFINITY could limit expanded use of DEFINITY and have a material adverse effect on the unit sales of this product and our financial condition and results of operations.

Risks Related to Reimbursement and Regulation

Many of our customers are highly dependent on payments from third party payors, including government sponsored programs, particularly Medicare, in the U.S. and other countries in which we operate, and reductions in third party coverage and reimbursement rates for our products (or services provided with our products) could adversely affect our business and results of operations.

A substantial portion of our revenue depends on the extent to which the costs of our products purchased by our customers (or services provided with our products) are reimbursed by third party payors, including Medicare, Medicaid, other U.S. government sponsored programs, non-U.S. governmental payors and private payors. These third party payors exercise significant control over patient access and increasingly use their enhanced bargaining power to secure discounted rates and impose other requirements that may reduce demand for our products. Our customers' ability to obtain adequate reimbursement for products and services from these third party payors affects the selection of products they purchase and the prices they are willing to pay. If Medicare and other third party payors do not provide adequate reimbursement for the costs of our products (or services provided using our products), deny the coverage of the products (or those services), or reduce current levels of reimbursement, healthcare professionals may not prescribe our products and providers and suppliers may not purchase our products.

In addition, demand for new products may be limited unless we obtain favorable reimbursement (including coding, coverage and payment) from governmental and private third party payors at the time of the product's introduction, which will depend, in part, on our ability to demonstrate that a new agent has a positive impact on clinical outcomes. Third party payors continually review their coverage policies for existing and new products and procedures and can deny coverage for procedures that include the use of our products or revise payment policies such that payments do not adequately cover the cost of our products. Even if third party payors make coverage and reimbursement available, that reimbursement may not be adequate or these payors' reimbursement policies may have an adverse effect on our business, results of operations, financial condition and cash flows.

For example, effective January 1, 2022, the CMS granted TPT Status in the hospital outpatient setting for PYLARIFY, enabling traditional Medicare to provide an incremental payment for PET/CT scans performed with PYLARIFY in that setting. TPT Status for PYLARIFY is expected to expire December 31, 2024. After TPT Status expires, under current Medicare rules, PYLARIFY, similar to other diagnostic radiopharmaceuticals, would not be separately reimbursed in the hospital outpatient setting but rather would be included as part of the facility fee a hospital otherwise receives for a PET/CT imaging procedure, and the facility fee does not always cover the cost of a drug used in the procedure. The Company can give no assurance that any CMS reimbursement in the hospital outpatient setting that follows the expiration of TPT Status will be adequate to cover the cost of PYLARIFY used in a PET/CT imaging procedure.

Over the past several years, Medicare has implemented numerous changes to payment policies for imaging procedures in both the hospital setting and non-hospital settings (which include physician offices and freestanding imaging facilities). Some of these changes have had a negative impact on utilization of imaging services. Examples of these changes include:

- Limiting payments for imaging services in physician offices and free-standing imaging facility settings based upon rates paid to hospital outpatient departments;
- Reducing payments for certain imaging procedures when performed together with other imaging procedures in the same family of procedures on the same patient on the same day in the physician office and free-standing imaging facility setting;
- Making significant revisions to the methodology for determining the practice expense component of the Medicare payment applicable to the physician office and free-standing imaging facility settings which results in a reduction in payment;
- Revising payment policies and reducing payment amounts for imaging procedures performed in the hospital outpatient settings; and
- Reducing prospective payment levels for applicable diagnosis-related groups in the hospital inpatient setting.

In the physician office and free-standing imaging facility setting, services provided using our products are reimbursed under the Medicare physician fee schedule. Payment rates under the Medicare physician fee schedule are regularly subject to updates to effectuate various policy goals. For example, since 2019, fee schedule payments have been adjusted for certain physicians based on their performance under a consolidated measurement system (that measures performance with respect to quality, resource utilization, meaningful use of certified electronic health records technology, and clinical practice improvement activities). From 2019 through payment year 2024, physicians may be eligible for a bonus based on the use of certain alternative payment models designated as “advanced” by CMS. The ongoing and future impact of these changes cannot be determined at this time.

We believe that Medicare changes to payment policies for imaging procedures applicable to non-hospital settings will continue to result in certain physician practices ceasing to provide these services and a further shifting of where certain medical imaging procedures are performed, from the physician office and free-standing imaging facility settings to the hospital outpatient setting. Changes applicable to Medicare payment in the hospital outpatient setting could also influence the decisions by hospital outpatient physicians to perform procedures that involve our products. Within the hospital outpatient setting, CMS payment policy is such that the use of many of our products are not separately payable by Medicare, although certain new drug products are eligible for separate (incremental) payment for the first three years after approval. Although Medicare generally does not provide separate payment to hospitals for the use of diagnostic radiopharmaceuticals administered in an outpatient setting, since 2013, CMS has had a policy to make a nominal additional payment ($10) to hospitals that utilize products with non-HEU, meaning the product is 95% derived from non-HEU sources. This payment policy continues in 2022. Although some of our TechneLite generators are manufactured using non-HEU, not all of our TechneLite generators currently meet CMS’s definition of non-HEU, and therefore this payment is not available for doses produced by the latter category of TechneLite generators used by our customers. Changes to the Medicare hospital outpatient prospective payment system payment rates, including reductions implemented for certain hospital outpatient sites, could influence the decisions by hospital outpatient physicians to perform procedures that involve our products.

We also believe that all these changes and their resulting pressures may incrementally reduce the overall number of diagnostic medical imaging procedures performed. These changes overall could slow the acceptance and introduction of next-generation imaging equipment into the marketplace, which, in turn, could adversely impact the future market adoption of certain of our imaging agents already in the market or currently in development. We expect that there will continue to be proposals to reduce or limit Medicare and Medicaid payment for diagnostic services.

We also expect increased regulation and oversight of advanced diagnostic testing in which our products are used. Under section 218(b) of the Protecting Access to Medicare Act, beginning January 1, 2020, a professional who is ordering advanced diagnostic imaging services (which include MRI, CT, nuclear medicine (including PET) and other advanced diagnostic imaging services that the Secretary of HHS may specify, but not currently including echocardiography) must consult a qualified clinical decision support mechanism, as identified by HHS, to determine whether the ordered service adheres to specified appropriate use criteria (“AUC”) developed or endorsed by CMS-qualified “provider led entities”. Medicare claims for such services must include information indicating whether services ordered would adhere to specified applicable AUC. Denial of claims for failure to include AUC consultation information on the claim form was set to begin on January 1, 2022. In the CY 2022 Physician Fee Schedule Final Rule, CMS delayed the start of these claims denials until the later of January 1, 2023, or the January 1st that follows the declared end of the Public Health Emergency for COVID–19. To the extent that these types of changes have the effect of reducing the aggregate number of diagnostic medical imaging procedures performed in the U.S., our business, results of operations, financial condition and cash flows would be adversely affected.

Medicare coverage of PET radiopharmaceuticals has been the subject of a large number of National Coverage Determinations ("NCDs") by CMS since 2000. Specific indications for PET imaging were covered, some through Coverage with Evidence Development. CMS's longtime policy, however, was that a particular use of PET scans is not covered unless an NCD specifically provided that such use was covered. Effective March 7, 2013, CMS revised its policy through an NCD to allow local Medicare Administrative Contractors ("MACs") to determine coverage within their respective jurisdictions for PET using radiopharmaceuticals for their FDA-approved labeled indications for oncologic imaging. Effective January 1, 2022, non-coverage in the absence of an NCD has also been removed for non-oncologic indications of PET radiopharmaceuticals, allowing MACs to determine coverage for these indications within their respective jurisdictions. To the extent that CMS or the MACs impose more restrictive coverage, our business, results of operations, financial condition and cash flows would be adversely affected.

Reforms to the U.S. healthcare system may adversely affect our business.

A significant portion of our patient volume is derived from U.S. government healthcare programs, principally Medicare, which are highly regulated and subject to frequent and substantial changes. The Healthcare Reform Act substantially changed the way healthcare is financed by both governmental and private insurers. The law contains a number of provisions that affect coverage and reimbursement of drug products and medical imaging procedures in which our drug products are used and/or that could potentially reduce the aggregate number of diagnostic medical imaging procedures performed in the U.S. Subsequently, the Medicare Access and CHIP Reauthorization Act of 2015 significantly revised the methodology for updating the Medicare physician fee schedule. And more recently, Congress enacted legislation in 2017 that effectively eliminated the Healthcare Reform Act's "individual mandate" beginning in 2019. Congress continues to consider other healthcare reform legislation. There is no assurance that the Healthcare Reform Act, as currently enacted or as amended in the future, will not adversely affect our business and financial results, and we cannot predict how future federal or state legislative, judicial or administrative changes relating to healthcare reform will affect our business.

In addition, other legislative changes have been proposed and adopted since the Healthcare Reform Act was enacted. The Budget Control Act of 2011 and subsequent Congressional actions includes provisions to reduce the federal deficit. These provisions have resulted in the imposition of 2% reductions in Medicare payments to providers, which went into effect on April 1, 2013 and will remain in effect through fiscal year 2030. The CARES Act temporarily suspended the 2% payment adjustment for dates of service from May 1 through December 31, 2020, the Consolidated Appropriations Act 2021 subsequently extended this suspension until March 31, 2021, and Congress further extended the suspension through March 31, 2022. Any significant spending reductions affecting Medicare, Medicaid or other publicly funded or subsidized health programs that may be implemented and/or any significant taxes or fees that may be imposed on us, as part of any broader deficit reduction effort or legislative replacement to the Budget Control Act, could have an adverse impact on our business, results of operations, financial condition and cash flows.

Further, changes in payor mix and reimbursement by private third party payors may also affect our business. Rates paid by some private third party payors are based, in part, on established physician, clinic and hospital charges and are generally higher than Medicare payment rates. Reductions in the amount of reimbursement paid for diagnostic medical imaging procedures and changes in the mix of our patients between non-governmental payors and government sponsored healthcare programs and among different types of non-government payor sources, could have a material adverse effect on our business, results of operations, financial condition and cash flows.

The full impact on our business of healthcare reforms and other new laws, or changes in existing laws, is uncertain. Nor is it clear whether additional legislative changes will be adopted or how those changes would affect our industry in general or our ability to successfully commercialize our products or develop new products.

Our business and industry are subject to complex and costly regulations. If government regulations are interpreted or enforced in a manner adverse to us or our business, we may be subject to enforcement actions, penalties, exclusion and other material limitations on our operations.

Both before and after the approval of our products and agents in development, we, our products, development agents, operations, facilities, suppliers, distributors, contract manufacturers, contract research organizations and contract testing laboratories are subject to extensive and, in certain circumstances, expanding regulation by federal, state and local government agencies in the U.S. as well as non-U.S. and transnational laws and regulations, with regulations differing from country to country, including, among other things, anti-trust and competition laws and regulations, and the General Data Protection Regulation in the European Union. In the U.S., the FDA regulates, among other things, the pre-clinical testing, clinical trials, manufacturing, safety, efficacy, potency, labeling, storage, record keeping, quality systems, advertising, promotion, sale, distribution, and import and export of drug products. We are required to register our business for permits and/or licenses with, and comply with the stringent requirements of the FDA, the NRC, the HHS, Health Canada, the EMA, the MHRA, the NMPA, state and provincial boards of pharmacy, state and provincial health departments and other federal, state and provincial agencies. Violation of any of these regulatory schemes, individually or collectively, could disrupt our business and have a material adverse effect on our business, results of operations, financial condition and cash flows.

Under U.S. law, for example, we are required to report certain adverse events and production problems, if any, to the FDA. We also have similar adverse event and production reporting obligations outside of the U.S., including to the EMA and MHRA. Additionally, we must comply with requirements concerning advertising and promotion for our products, including the prohibition on the promotion of our products for indications that have not been approved by the FDA or a so-called "off-label use" or promotion that is inconsistent with the approved labeling. If the FDA determines that our promotional materials constitute unlawful promotion, it could request that we modify our promotional materials or subject us to regulatory or enforcement actions. Also, quality control and manufacturing procedures at our own facility and at third party suppliers must conform to cGMP regulations and other applicable law after approval, and the FDA periodically inspects manufacturing facilities to assess compliance with cGMPs and other applicable law, and, from time to time, makes those cGMPs more stringent. Accordingly, we and others with whom we work must expend time, money, and effort in all areas of regulatory compliance, including manufacturing, production and quality control. If in the future issues arise at a third party manufacturer, the FDA could take regulatory action which could limit or suspend the ability of that third party to manufacture our products or have any additional products approved at the relevant facility for manufacture until the issues are resolved and remediated. Such a limitation or suspension could have a material adverse effect on our business, results of operations, financial condition and cash flows.

We are also subject to laws and regulations that govern financial and other arrangements between pharmaceutical manufacturers and healthcare providers, including federal and state anti-kickback statutes, federal and state false claims laws and regulations, federal and state "sunshine" laws and regulations and other fraud and abuse laws and regulations.

We must offer discounted pricing or rebates on purchases of pharmaceutical products under various federal and state healthcare programs, such as the Medicaid drug rebate program, the "federal ceiling price" drug pricing program, the 340B drug pricing program and the Medicare Part D Program. We must also report specific prices to government agencies under healthcare programs, such as the Medicaid drug rebate program and Medicare Part B. Our Medicaid Drug Rebate agreements require us to report certain price information to the federal government. Determination of the rebate amount that we pay to state Medicaid programs for our products, of prices charged to government and certain private payors for our products, or of amounts paid for our products under government healthcare programs, depends upon information reported by us to the government. If we provide customers or government officials with inaccurate information about the products' pricing or eligibility for coverage, or the products fail to satisfy coverage requirements, we could be terminated from the rebate program, be excluded from participation in government healthcare programs, or be subject to potential liability under the False Claims Act or other laws and regulations.

Failure to comply with other requirements and restrictions placed upon us or our third party manufacturers or suppliers by laws and regulations can result in fines, civil and criminal penalties, exclusion from federal healthcare programs and debarment. Possible consequences of those actions could include:

- Substantial modifications to our business practices and operations;
- Significantly reduced demand for our products (if products become ineligible for reimbursement under federal and state healthcare programs);
- A total or partial shutdown of production in one or more of the facilities where our products are produced while the alleged violation is being remediated;
- Delays in or the inability to obtain future pre-market clearances or approvals; and
- Withdrawals or suspensions of our current products from the market.

Regulations are subject to change as a result of legislative, administrative or judicial action, which may also increase our costs or reduce sales or otherwise adversely impact our products. For example, on April 16, 2021 in the case Genus Medical Technologies LLC v. Food and Drug Administration, the U.S. Court of Appeals for the D.C. Circuit held that a product (other than a combination product) that meets the definitions of both "drug" and "device" in the FDCA must be regulated as a device. On August 9, 2021, the FDA announced that, as part of its implementation of this court decision, the FDA intended to regulate products that meet both the device and drug definition as devices, except where Congress intended a different classification. The FDA further indicated that it intended to bring previously classified products into line with the court decision and would reexamine whether individual imaging agents meet the device definition. In connection with its announcement, the FDA requested comments from the industry on five topics: categories of products implicated by the court decision; the transition process; the transition timing; user fee transitions; and determining drug or device status. We submitted comments to the FDA in response to its request for comments. While we question whether the FDA has authority to make this change, we believe that pre-existing law already establishes that a broad spectrum of imaging agents have already been established by Congress to be "drugs", and do not believe that any of our imaging agents meets the definition of a "device" under the FDCA. We can give no assurance that the FDA will agree with our position. In addition, if the FDA determines that one or more of our imaging agents meet the definition of a "device", we do not know when such reclassification would be effective, how any transition rules would be formulated or applied, and whether or not the legal framework provided by the Hatch-Waxman Act would be preserved for some time after such reclassification. A reclassification of one or more of our imaging agents as a "device" could have a material adverse effect on our business, results of operations, financial condition and cash flows.

Our marketing and sales practices may contain risks that could result in significant liability, require us to change our business practices, and restrict our operations in the future.

We are subject to numerous domestic (federal, state and local) and foreign laws addressing fraud and abuse in the healthcare industry, including the FCA and federal Anti-Kickback Statute, self-referral laws, the FCPA, the Bribery Act, FDA promotional restrictions, the federal disclosure (sunshine) law and state marketing and disclosure (sunshine) laws. Violations of these laws are punishable by criminal or civil sanctions, including substantial fines, imprisonment and exclusion from participation in healthcare programs such as Medicare and Medicaid as well as health programs outside the U.S., and even settlement of alleged violations can result in the imposition of corporate integrity agreements that could subject us to additional compliance and reporting requirements and impact our business practices. These laws and regulations are complex and subject to changing interpretation and application, which could restrict our sales or marketing practices. Even minor and inadvertent irregularities could potentially give rise to a charge that the law has been violated. Although we believe we maintain an appropriate compliance program, we cannot be certain that the program will adequately detect or prevent violations and/or the relevant regulatory authorities may disagree with our interpretation. Additionally, if there is a change in law, regulation or administrative or judicial interpretations, we may have to change one or more of our business practices to be in compliance with these laws. Required changes could be costly and time consuming.

If our operations are found to be in violation of these laws or any other government regulations that apply to us, we may be subject to penalties, including, without limitation, civil and criminal penalties, damages, fines, imprisonment, the curtailment or restructuring of our operations, or exclusion from state and federal healthcare programs including Medicare and Medicaid, any of which could have a material adverse effect on our business, results of operations, financial condition and cash flows.

Risks Related to Our Business Operations and Financial Results

The COVID-19 pandemic has had, and could continue to have, a material impact on our business, results of operation and financial condition, operating results, cash flows and prospects.

Towards the end of the first quarter of 2020 we began to experience, and through the date of this filing we are continuing to experience, impacts to our business and operations related to the COVID-19 pandemic, including the impact of hospital staffing challenges, vaccination mandates, employee absences due to illness, and a decline in the volume of procedures and treatments using our products. In response to the pandemic, healthcare providers have, and may need to further, reallocate resources, such as physicians, staff and facilities, as they prioritize limited resources and personnel capacity to focus on the treatment of patients with COVID-19 and implement limitations on access to hospitals and other medical institutions due to concerns about the potential spread of COVID-19 in such settings. Vaccination mandates may also create additional personnel and capacity constraints.

For example, we believe that during the fourth quarter of 2021 sales of DEFINITY were impacted by hospital nursing and sonographer shortages, and sales of AZEDRA were impacted by treatment capacity constraints in hospitals, treatment deferrals and cancellations by patients, and access restrictions by hospitals. There has also been a reduction in pulmonary ventilation studies in which our Xenon is used because of institutional concerns and professional society guidelines relating to the possible spread of COVID-19 to technicians and other patients, given that Xenon is both inhaled and exhaled by the patient. As a result, Xenon sales have decreased. We expect Xenon sales to continue to be at reduced levels so long as COVID-19 precautions remain in place. Similarly, with respect to AZEDRA, the resurgence of COVID-19 infection rates impacted sales by creating treatment capacity constraints in hospitals, treatment deferrals and cancellations by patients and access restrictions by hospitals.

These actions have significantly delayed the provision of other medical care including procedures involving our products, having an adverse effect on our revenue. These measures and challenges may continue for the duration of the COVID-19 pandemic, and such duration is uncertain and may significantly reduce our revenue and cash flows while the pandemic continues and thereafter until we and our customers are able to resume normal business operations. We cannot predict the magnitude or duration of the pandemic's impact on our business.

In connection with the COVID-19 pandemic, the following risks could have a material effect on our business, financial condition, results of operations and prospects:

- The delay or cancellation by hospitals and clinics of the procedures in which our products are used as a result of their COVID-19 response efforts and the duration of such effects, thereby reducing sales of our products for an unknown period of time;
- The inability or unwillingness of some patients to visit hospitals or clinics in order to undergo procedures in which our products are used, thereby reducing sales of our products for an unknown period of time;
- The inability of some patients to pay for procedures and/or the co-pay associated with those procedures in which our products are used due to job loss or lack of insurance, thereby reducing sales of our products for an unknown period of time;
- The inability of our distributors, radiopharmacy customers, PET manufacturing partners, hospitals, clinics and other customers to conduct their normal operations, including supplying or conducting procedures in which our products are used, because of their COVID-19 response efforts, or the reduced capacity or productivity of their employees and contractors as a result of possible illness, quarantine or other inability to work, thereby reducing sales of our products for an unknown period of time;
- The financial challenges experienced by certain of our customers due to the COVID-19 pandemic resulting in increased pressure from those customers on the pricing of our commercial products;
- The inability of global suppliers of raw materials or components used in the manufacture of our products, or contract manufacturers of our products, to supply and/or transport those raw materials, components and products to us in a timely and cost effective manner due to shutdowns, interruptions or delays, limiting and potentially precluding the production of our finished products, impacting our ability to supply customers, reducing our sales, increasing our costs of goods sold, and reducing our absorption of overhead;
- The partial or complete delay or cancellation of international or domestic flights by our airfreight carriers, resulting in our inability to receive raw materials, components and products from our global suppliers or to ship and deliver our finished products to our domestic and international customers in a timely or cost effective manner, thereby potentially increasing our freight costs as we seek alternate, potentially more expensive, methods to ship raw materials, components or products, and negatively impacting our sales;
- The reduced capacity or productivity of our complex, on-campus operations as a result of possible illness, quarantine or other inability of our employees and contractors to work, despite all of the preventative measures we continue to undertake to protect the health and safety of our workforce;
- The illiquidity or insolvency of our suppliers, contract manufacturers (including our PET manufacturing partners) or freight carriers whose business activities could be shut down, interrupted or delayed;
- The illiquidity or insolvency of our distributors or customers, or their inability to pay our invoices in full or in a timely manner, due to the reduction in their revenues caused by the cancellation or delay of procedures and other factors, which could potentially reduce our cash flow, reduce our liquidity and increase our bad debt reserves;
- A portion of our raw materials or finished product inventory may expire due to reduced demand for our drugs;
- Delays in our ability, and the ability of our contract research organizations and development partners to conduct, enroll and complete clinical development programs such as our ARROW Phase 2 study in mCRPC or the flurpiridaz F 18 Phase 3 clinical development program currently being conducted by GE Healthcare;
- Delays of regulatory reviews and approvals, including with respect to our product candidates and manufacturing facilities, by the FDA or other health or regulatory authorities;
- Decreased sales of those of our products that are promotionally sensitive, like DEFINITY and AZEDRA, due to the reduction of in-person sales and marketing activities and training caused by travel restrictions, quarantines, other similar social distancing measures and more restrictive hospital access policies;
- Our ability to maintain employee morale and motivate and retain management personnel and other key employees as a result of our previous work week and salary reductions;

- A disruption in the operation of our new on-site manufacturing facility, which would delay implementation of our supply diversification strategy for DEFINITY and impact our ability to benefit from a lower cost of goods for that product;
- A reduction in revenue with continued incurrence of high fixed costs relating to our already-existing, complex and expensive radiopharmaceutical manufacturing facility could adversely affect our cash flows, liquidity and ability to comply with the financial covenants in our 2019 Facility;
- The increased reliance on our personnel working from home, which may negatively impact employee engagement, loyalty and productivity, or disrupt, delay or otherwise adversely impact our business, including through the increased employee resignations and retirements;
- The instability in worldwide economies, financial markets, social institutions, labor markets and the healthcare systems as a result of the COVID-19 pandemic, which could result in an economic downturn that could adversely impact our business, results of operations and financial condition, as well as that of our suppliers, distributors, customers or other business partners; and
- A recurrence of the COVID-19 pandemic, or the development and spread of new strains of COVID-19 after social distancing and other similar measures have been relaxed.

The extent to which the COVID-19 pandemic impacts our business and our results of operations and financial condition will depend on future developments that are highly uncertain and cannot be predicted, including new information that may emerge in connection with the severity of the virus, the ability to treat and ultimately prevent it with vaccines, its potential recurrence or transformation into new or more contagious or virulent strains, and further actions that federal, state, local, or foreign governments may take to contain its impact.

We may not be able to hire or retain the number of qualified personnel, particularly scientific, medical and sales personnel, required for our business, which would harm the development and sales of our products and limit our ability to grow.

Competition in our industry for highly skilled scientific, healthcare and sales personnel is intense. During 2021, we hired additional employees to assist us with the commercialization of PYLARIFY, including in sales, marketing, reimbursement, quality and medical affairs. Although we were successful in hiring and onboarding those employees and we have not had any material difficulty in the past in hiring or retaining qualified personnel, if we are unable to retain our existing personnel, or attract and train additional qualified personnel, either because of competition in our industry for these personnel, prolonged remote working conditions due to the COVID-19 pandemic, or insufficient financial resources, then our growth may be limited and it could have a material adverse effect on our business.

If we lose the services of our key personnel, our business could be adversely affected.

Our success is substantially dependent upon the performance, contributions and expertise of our chief executive officer, executive leadership and senior management team. Mary Anne Heino, our Chief Executive Officer and President, and other members of our executive leadership and senior management team play a significant role in formulating and executing on our long-term strategy, generating business and overseeing operations. We have an employment agreement with Ms. Heino and a limited number of other individuals on our executive leadership team, although we cannot prevent them from terminating their employment with us. We do not maintain key person life insurance policies on any of our executive officers. While we have experienced some turnover on our executive leadership team, we have generally been able to fill positions by either promoting existing employees or attracting new, qualified individuals to lead key functional areas. Our inability to retain our existing executive leadership and senior management team, maintain an appropriate internal succession program or attract and retain additional qualified personnel could have a material adverse effect on our business.

Our business depends on our ability to successfully introduce new products and adapt to a changing technology and medical practice landscape.

The healthcare industry is characterized by continuous technological development resulting in changing customer preferences and requirements. The success of new product development depends on many factors, including our ability to fund development of new agents or new indications for existing agents, anticipate and satisfy customer needs, obtain timely regulatory approval based on performance of our agents in development versus their clinical study comparators, develop and manufacture products in a cost-effective and timely manner, maintain advantageous positions with respect to intellectual property and differentiate our products from our competitors. To compete successfully in the marketplace, we must make substantial investments in new product development, whether internally or externally through licensing or acquisitions. Our failure to introduce new and innovative products in a timely manner would have an adverse effect on our business, results of operations, financial condition and cash flows.

Even if we are able to develop, manufacture and obtain regulatory approvals for our new products, the success of these products would depend upon market acceptance and adequate coding, coverage and payment. Levels of market acceptance for our new products could be affected by a number of factors, including:

- The availability of alternative products from our competitors;
- The breadth of indications in which alternative products from our competitors can be marketed;
- The price of our products relative to those of our competitors;
- The timing of our market entry;
- Our ability to enter into commercial contracts to sell our products;
- Our ability to market and distribute our products effectively;
- Market acceptance of our products; and
- Our ability to obtain adequate coding, coverage and payment.

The field of diagnostic medical imaging is dynamic, with new products, including equipment, software and products, continually being developed and existing products continually being refined. Our own diagnostic imaging agents compete not only with other similarly administered imaging agents but also with imaging agents employed in different and often competing diagnostic modalities, and in the case of DEFINITY, echocardiography procedures without ultrasound enhancing agents. New hardware, software or agents in a given diagnostic modality may be developed that provide benefits superior to the then-dominant hardware, software and agents in that modality, resulting in commercial displacement of the agents. Similarly, changing perceptions about comparative efficacy and safety including, among other things, comparative radiation exposure, as well as changing availability of supply may favor one agent over another or one modality over another. In addition, new or revised appropriate use criteria developed by professional societies, to assist physicians and other health care providers in making appropriate imaging decisions for specific clinical conditions, can and have reduced the frequency of and demand for certain imaging modalities and imaging agents. To the extent there is technological obsolescence in any of our products that we manufacture, resulting in lower unit sales or decreased unit sales prices, we will have increased unit overhead allocable to the remaining market share, which could have a material adverse effect on our business, results of operations, financial condition and cash flows.

Our future growth may depend on our ability to identify and acquire or in-license additional products, businesses or technologies, and if we do not successfully do so, or otherwise fail to integrate any new products, lines of business or technologies into our operations, we may have limited growth opportunities and it could result in significant impairment charges or other adverse financial consequences.

Even after giving effect to the Progenics Acquisition, we are continuing to seek to acquire or in-license products, businesses or technologies that we believe are a strategic fit with our business strategy. Future acquisitions or in-licenses, however, may entail numerous operational and financial risks, including:

- A reduction of our current financial resources;
- Incurrence of substantial debt or dilutive issuances of securities to pay for acquisitions;
- Difficulty or inability to secure financing to fund development activities for those acquired or in-licensed technologies;
- Higher than expected acquisition and integration costs;
- Disruption of our business, customer base and diversion of our management’s time and attention to develop acquired products or technologies; and
- Exposure to unknown liabilities.

We may not have sufficient resources to identify and execute the acquisition or in-licensing of third party products, businesses and technologies and integrate them into our current infrastructure. In particular, we may compete with larger pharmaceutical companies and other competitors in our efforts to establish new collaborations and in-licensing opportunities. These competitors likely will have access to greater financial resources than we do and may have greater expertise in identifying and evaluating new opportunities. Furthermore, there may be an overlap between our products or customers and the companies which we acquire that may create conflicts in relationships or other commitments detrimental to the integrated businesses. Additionally, the time between our expenditures to acquire or in-license new products, technologies or businesses and the subsequent generation of revenues from those acquired products, technologies or businesses (or the timing of revenue recognition related to licensing agreements and/or strategic collaborations) could cause fluctuations in our financial performance from period to period. Finally, if we devote resources to potential acquisitions or in-licensing opportunities that are never completed, or if we fail to realize the anticipated benefits of those efforts, we could incur significant impairment charges or other adverse financial consequences.

Challenges with product quality or product performance, including defects, caused by us or our suppliers could result in a decrease in customers and revenues, unexpected expenses and loss of market share.

The manufacture of our products is highly exacting and complex and must meet stringent quality requirements, due in part to strict regulatory requirements, including the FDA's cGMPs. Problems may be identified or arise during manufacturing, quality review, packaging or shipment for a variety of reasons including equipment malfunction, failure to follow specific protocols and procedures, defective raw materials and environmental factors. Additionally, 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. Those events could lead to a recall of, or issuance of a safety alert relating to, our products. We also may undertake voluntarily to recall products or temporarily shut down production lines based on internal safety and quality monitoring and testing data.

Quality, regulatory and recall challenges could cause us to incur significant costs, including costs to replace products, lost revenue, damage to customer relationships, time and expense spent investigating the cause and costs of any possible settlements or judgments related thereto and potentially cause similar losses with respect to other products. These challenges could also divert the attention of our management and employees from operational, commercial or other business efforts. If we deliver products with defects, or if there is a perception that our products or the processes related to our products contain errors or defects, we could incur additional recall and product liability costs, and our credibility and the market acceptance and sales of our products could be materially adversely affected. Due to the strong name recognition of our brands, an adverse event involving one of our products could result in reduced market acceptance and demand for all products within that brand, 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 applications for new product approvals. These challenges could have a material adverse effect on our business, results of operations, financial condition and cash flows.

In the ordinary course of business, we may be subject to product liability claims and lawsuits, including potential class actions, alleging that our products have resulted or could result in an unsafe condition or injury.

Any product liability claim brought against us, with or without merit, could be time consuming and costly to defend and could result in an increase of our insurance premiums. Although we have not had any such claims to date, claims that could be brought against us might not be covered by our insurance policies. Furthermore, although we currently have product liability insurance coverage with policy limits that we believe are customary for pharmaceutical companies in the diagnostic medical imaging industry and adequate to provide us with insurance coverage for foreseeable risks, even where the claim is covered by our insurance, our insurance coverage might be inadequate and we would have to pay the amount of any settlement or judgment that is in excess of our policy limits. We may not be able to obtain insurance on terms acceptable to us or at all, since insurance varies in cost and can be difficult to obtain. Our failure to maintain adequate insurance coverage or successfully defend against product liability claims could have a material adverse effect on our business, results of operations, financial condition and cash flows.

We use hazardous materials in our business and must comply with environmental laws and regulations, which can be expensive.

Our operations use hazardous materials and produce hazardous wastes, including radioactive, chemical and, in certain circumstances, biological materials and wastes. We are subject to a variety of federal, state and local laws and regulations as well as non-U.S. laws and regulations relating to the transport, use, handling, storage, exposure to and disposal of these materials and wastes. Environmental laws and regulations are complex, change frequently and have generally become more stringent over time. We are required to obtain, maintain and renew various environmental permits and nuclear licenses. Although we believe that our safety procedures for transporting, using, handling, storing and disposing of, and limiting exposure to, these materials and wastes comply in all material respects with the standards prescribed by applicable laws and regulations, the risk of accidental contamination or injury cannot be eliminated. We place a high priority on these safety procedures and seek to limit any inherent risks. We generally contract with third parties for the disposal of wastes generated by our operations. Prior to disposal, we store any low level radioactive waste at our facilities to decay until the materials are no longer considered radioactive. Although we believe we have complied in all material respects with all applicable environmental, health and safety laws and regulations, we cannot assure you that we have been or will be in compliance with all such laws at all times. If we violate these laws, we could be fined, criminally charged or otherwise sanctioned by regulators. We may be required to incur further costs to comply with current or future environmental and safety laws and regulations. In addition, in the event of accidental contamination or injury from these materials, we could be held liable for any damages that result and any such liability could exceed our resources.

We previously leased a small portion of our North Billerica, Massachusetts facility to PerkinElmer for the manufacturing, finishing and packaging of certain radioisotopes, including Strontium-90, which has physical characteristics that make it more challenging to work with and dispose of than our own commercial radioisotopes, including a much longer half-life. PerkinElmer decommissioned its space and vacated the premises as of December 30, 2021. We are fully indemnified by PerkinElmer under our lease for any property damage or personal injury resulting from their activities in our facility. If any release or excursion of radioactive materials took place from their leased space that resulted in property damage or personal injury, the indemnification obligations were

not honored, and we were forced to cover any related remediation, clean-up or other expenses, depending on the magnitude, the cost of such remediation, clean-up or other expenses could have a material adverse effect on our business, results of operations, financial condition and cash flows.

While we have budgeted for current and future capital and operating expenditures to maintain compliance with these laws and regulations, we cannot assure you that our costs of complying with current or future environmental, health and safety laws and regulations will not exceed our estimates or adversely affect our results of operations and financial condition. Further, we cannot assure you that we will not be subject to additional environmental claims for personal injury, investigation or cleanup in the future based on our past, present or future business activities.

If we are unable to protect our intellectual property, our competitors could develop and market products with features similar to our products, and demand for our products may decline.

Our commercial success will depend in part on obtaining and maintaining patent and trade secret protection of our commercial products and technologies and agents in development as well as successfully enforcing and defending these patents and trade secrets against third parties and their challenges, both in the U.S. and in foreign countries. We will only be able to protect our intellectual property from unauthorized use by third parties to the extent that we maintain the secrecy of our trade secrets and can enforce our valid patents and trademarks.

The patent positions of pharmaceutical and biotechnology companies can be highly uncertain and involve complex legal and factual questions for which important legal principles remain unresolved. In addition, changes in either the patent laws or in interpretations of patent laws in the U.S. or other countries may diminish the value of our intellectual property and we may not receive the same degree of protection in every jurisdiction. Accordingly, we cannot predict the breadth of claims that may be allowed or enforced in our patents or in third party patents.

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 our competitive advantage. For example:

- We might not have been the first to make the inventions covered by each of our pending patent applications and issued patents, and we could lose our patent rights as a result;
- We might not have been the first to file patent applications for these inventions or our patent applications may not have been timely filed, and we could lose our patent rights as a result;
- Others may independently develop similar or alternative technologies or duplicate any of our technologies;
- It is possible that none of our pending patent applications will result in any further issued patents;
- Our issued patents may not provide a basis for commercially viable drugs, may not provide us with any protection from unauthorized use of our intellectual property by third parties, and may not provide us with any competitive advantages;
- The validity or enforceability of our patent applications or patents may be subject to challenge through interferences, oppositions, post-grant review, ex-parte re-examinations, inter partes review or similar administrative proceedings;
- While we generally apply for patents in those countries where we intend to make, have made, use or sell patented products, we may not be able to accurately predict all of the countries where patent protection will ultimately be desirable and may be precluded from doing so at a later date;
- We may choose not to seek patent protection in certain countries where the actual cost outweighs the perceived benefit at a certain time;
- Patents issued in foreign jurisdictions may have different scopes of coverage than our U.S. patents and so our products may not receive the same degree of protection in foreign countries as they would in the U.S.;
- We may not develop additional proprietary technologies that are patentable; or
- The patents of others may have an adverse effect on our business.

Moreover, the issuance of a patent is not conclusive as to its validity or enforceability. A third party may challenge the validity or enforceability of a patent even after its issuance by the USPTO or the applicable foreign patent office. It is also uncertain how much protection, if any, will be afforded by our patents if we attempt to enforce them and they are challenged in court or in other proceedings, which may be brought in U.S. or non-U.S. jurisdictions to challenge the validity of a patent.

The initiation, defense and prosecution of intellectual property suits (including Hatch-Waxman related litigation), interferences, oppositions and related legal and administrative proceedings are costly, time consuming to pursue and result in a diversion of resources, including a significant amount of management time. The outcome of these proceedings is uncertain and could significantly harm our business. If we are not able to enforce and defend the patents of our technologies and products, then we will not be able to exclude competitors from marketing products that directly compete with our products, which could have a material and adverse effect on our business, results of operations, financial condition and cash flows.

For DEFINITY, we continue to actively pursue patents in both the U.S. and internationally. In the U.S. for DEFINITY we have four Orange Book-listed method of use patents, one of which expires in 2035 and three of which expire in 2037, as well as additional manufacturing patents that are not Orange Book-listed expiring in 2023 and 2037. In the U.S. for DEFINITY RT, we have five Orange Book-listed patents, including a composition of matter patent which expires in 2035. Outside of the U.S., we are currently pursuing additional DEFINITY and DEFINITY RT patents to obtain similar patent protection as in the U.S. The Orange Book-listed patents include a patent on the use of VIALMIX RFID, which expires in 2037; additional VIALMIX RFID patent applications have been submitted in major markets throughout the world.

We also rely on trade secrets and other know-how and proprietary information to protect our technology, especially where we do not believe patent protection is appropriate or obtainable. However, trade secrets are difficult to protect. We use reasonable efforts to protect our trade secrets, but our employees, consultants, contractors, outside scientific partners and other advisors may unintentionally or willfully disclose our confidential information to competitors or other third parties. Enforcing a claim that a third party improperly obtained and is using our trade secrets is expensive, time consuming and resource intensive, and the outcome is unpredictable. In addition, courts outside the U.S. are sometimes less willing to protect trade secrets. Moreover, our competitors may independently develop equivalent knowledge, methods and know-how. We rely on confidentiality agreements with our collaborators, employees, consultants and other third parties and invention assignment agreements with our employees to protect our trade secrets and other know-how and proprietary information concerning our business. These confidentiality agreements may not prevent unauthorized disclosure of trade secrets and other know-how and proprietary information, and there can be no guarantee that an employee or an outside party will not make an unauthorized disclosure of our trade secrets, other technical know-how or proprietary information, or that we can detect such an unauthorized disclosure. We may not have adequate remedies for any unauthorized disclosure. This might happen intentionally or inadvertently. It is possible that a competitor will make use of that information, and that our competitive position will be compromised, in spite of any legal action we might take against persons making those unauthorized disclosures, which could have a material and adverse effect on our business, results of operations, financial condition and cash flows.

We rely on our trademarks, trade names and brand names to distinguish our products from the products of our competitors, and have registered or applied to register many of these trademarks, including, among others, AZEDRA®, AZEDRA Service Connection®, Cardiolite®, DEFINITY®, DEFINITY RT™, EXINI®, Find, Fight and Follow®, Find > Fight > Follow™, Lantheus®, Lantheus Medical Imaging®, LUMINITY®, Molecular Insight®, NEUROLITE®, Progenics®, Progenics Pharmaceuticals®, PYLARIFY®, TechneLite®, VIALMIX®, and VIALMIX RFID®. We cannot assure you that any pending trademark applications will be approved. Third parties may also oppose our trademark applications, or otherwise challenge our use of the trademarks. If our trademarks are successfully challenged, we could be forced to re-brand our products, which could result in loss of brand recognition, and could require us to devote resources to advertising and marketing new brands. Further, we cannot assure you that competitors will not infringe our trademarks, or that we will have adequate resources to enforce our trademarks.

Our patents are subject to generic challenge, and the validity, enforceability and commercial value of these patents are highly uncertain.

Our ability to obtain and defend our patents impacts the commercial value of our products and product candidates. Third parties have challenged and are likely to continue challenging the patents that have been issued or licensed to us. Patent protection involves complex legal and factual questions and, therefore, enforceability is uncertain. Our patents may be challenged, invalidated, held to be unenforceable, or circumvented, which could negatively impact their commercial value. Furthermore, patent applications filed outside the United States may be challenged by other parties, for example, by filing third party observations that argue against patentability or an opposition. Such opposition proceedings are increasingly common in the EU and are costly to defend. For example, we received notices of opposition to three European patents relating to RELISTOR.

Pursuant to the RELISTOR license agreement between us and Bausch, Bausch has the first right to enforce the intellectual property rights at issue and is responsible for the costs of such enforcement. At the same time, we may incur substantial further costs in supporting the effort to uphold the validity of patents or to prevent infringement. Patent disputes are frequent, costly and can preclude, delay or increase the cost of commercialization of products. Progenics has previously been and is currently involved in patent litigation, and we expect to be subject to patent litigation in the future.

We may be subject to claims that we have infringed, misappropriated or otherwise violated the patent or other intellectual property rights of a third party. The outcome of any of these claims is uncertain and any unfavorable result could adversely affect our business, financial condition and results of operations.

We may be subject to claims by third parties that we have infringed, misappropriated or otherwise violated their intellectual property rights. We are aware of intellectual property rights held by third parties that relate to products or technologies we are developing. For example, we are aware of other groups investigating PSMA or related compounds and monoclonal antibodies directed at PSMA, PSMA-targeted imaging agents and therapeutics, and methylnaltrexone and other peripheral opioid antagonists, and of patents held, and patent applications filed, by these groups in those areas. While the validity of these issued patents, the patentability of pending patent applications and the applicability of any of them to our products and programs are uncertain, if asserted against us, any related patent or other intellectual property rights could adversely affect our ability to commercialize our products.

We may be subject to litigation over infringement claims regarding the products we manufacture or distribute. This type of litigation can be costly and time consuming and could divert management's attention and resources, generate significant expenses, damage payments (potentially including treble damages) or restrictions or prohibitions on our use of our technology, which could adversely affect our business, results of operations, financial condition and cash flows. In addition, if we are found to be infringing on proprietary rights of others, we may be required to develop non-infringing technology, obtain a license (which may not be available on reasonable terms, or at all), make substantial one-time or ongoing royalty payments, or cease making, using and/or selling the infringing products, any of which could have a material adverse effect on our business, results of operations, financial condition and cash flows.

We may be adversely affected by prevailing economic conditions and financial, business and other factors beyond our control.

Our ability to attract and retain customers, invest in and grow our business and meet our financial obligations depends on our operating and financial performance, which, in turn, is subject to numerous factors, including the prevailing economic conditions and financial, business and other factors beyond our control, such as the rate of unemployment, the number of uninsured persons in the U.S. and inflationary pressures. We cannot anticipate all the ways in which the current or future economic climate and financial market conditions could adversely impact our business. We are exposed to risks associated with reduced profitability and the potential financial instability of our customers, many of which may be adversely affected by volatile conditions in the financial markets. For example, unemployment and underemployment, and the resultant loss of insurance, may decrease the demand for healthcare services and pharmaceuticals. If fewer patients are seeking medical care because they do not have insurance coverage, our customers may experience reductions in revenues, profitability and/or cash flow that could lead them to modify, delay or cancel orders for our products. If customers are not successful in generating sufficient revenue or are precluded from securing financing, they may not be able to pay, or may delay payment of, accounts receivable that are owed to us. This, in turn, could adversely affect our financial condition and liquidity. To the extent prevailing economic conditions result in fewer procedures being performed, our business, results of operations, financial condition and cash flows could be adversely affected.

Our business is subject to international economic, political and other risks that could negatively affect our results of operations or financial position.

For the year ended December 31, 2021, we derived approximately 10% of our revenues and expended approximately 25% of our costs of goods sold outside of the fifty United States. Accordingly, our business is subject to risks associated with doing business internationally, including:

- Less stable political and economic environment and changes in a specific country's or region's political or economic conditions;
- Changes in trade policies, regulatory requirements and other barriers, including, for example, U.S. trade sanctions against Iran and those countries and entities doing business with Iran, which could adversely impact international isotope production and, indirectly, our global supply chain;
- Potential global disruptions in air transport due to COVID-19, which could adversely affect our international supply chains for radioisotopes and DEFINITY RT as well as international distribution channels for our commercial products;
- Entering into, renewing or enforcing commercial agreements with international governments or provincial authorities or entities directly or indirectly owned or controlled by such governments or authorities, such as our Belgian, Australian and South African isotope suppliers, IRE, ANSTO and NTP, and our Chinese development and commercialization partner, Double-Crane;
- International customers which are agencies or institutions owned or controlled by foreign governments;
- Local business practices which may be in conflict with the U.S. Foreign Corrupt Practices Act and U.K. Bribery Act;
- Currency fluctuations;

- Unfavorable labor regulations;
- Greater difficulties in relying on non-U.S. courts to enforce either local or U.S. laws, particularly with respect to intellectual property;
- Greater potential for intellectual property piracy;
- Greater difficulties in managing and staffing non-U.S. operations, including our EXINI operations in Sweden;
- The need to ensure compliance with the numerous in-country and international regulatory and legal requirements applicable to our business in each of these jurisdictions and to maintain an effective compliance program to ensure compliance with these requirements, including in connection with the GDPR in the EU;
- Changes in public attitudes about the perceived safety of nuclear facilities;
- Civil unrest or other catastrophic events; and
- Longer payment cycles of non-U.S. customers and difficulty collecting receivables in non-U.S. jurisdictions.

These factors are beyond our control. The realization of any of these or other risks associated with operating outside the United States could have a material adverse effect on our business, results of operations, financial condition and cash flows.

We face currency and other risks associated with international sales.

We generate revenue from export sales, as well as from operations conducted outside the United States. Operations outside the U.S. expose us to risks including fluctuations in currency values, trade restrictions, tariff and trade regulations, U.S. export controls, U.S. and non-U.S. tax laws, shipping delays and economic and political instability. For example, violations of U.S. export controls, including those administered by the U.S. Treasury Department's Office of Foreign Assets Control, could result in fines, other civil or criminal penalties and the suspension or loss of export privileges which could have a material adverse effect on our business, results of operations, financial conditions and cash flows.

Many of our customer relationships outside of the U.S. are, either directly or indirectly, with governmental entities, and we could be adversely affected by violations of the FCPA and similar worldwide anti-bribery laws outside the U.S.

The FCPA, the Bribery Act and similar worldwide anti-bribery laws in non-U.S. jurisdictions generally prohibit companies and their intermediaries from making improper payments to non-U.S. officials for the purpose of obtaining or retaining business.

The FCPA prohibits us from providing anything of value to foreign officials for the purposes of obtaining or retaining business or securing any improper business advantage. It also requires us to keep books and records that accurately and fairly reflect our transactions. Because of the predominance of government-sponsored healthcare systems around the world, many of our customer relationships outside of the U.S. are, either directly or indirectly, with governmental entities and are therefore subject to the FCPA and similar anti-bribery laws in non-U.S. jurisdictions. In addition, the provisions of the Bribery Act extend beyond bribery of foreign public officials and are more onerous than the FCPA in a number of other respects, including jurisdiction, non-exemption of facilitation payments and penalties.

Our policies mandate compliance with these anti-bribery laws. We operate in many parts of the world that have experienced governmental corruption to some degree, and in certain circumstances strict compliance with anti-bribery laws may conflict 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 or agents. Violations of these laws, or allegations of those violations, could disrupt our business and result in a material adverse effect on our results of operations, financial condition and cash flows.

Our business depends on the continued effectiveness and availability of our information technology infrastructure, and failures of this infrastructure could harm our operations.

To remain competitive in our industry, we must employ information technologies to support manufacturing processes, quality processes, distribution, R&D and regulatory applications and that capture, manage and analyze large streams of data in compliance with applicable regulatory requirements. We rely extensively on technology, some of which is managed by third party service providers, to allow the concurrent conduct of work sharing around the world. As with all information technology, our equipment and infrastructure age and become subject to increasing maintenance and repair and our systems generally are vulnerable to potential damage or interruptions from fires, natural disasters, power outages, blackouts, machinery breakdown, telecommunications failures and other unexpected events, as well as to break-ins, sabotage, increasingly sophisticated intentional acts of vandalism or cybersecurity threats which, due to the nature of such attacks, may remain undetected for a period of time. As these threats continue to evolve, we may be required to expend additional resources to enhance our information security measures or to investigate and remediate any information security vulnerabilities. Given the extensive reliance of our business on technology, any substantial disruption or resulting loss of data that is not avoided or corrected by our backup measures could harm our business, reputation, operations and financial condition.

A disruption in our computer networks, including those related to cybersecurity, could adversely affect our operations or financial position.

We rely on our computer networks and systems, some of which are managed by third parties, to manage and store electronic information (including sensitive data such as confidential business information, personally identifiable data and personal health information), and to manage or support a variety of critical business processes and activities. We may face threats to our networks from unauthorized access, security breaches and other system disruptions. Despite our security measures, our infrastructure may be vulnerable to external or internal attacks. Any such security breach may compromise information stored on our networks and may result in significant data losses or theft of sensitive or proprietary information. A cybersecurity breach could hurt our reputation by adversely affecting the perception of customers and potential customers of the security of their orders and personal information, as well as the perception of our manufacturing partners of the security of their proprietary information. In addition, a cybersecurity attack could result in other negative consequences, including disruption of our internal operations, increased cybersecurity protection costs, lost revenue, regulatory actions or litigation. Any disruption of internal operations could also have a material adverse impact on our results of operations, financial condition and cash flows. To date, we have not experienced any material cybersecurity attacks.

We may be limited in our ability to utilize, or may not be able to utilize, net operating loss carryforwards to reduce our future tax liability.

As of December 31, 2021, we had U.S. federal income tax loss carryforwards of $476.2 million, $338.1 million of which will expire between 2022 and 2037, $138.0 million of which can be carried forward indefinitely, and state income tax loss carryforwards of $17.4 million, tax-effected. We may be limited in our ability to use these tax loss carryforwards to reduce our future U.S. federal and state income tax liabilities if our future income is not sufficient to absorb the losses, or if we were to experience another “ownership change” as specified in Section 382 of the Internal Revenue Code including if we were to issue a certain amount of equity securities, certain of our stockholders were to sell shares of our common stock, or we were to enter into certain strategic transactions.

We are involved in various legal proceedings that are uncertain, costly and time-consuming and could have a material adverse impact on our business, financial condition and results of operations.

From time to time we are involved in legal proceedings and disputes and may be involved in litigation in the future. These proceedings are complex and extended and occupy the resources of our management and employees. These proceedings are also costly to prosecute and defend and may involve substantial awards or damages payable by us if not found in our favor. We may also be required to pay substantial amounts or grant certain rights on unfavorable terms in order to settle such proceedings. Defending against or settling such claims and any unfavorable legal decisions, settlements or orders could have a material adverse effect on our business, financial condition and results of operations and could cause the market value of our common stock to decline.

In particular, the pharmaceutical and medical device industries historically have generated substantial litigation concerning the manufacture, use and sale of products, and we expect this litigation activity to continue. As a result, we expect that patents related to our products will routinely be challenged, and our patents may not be upheld. In order to protect or enforce patent rights, we may initiate litigation against third parties. If we are not successful in defending an attack on our patents and maintaining exclusive rights to market one or more of our products still under patent protection, we could lose a significant portion of sales in a very short period. We may also become subject to infringement claims by third parties and may have to defend against charges that we violated patents or the proprietary rights of third parties. If we infringe the intellectual property rights of others, we could lose our right to develop, manufacture or sell products, or could be required to pay monetary damages or royalties to license proprietary rights from third parties.

In addition, in the U.S., it has become increasingly common for patent infringement actions to prompt claims that antitrust laws have been violated during the prosecution of the patent or during litigation involving the defense of that patent. Such claims by direct

and indirect purchasers and other payors are typically filed as class actions. The relief sought may include treble damages and restitution claims. Similarly, antitrust claims may be brought by government entities or private parties following settlement of patent litigation, alleging that such settlements are anti-competitive and in violation of antitrust laws. In the U.S. and Europe, regulatory authorities have continued to challenge as anti-competitive so-called "reverse payment" settlements between branded and generic drug manufacturers. We may also be subject to other antitrust litigation involving competition claims unrelated to patent infringement and prosecution. A successful antitrust claim by a private party or government entity against us could have a material adverse effect on our business, financial condition and results of operations and could cause the market value of our common stock to decline.

Risks Related to our Portfolio of Clinical Development Candidates

The process of developing new drugs and obtaining regulatory approval is complex, time-consuming and costly, and the outcome is not certain.

We currently have two clinical development programs in the U.S. – 1095 and LMI 1195, and are exploring additional lifecycle management opportunities for some of our current products, including AZEDRA. We also have a number of strategic partnerships relating to obtaining additional indications for existing commercial products or regulatory approval for clinical development candidates. To obtain regulatory approval for these agents in the indications being pursued, we must conduct extensive human tests, which are referred to as clinical trials, as well as meet other rigorous regulatory requirements, as further described in Part I, Item 1. "Business—Regulatory Matters." Satisfaction of all regulatory requirements typically takes many years and requires the expenditure of substantial resources. A number of other factors may cause significant delays in the completion of our clinical trials, including unexpected delays in the initiation of clinical sites, slower than projected enrollment, competition with ongoing clinical trials and scheduling conflicts with participating clinicians, regulatory requirements, limits on manufacturing capacity and failure of an agent to meet required standards for administration to humans. In addition, it may take longer than we project to achieve study endpoints and complete data analysis for a clinical trial or we may decide to slow down the enrollment in a trial in order to conserve financial resources.

Our products in development are also subject to the risks of failure inherent in drug development and testing. The results of preliminary studies do not necessarily predict clinical success, and larger and later stage clinical trials may not produce the same results as earlier stage trials. Sometimes, products that have shown promising results in early clinical trials have subsequently suffered significant setbacks in later clinical trials. Agents in later stage clinical trials may fail to show desired safety and efficacy traits, despite having progressed through initial clinical testing. In addition, the data collected from clinical trials of our products in development may not be sufficient to support regulatory approval, or regulators could interpret the data differently and less favorably than we do. Further, the design of a clinical trial can determine whether its results will support approval of a product, and flaws in the design of a clinical trial may not become apparent until the clinical trial is well advanced. Clinical trials of potential products often reveal that it is not practical or feasible to continue development efforts. Regulatory authorities may require us or our partners to conduct additional clinical testing, in which case we would have to expend additional time and resources. The approval process may also be delayed by changes in government regulation, future legislation or administrative action or changes in regulatory policy that occur prior to or during regulatory review. The failure to provide clinical and preclinical data that are adequate to demonstrate to the satisfaction of the regulatory authorities that our products in development are safe and effective for their proposed use will delay or preclude approval and will prevent us from marketing those products.

We are not permitted to market our products in development in the U.S. or other countries until we have received requisite regulatory approvals. For example, securing FDA approval for a new drug requires the submission of an NDA to the FDA for our products in development. The NDA must include extensive nonclinical and clinical data and supporting information to establish the product's safety and effectiveness for each indication. The NDA must also include significant information regarding the chemistry, manufacturing and controls for the product. The FDA review process can take many years to complete, and approval is never guaranteed. If a product is approved, the FDA may limit the indications for which the product may be marketed, require extensive warnings on the product labeling, impose restricted distribution programs, require expedited reporting of certain adverse events, or require costly ongoing requirements for post-marketing clinical studies and surveillance or other risk management measures to monitor the safety or efficacy of the product. Markets outside of the U.S. also have requirements for approval of products with which we must comply prior to marketing. Obtaining regulatory approval for marketing of a product in one country does not ensure we will be able to obtain regulatory approval in other countries, but a failure or delay in obtaining regulatory approval in one country may have a negative effect on the regulatory process in other countries. Also, any regulatory approval of any of our products in development, once obtained, may be withdrawn. Approvals might not be granted on a timely basis, if at all.

We can give no assurance that GE Healthcare will be successful with the further clinical development of flurpiridaz F 18.

In May 2015, we announced complete results from the first of two planned Phase 3 clinical trials for flurpiridaz F 18. Although the development candidate appeared to be well-tolerated from a safety perspective and outperformed SPECT in a highly statistically significant manner in the co-primary endpoint of sensitivity and in the secondary endpoints of image quality and diagnostic certainty, flurpiridaz F 18 did not meet its other co-primary endpoint of non-inferiority for identifying subjects without disease. In April 2017,

we entered into the License Agreement with GE Healthcare for the continued Phase 3 development and worldwide commercialization of flurpiridaz F 18. Under the License Agreement, GE Healthcare will, among other things, complete the worldwide development of flurpiridaz F 18 by conducting a second Phase 3 trial and pursue worldwide regulatory approvals. We cannot assure any particular outcome from GE Healthcare's continued Phase 3 development of the agent or from regulatory review of either our or their Phase 3 study of the agent, that any of the data generated in either our or their sponsored Phase 3 study will be sufficient to support an NDA approval, that GE Healthcare will only have to conduct the one additional Phase 3 clinical study prior to filing an NDA, or that flurpiridaz F 18 will ever be approved as a PET MPI imaging agent by the FDA. Any failure or significant delay in completing clinical trials for our product candidates or in receiving regulatory approval for the sale of our product candidates may harm our business and delay or prevent us from being able to generate additional future revenue from product sales.

Even if clinical development candidates receive regulatory approval, we can give no assurance that they can be successfully commercialized.

Even if our clinical development candidates proceed through their clinical trials and ultimately receive regulatory approval, there is no guarantee that an approved product can be manufactured in commercial quantities at a reasonable cost or that such a product will be successfully marketed or distributed. For example, the manufacturing, marketing and distribution of a radiopharmaceutical like flurpiridaz F 18 will require the creation of a field-based network of specialized PET manufacturing facilities, or PMFs, with radioisotope-producing cyclotrons, similar to what we created for PYLARIFY, and will need to be manufactured and distributed rapidly to end-users.

In addition, obtaining adequate coding, coverage and payment at appropriate payment levels for any clinical development candidate will be critical, including not only coverage from Medicare, Medicaid, and other government payors, but also from private payors. We can give no assurance, even if a clinical development candidate were to obtain regulatory approval, that adequate coding, coverage and payment could be secured to allow the approved products to become successfully commercialized.

We have been and expect to continue to be dependent on partners for the development of certain product candidates, which expose us to the risk of reliance on these partners.

In connection with our ongoing development activities, we currently depend, and expect to continue to depend, on numerous collaborators. For example, in addition to our collaboration with GE Healthcare on flurpiridaz F 18, we have collaborations with Bayer to develop and commercialize products using our PSMA antibody technology, with Curium for the development and commercialization of PYLARIFY in Europe, and with ROTOP for the development and commercialization of 1404 in Europe. In addition, certain clinical trials for our product candidates may be conducted by government-sponsored agencies, and consequently will be dependent on governmental participation and funding. These arrangements expose us to the same considerations we face when contracting with third parties for our own trials.

If any of our collaborators breach or terminate its agreement with us or otherwise fail to conduct successfully and in a timely manner the collaborative activities for which they are responsible, the preclinical or clinical development or commercialization of the affected product candidate or research program could be delayed or terminated. We generally do not control the amount and timing of resources that our collaborators devote to our programs or product candidates. We also do not know whether current or future collaboration partners, if any, might pursue alternative technologies or develop alternative products either on their own or in collaboration with others, including our competitors, as a means for developing treatments for the diseases or conditions targeted by our collaborative arrangements. Our collaborators are also subject to similar development, regulatory, manufacturing, cyber-security and competitive risks as us, which may further impede their ability to successfully perform the collaborative activities for which they are responsible. Setbacks of these types to our collaborators could have a material adverse effect on our business, results of operations and financial condition.

We depend on licenses from third parties for our rights to develop and commercialize certain product candidates. If we fail to achieve milestone requirements or to satisfy other conditions, we may lose those rights under those license agreements, and our business, results of operations and financial condition could be adversely affected.

Many of our products or product candidates incorporate rights licensed by third parties -- for example, we license patent rights on PYLARIFY from JHU and on RELISTOR from Wyeth LLC. We could lose the rights to develop or commercialize these products and product candidates if the related license agreement is terminated due to a breach by us or otherwise. In addition, we are required to make substantial cash payments, achieve milestones and satisfy other conditions, including filing for and obtaining marketing approvals and introducing products, to maintain rights under our license agreements. Due to the nature of these agreements and the uncertainties of development, we may not be able to achieve milestones or satisfy conditions to which we have contractually committed, and as a result may be unable to maintain our rights under these licenses. If we do not comply with our license agreements, the licensors may terminate them, which could result in our losing our rights to, and therefore being unable to commercialize, related products. This loss could have a material adverse effect on our business, results of operations and financial condition.

Risks Related to Our Capital Structure

We have indebtedness which may limit our financial and operating activities and may adversely affect our ability to incur additional debt to fund future needs.

As of December 31, 2021, we had approximately $175.0 million of total principal indebtedness remaining under our five-year secured term loan facility, which matures on June 30, 2024 (the "2019 Term Facility" and the loans thereunder, the "2019 Term Loans") and availability of $200.0 million under our five-year revolving credit facility (the "2019 Revolving Facility" and, together with the 2019 Term Facility, the "2019 Facility"). Our indebtedness and any future indebtedness we incur could:

- Require us to dedicate a substantial portion of cash flow from operations to the payment of interest on and principal of our indebtedness, thereby reducing the funds available for other purposes, including for working capital, capital expenditures and acquisitions;
- Make it more difficult for us to satisfy and comply with our obligations with respect to our outstanding indebtedness, namely the payment of interest and principal;
- Make it more difficult to refinance the outstanding indebtedness;
- Subject us to increased sensitivity to interest rate increases;
- Make us more vulnerable to economic downturns, adverse industry or company conditions or catastrophic external events;
- Limit our ability to withstand competitive pressures;
- Reduce our flexibility in planning for or responding to changing business, industry and economic conditions; and
- Place us at a competitive disadvantage to competitors that have relatively less debt than we have.

In addition, our substantial level of indebtedness could limit our ability to obtain additional financing on acceptable terms, or at all, for working capital, capital expenditures and general corporate purposes. Our liquidity needs could vary significantly and may be affected by general economic conditions, industry trends, performance and many other factors outside our control.

We may not be able to generate sufficient cash flow to meet our debt service obligations.

Our ability to generate sufficient cash flow from operations to make scheduled payments on our debt obligations will depend on our future financial performance, which will be affected by a range of economic, competitive and business factors, many of which are outside of our control. If we do not generate sufficient cash flow from operations to satisfy our debt obligations, including interest and principal payments, our credit ratings could be downgraded, and we may have to undertake alternative financing plans, such as refinancing or restructuring our debt, selling assets, entering into additional corporate collaborations or licensing arrangements for one or more of our products in development, reducing or delaying capital investments or seeking to raise additional capital. We cannot assure you that any refinancing would be possible, that any assets could be sold, licensed or partnered, or, if sold, licensed or partnered, of the timing of the transactions and the amount of proceeds realized from those transactions, that additional financing could be obtained on acceptable terms, if at all, or that additional financing would be permitted under the terms of our various debt instruments then in effect. Furthermore, our ability to refinance would depend upon the condition of the financial and credit markets. Our inability to generate sufficient cash flow to satisfy our debt obligations, or to refinance our obligations on commercially reasonable terms or on a timely basis, would have an adverse effect on our business, results of operations and financial condition.

Despite our indebtedness, we may incur more debt, which could exacerbate the risks described above.

We and our subsidiaries may be able to incur substantial additional indebtedness in the future subject to the limitations contained in the agreements governing our debt, including the 2019 Facility. Although these agreements restrict us and our restricted subsidiaries from incurring additional indebtedness, these restrictions are subject to important exceptions and qualifications. For example, we are generally permitted to incur certain indebtedness, including indebtedness arising in the ordinary course of business, indebtedness among restricted subsidiaries and us and indebtedness relating to hedging obligations. If we or our subsidiaries incur additional debt, the risks that we and they now face as a result of our leverage could intensify. In addition, the 2019 Facility will not prevent us from incurring obligations that do not constitute indebtedness under the agreements.

Our 2019 Facility contains restrictions that will limit our flexibility in operating our business.

Our 2019 Facility contains various covenants that limit our ability to engage in specified types of transactions. These covenants limit our and our restricted subsidiaries' ability to, among other things:

- Maintain net leverage above certain specified levels;
- Maintain interest coverage below certain specified levels;

- Incur additional debt;
- Pay dividends or make other distributions;
- Redeem stock;
- Issue stock of subsidiaries;
- Make certain investments;
- Create liens;
- Enter into transactions with affiliates; and
- Merge, consolidate or transfer all or substantially all of our assets.

A breach of any of these covenants could result in a default under the 2019 Facility. We may also be unable to take advantage of business opportunities that arise because of the limitations imposed on us by the restrictive covenants under our indebtedness.

As LIBOR is phased out, as anticipated, we will need to agree to a replacement index rate to be used under our 2019 Facility, which may have an adverse effect on our financial condition.

The use of LIBOR, as it relates to the Company's 2019 Term Facility, is expected to be phased out by the end of June 2023. The 2019 Facility does not specify a particular "hard-wired" replacement index rate (or related margin) when LIBOR becomes unavailable, but relies on the administrative agent and the Company reaching agreement on such a replacement rate (and related margin) that gives due consideration to the then prevailing market convention for determining rates of interest for syndicated loans denominated in U.S. dollars in the United States. We expect to amend our credit facilities to provide a market-based replacement index rate and margin prior to the time when LIBOR is no longer available. Any replacement rate will be based on a negotiation between us and the administrative agent and could result in an increase in our interest expense.

U.S. credit markets may impact our ability to obtain financing or increase the cost of future financing, including interest rate fluctuations based on macroeconomic conditions that are beyond our control.

During periods of volatility and disruption in the U.S., European, or global credit markets, obtaining additional or replacement financing may be more difficult and the cost of issuing new debt or replacing our 2019 Facility could be higher than under our current 2019 Facility. Higher cost of new debt may limit our ability to have cash on hand for working capital, capital expenditures and acquisitions on terms that are acceptable to us. Additionally, our 2019 Facility has variable interest rates. By its nature, a variable interest rate will move up or down based on changes in the economy and other factors, all of which are beyond our control. If interest rates increase, our interest expense could increase, affecting earnings and reducing cash flows available for working capital, capital expenditures and acquisitions.

The CVRs we issued as part of the Progenics Acquisition may result in substantial future payments to the holders of the CVRs; in addition, the actual payments made in connection with the CVRs, if any, may not be consistent with the estimated fair value of the CVRs that we are required to prepare for accounting purposes.

As part of the consideration for the Progenics Acquisition, we issued CVRs to the stockholders of Progenics and holders of in-the-money Progenics equity awards entitling them to future cash payments of 40% of PYLARIFY net sales over $100.0 million in 2022 and over $150.0 million in 2023, subject to an aggregate cap. These payments could be substantial. In addition, we are obligated to exercise a level of effort, expertise and resources consistent with those normally used in a medical diagnostics business similar to our size and resources with respect to commercializing a product of similar market potential at a similar stage in its product life to PYLARIFY. We are also required to produce net sales statements for PYLARIFY that may be reviewed and challenged by CVR holders, with any disagreement to be resolved by an independent accountant.

Because the CVRs are considered contingent consideration liabilities, for accounting purposes we are required by accounting principles generally accepted in the U.S. to estimate their fair value on a recurring basis. Adjustments in the estimated fair value of the CVRs can impact our consolidated financial statements on a quarterly or annual basis. The estimated fair value of the CVRs is determined based on a Monte Carlo simulation model that includes significant estimates and assumptions pertaining to commercialization events, sales targets, market conditions and discount rates. These estimates and assumptions are subject to the judgment of our management team and are not prepared with a view towards public disclosure of projected sales. Our sales targets are also subject to significant economic, competitive, industry and other uncertainties and contingencies, which are difficult to predict and in many cases are beyond our control. We can give no assurance that the actual amounts paid, if any, in connection with the CVRs will be consistent with any recurring fair value estimate for such CVRs.

Our stock price could fluctuate significantly, which could cause the value of your investment to decline, and you may not be able to resell your shares at or above your purchase price.

Securities markets worldwide have experienced, and may continue to experience, significant price and volume fluctuations. This market volatility, as well as general economic, market or political conditions, could reduce the market price of our common stock regardless of our operating performance. The trading price of our common stock is likely to be volatile and subject to wide price fluctuations in response to various factors, including:

- Market conditions in the broader stock market;
- Actual or anticipated fluctuations in our quarterly financial and operating results;
- Issuance of new or changed securities analysts' reports or recommendations;
- Investor perceptions of us and the pharmaceutical and medical device industries;
- Sales, or anticipated sales, of large blocks of our stock;
- Acquisitions or introductions of new products or services by us or our competitors, including our ongoing commercial launch of PYLARIFY;
- Positive or negative results from our clinical development programs;
- Additions or departures of key personnel;
- Regulatory or political developments;
- Loss of intellectual property protections;
- Litigation and governmental investigations;
- Geopolitical events; and
- Changing economic conditions.

These and other factors may cause the market price and demand for our common stock to fluctuate substantially, which may limit or prevent investors from readily selling their shares of common stock and may otherwise negatively affect the liquidity of our common stock. In addition, in the past, when the market price of a stock has been volatile, holders of that stock have sometimes instituted securities class action litigation against the company that issued the stock. If any of our stockholders brought a lawsuit against us, we could incur substantial costs defending the lawsuit. Such a lawsuit could also divert the time and attention of our management from our business, which could significantly harm our profitability and reputation.

If securities or industry analysts do not publish research or reports about our business, if they adversely change their recommendations regarding our stock, or if our results of operations do not meet their expectations, our stock price and trading volume could decline.

The trading market for our common stock will be influenced by the research and reports that industry or securities analysts publish about us or our business. If one or more of these analysts ceases coverage of our company or fails to publish reports on us regularly, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline. Moreover, if one or more of the analysts who cover us downgrades our stock, or if our results of operations do not meet their expectations, our stock price could also decline.

We do not anticipate paying any cash dividends for the foreseeable future.

We currently intend to retain our future earnings, if any, for the foreseeable future, to repay indebtedness and to fund the development and growth of our business. We do not intend to pay any dividends to holders of our common stock and the agreements governing our senior secured credit facilities limit our ability to pay dividends. As a result, capital appreciation in the price of our common stock, if any, will be your only source of gain on an investment in our common stock.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

The following table summarizes information regarding our significant leased and owned properties, as of December 31, 2021:

Location	Purpose	Square Footage	Ownership	Lease Term End
U.S.				
North Billerica, Massachusetts	Corporate Headquarters, Manufacturing, Laboratory, Mixed Use and Other Office Space	431,000	Owned	N/A
New York, New York	Progenics Headquarters, Office Space	26,000	Leased*	September 2030
Somerset, New Jersey	Manufacturing, Mixed Use and Office Space	11,400	Leased	November 2028
Somerset, New Jersey	Office Space	8,249	Leased	March 2027
Canada				
Quebec	Mixed Use and Office Space	1,106	Leased	May 2022
Quebec	Distribution Center and Office Space	1,433	Leased	May 2022
Sweden				
Lund	Office Space	4,000	Leased	December 2024

* On October 11, 2021, we entered into an agreement to sublease our office space at the World Trade Center in New York City to an unrelated third party. Please refer to Note 17, “Leases” for further details.

We believe all of these facilities are well-maintained and suitable for the office, manufacturing or warehouse operations conducted in them and provide adequate capacity for current and foreseeable future needs.

Item 3. Legal Proceedings

Information with respect to certain legal proceedings is included in Note 20, “Commitments and Contingencies”, to the consolidated financial statements contained in Item 8. Financial Statements and Supplementary Data, and is incorporated herein by reference.

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 trades on the NASDAQ Global Market under the symbol "LNTH".

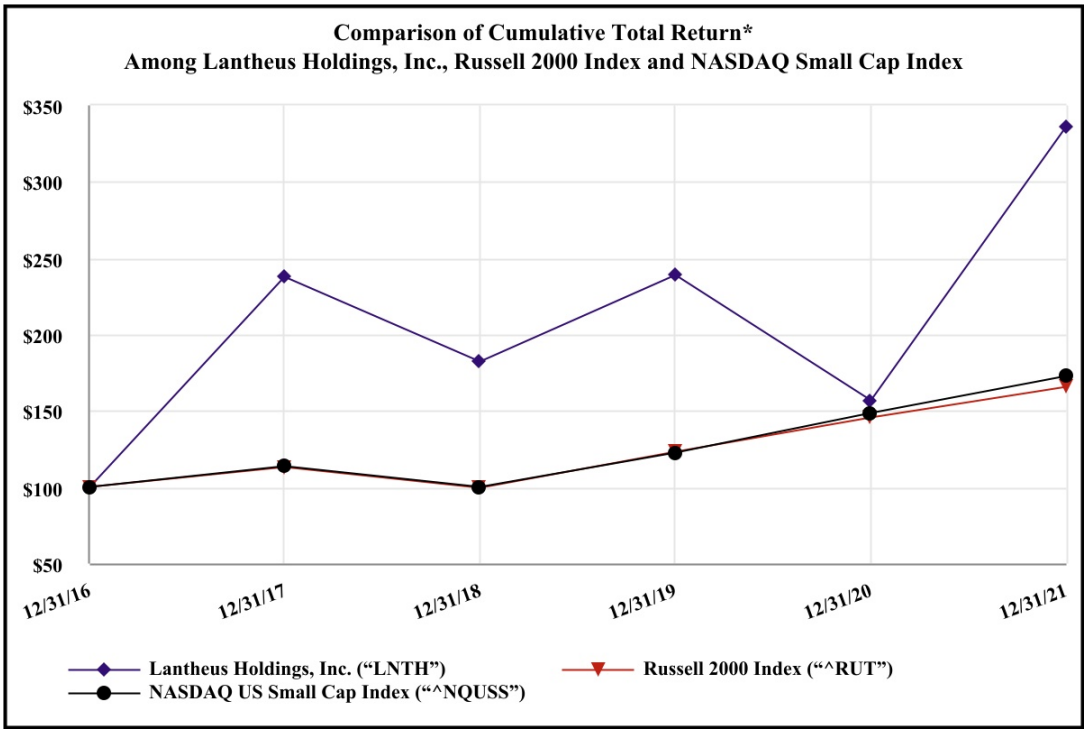
Holders of Record

On February 18, 2021, there were approximately 35 stockholders of record of our common stock. This number does not include stockholders for whom shares are held in "nominee" or "street" name.

Performance Graph

The performance graph set forth below shall not be deemed "soliciting material" or to be "filed" with the SEC. This graph will not be deemed "incorporated by reference" into any filing under the Securities Act or the Exchange Act, whether such filing occurs before or after the date hereof, except to the extent that we explicitly incorporate it by reference into in such filing.

The following graph provides a comparison of the cumulative total shareholder return on our common shares with that of the cumulative total shareholder return on the (i) Russell 2000 Index and (ii) the NASDAQ US Small Cap Index, commencing on December 31, 2016 and ending December 31, 2021. The graph assumes a hypothetical $100 investment in our common stock and in each of the comparative indices on December 31, 2016. Our historic share price performance is not necessarily indicative of future share price performance.



** Assumes hypothetical investment of $100 in our common stock and each of the indices on December 31, 2016, including reinvestment of dividends.*

Performance Graph Data

The following table sets forth the cumulative total shareholder return on the hypothetical $100 investment in our common stock and each of the comparative indices on December 31, 2016:

Date	Lantheus Holdings, Inc. ("LNTH")	Russell 2000 Index ("^RUT")	NASDAQ US Small Cap Index ("^NQUSS")
12/31/16	$ 100.00	$ 100.00	$ 100.00
12/31/17	$ 237.79	$ 113.14	$ 113.57
12/31/18	$ 181.98	$ 99.37	$ 99.96
12/31/19	$ 238.49	$ 122.94	$ 122.32
12/31/20	$ 156.86	$ 145.52	$ 148.58
12/31/21	$ 335.93	$ 165.45	$ 172.50

Issuer Purchase of Equity Securities

None.

Dividend Policy

We did not declare or pay any dividends in 2021, and we do not currently intend to pay dividends in the foreseeable future. We currently expect to retain future earnings, if any, for the foreseeable future, to finance the growth and development of our business and to repay indebtedness. Our ability to pay dividends is restricted by our financing arrangements. See Part II, Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations—Liquidity and Capital Resources—External Sources of Liquidity" for further information.

Recent Sales of Unregistered Securities

None.

Repurchases

The following table presents information with respect to purchases of common stock we made during the three months ended December 31, 2021. We do not currently have a share repurchase program in effect. The 2015 Equity Incentive Plan, adopted by us on June 24, 2015, as amended on April 26, 2016 and as further amended on April 27, 2017, April 24, 2019 and April 28, 2021 (the "2015 Plan"), provides for the withholding of shares to satisfy minimum statutory tax withholding obligations. It does not specify a maximum number of shares that can be withheld for this purpose. The shares of common stock withheld to satisfy minimum tax withholding obligations may be deemed to be "issuer purchases" of shares that are required to be disclosed pursuant to this Item 5.

Period	Total Number of Shares Purchased	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Programs	Approximate Dollar Value of Shares that May Yet Be Purchased Under the Program
October 2021 **	1,908	$ 23.26	*	*
November 2021 **	3,223	$ 29.79	*	*
December 2021 **	2,060	$ 27.39	*	*
Total	7,191		*	

* These amounts are not applicable as we do not have a share repurchase program in effect.

** Reflects shares withheld to satisfy minimum statutory tax withholding amounts due from employees related to the receipt of stock which resulted from the exercise for vesting of equity awards.

Securities Authorized for Issuance under Equity Compensations Plans

The information required with respect to this item is incorporated herein by reference to our Definitive Proxy Statement for our 2022 Annual Meeting of Stockholders to be filed with the SEC no later than 120 days after the close of our year ended December 31, 2021.

Item 6. Selected Financial Data

Basis of Financial Information

The consolidated financial statements have been prepared in U.S. Dollars, in accordance with accounting principles generally accepted in the United States of America ("U.S. GAAP"). The consolidated financial statements include the accounts of Lantheus Holdings, Inc. ("Holdings") and its wholly-owned subsidiaries. All intercompany accounts and transactions have been eliminated in consolidation.

Selected Financial Data

In the table below, we provide you with our selected consolidated financial data for the periods presented. We have prepared this information using our audited consolidated financial statements for the years ended December 31, 2021, 2020, 2019, 2018 and 2017.

The following selected consolidated financial information should be read in conjunction with our consolidated financial statements, the related notes and Part II, Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations" included elsewhere in this Annual Report on Form 10-K. The results indicated below and elsewhere in this Annual Report on Form 10-K are not necessarily indicative of results to be expected for any future period.

	Year Ended December 31,				
	2021	2020[b]	2019	2018	2017
Statement of Operations	(in thousands, except per share data)				
Revenues	$ 425,208	$ 339,410	$ 347,337	$ 343,374	$ 331,378
Cost of goods sold	237,513	200,649	172,526	168,489	169,243
Sales and marketing	68,422	40,901	41,888	43,159	42,315
General and administrative[c]	150,395	69,270	61,244	50,167	49,842
Research and development	44,966	32,788	20,018	17,071	18,125
Gain on sales of assets	15,263	—	—	—	—
Operating (loss) income	(60,825)	(4,198)	51,661	64,488	51,853
Interest expense	7,752	9,479	13,617	17,405	18,410
(Gain) loss on extinguishment of debt	(889)	—	3,196	—	2,442
Other loss (income)	7,350	(2,198)	6,221	(2,465)	(8,638)
(Loss) income before income taxes	(75,038)	(11,479)	28,627	49,548	39,639
Income tax (benefit) expense[a]	(3,759)	1,994	(3,040)	9,030	(83,746)
Net (loss) income	$ (71,279)	$ (13,473)	$ 31,667	$ 40,518	$ 123,385
Net (loss) income per common share:					
Basic	$ (1.06)	$ (0.25)	$ 0.81	$ 1.06	$ 3.31
Diluted	$ (1.06)	$ (0.25)	$ 0.79	$ 1.03	$ 3.17
Weighted-average common shares:					
Basic	67,486	54,134	38,988	38,233	37,276
Diluted	67,486	54,134	40,113	39,501	38,892

	December 31,				
	2021	2020[b]	2019	2018	2017
Balance Sheet Data	(in thousands)				
Cash and cash equivalents	$ 98,508	$ 79,612	$ 92,919	$ 113,401	$ 76,290
Total assets	$ 863,784	$ 869,821	$ 405,919	$ 439,831	$ 383,858
Long-term debt, net	$ 163,121	$ 197,699	$ 183,927	$ 263,709	$ 265,393
Total liabilities	$ 399,345	$ 355,616	$ 291,318	$ 368,829	$ 360,567
Total stockholders' equity (deficit)	$ 464,439	$ 514,205	$ 114,601	$ 71,002	$ 23,291

(a) The 2017 amount reflects the release of our valuation allowance of $141.1 million against its deferred tax assets offset by a provision of $45.1 million for remeasuring the Company's deferred tax assets for the change in tax rates enacted under the Tax Cuts and Jobs Act of 2017.

(b) Includes the impact of the Progenics Acquisition on June 19, 2020. See Note 8, "Business Combinations", in our accompanying financial statements for further information.

(c) The 2021 amount reflects the change in fair value of the contingent financial asset and contingent financial liabilities, including the CVRs, which resulted in an expense of $72.4 million. See Note 4, "Fair Value of Financial Instruments", in our accompanying financial statements for further information.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

The following discussion and analysis of our financial condition and results of operations should be read together with Item 6, "Selected Financial Data" and the consolidated financial statements and the related notes included in Item 8 of this Annual Report on Form 10-K. This discussion contains forward-looking statements related to future events and our future financial performance that are based on current expectations and subject to risks and uncertainties. Our actual results may differ materially from those anticipated in these forward-looking statements as a result of many factors, including those set forth in Part I—Item 1A. "Risk Factors" and "Cautionary Note Regarding Forward Looking Statements." included in this Annual Report on Form 10-K.

Overview

Our Business

We are an established leader and fully integrated provider committed to innovative imaging diagnostics, targeted therapeutics, and artificial intelligence solutions to Find, Fight and Follow serious medical conditions. We classify our products in three revenue categories: precision diagnostics, radiopharmaceutical oncology, and strategic partnerships and other revenue. Our leading precision diagnostic products assist HCPs Find and Follow diseases in non-oncologic conditions. Our radiopharmaceutical oncology diagnostics and therapeutics help HCPs Find, Fight and Follow cancer. Our strategic partnerships and other revenue category focuses on facilitating precision medicine through the use of biomarkers, digital solutions and radiotherapeutic platforms, and also includes our license of RELISTOR to Bausch.

Our commercial products are used by cardiologists, internal medicine physicians, nuclear medicine physicians, oncologists, radiologists, sonographers, technologists and urologists working in a variety of clinical settings. We believe that our diagnostic products provide improved diagnostic information that enables HCPs to better detect and characterize, or rule out, disease, with the potential to achieve better patient outcomes, reduce patient risk and limit overall costs for payors and throughout the healthcare system.

We produce and market our products throughout the U.S., selling primarily to clinics, group practices, hospitals, integrated delivery networks and radiopharmacies. We sell our products outside the U.S. through a combination of direct distribution in Canada and third party distribution relationships in Europe, Canada, Australia, Asia-Pacific, Central America and South America.

Our headquarters are located in North Billerica, MA, with additional offices in Somerset, NJ; Montreal, Canada and Lund, Sweden.

In the first quarter of 2021, we completed the evaluation of our operating and reporting structure, including the impact on our business of the acquisition of Progenics, and the sale of our Puerto Rico subsidiary, which resulted in a change in our operating segments to one reportable business segment.

Key Factors Affecting Our Results

Our 2021 financial performance reflects full year results of the Progenics business, whereas the year ended December 31, 2020 only incorporates results since the June 19, 2020 closing date of the Progenics Acquisition.

Our business and financial performance have been, and continue to be, affected by the following:

PYLARIFY Approval and Commercial Launch

On May 27, 2021, we announced that the U.S. Food and Drug Administration ("FDA") had approved PYLARIFY, an F 18-labeled PET imaging agent targeting prostate-specific membrane antigen ("PSMA"). PYLARIFY is a product in our radiopharmaceutical oncology product category. We commercially launched PYLARIFY in the U.S. in June 2021.

PYLARIFY is a radioactive diagnostic agent indicated for PET imaging of PSMA-positive lesions in men with prostate cancer with suspected metastasis who are candidates for initial definitive therapy and with suspected recurrence based on elevated serum prostate-specific antigen ("PSA") levels. PYLARIFY works by binding to PSMA, a protein that is overexpressed on the surface of more than 90% of primary and metastatic prostate cancer cells. PYLARIFY works with PET/CT technology to produce a combined PET/CT scan that enables the reader of the PET/CT scan to detect and locate the disease.

According to the American Cancer Society, prostate cancer is the second most common cancer in American men -- one in eight American men will be diagnosed with prostate cancer in their lifetimes and over 3.1 million American men are living with prostate cancer today. Based on estimates from third party sources regarding the incidence of prostate cancer in men in the U.S., we believe the market potential for PSMA PET imaging agents could be up to 220,000 annual scans, comprised of 90,000 scans for patients with intermediate, unfavorable or high/very high risk of suspected metastases of prostate cancer and 130,000 scans for patients with

suspected recurrence of prostate cancer. Because we are in the process of launching this imaging agent, we can give no assurance as to how clinical practice may evolve or what our ultimate market penetration may be.

The approval of PYLARIFY was based on data from two Company-sponsored pivotal studies ("OSPREY" and "CONDOR") designed to establish the safety and diagnostic performance of PYLARIFY across the prostate cancer disease continuum. Results from OSPREY (Cohort A) demonstrated improvement in specificity and positive predictive value of PYLARIFY PET imaging over conventional imaging in men at risk for metastatic prostate cancer prior to initial definitive therapy. CONDOR studied men with biochemical recurrent prostate cancer. In patients with biochemical recurrent prostate cancer and non-informative baseline imaging, PYLARIFY demonstrated high correct localization and detection rates, including in patients with early recurrent disease with low, but rising, PSA blood levels (median PSA 0.8 ng/mL).

Upon commercial launch in June 2021, PYLARIFY was immediately available in select parts of the U.S. Over the course of the remainder of 2021, PYLARIFY availability expanded into additional regions and is now broadly available nationwide. We continue to expand our geographic coverage, customer contracting and market access coverage to serve our customers and the U.S. prostate cancer community.

The commercial launch of PYLARIFY is complex and expensive. During 2021, we hired additional employees to assist us with the commercialization of PYLARIFY, including in sales, marketing, reimbursement, quality and medical affairs. To manufacture PYLARIFY, we assembled and qualified a nationwide network of PMFs with radioisotope-producing cyclotrons that make F 18, which has a 110-minute half-life, so PYLARIFY is manufactured and distributed rapidly to end-users. After being made on a cyclotron at a PMF, the F 18 is then combined with certain chemical ingredients in specially designed chemistry synthesis boxes to manufacture PYLARIFY. The finished PYLARIFY is then quality control tested and transferred to a radiopharmacist who prepares and dispenses patient-specific doses of the final product. Because each of the PMFs manufacturing these products is deemed by the FDA to be a separate manufacturing site, each has to be separately approved by the FDA. Although PYLARIFY is now broadly available nationwide and we continue to qualify additional PMFs, we can give no assurance that the FDA will continue to approve PMFs in accordance with our planned roll-out schedule. If FDA approval of manufacturing sites is delayed or withdrawn, our future business, results of operations, financial condition and cash flows could be adversely affected.

In addition to the network of PMFs, we have also been working with academic medical centers in the U.S. that have radioisotope-producing cyclotrons and which have expressed an interest in manufacturing PYLARIFY. Under this initiative, we would enter into a fee-for-service arrangement under which the academic medical center's PMF would manufacture and supply batches of PYLARIFY, and its radiopharmacy would prepare patient-ready unit doses, in each case for and on behalf of us. We would then sell those unit doses to the academic medical center's hospitals and clinics, and in some instances, to additional customers in the academic medical center's geographic area, in each case, under separate purchase agreements. The academic medical center's PMF's ability to manufacture and supply batches of PYLARIFY will be subject to FDA approval, and we can give no assurance that the FDA will approve such PMFs in accordance with our planned roll-out schedule.

Our commercial launch also required obtaining adequate coding, coverage and payment for PYLARIFY, including not only coverage from Medicare, Medicaid and other government payors, as well as private payors, but also appropriate payment levels, to adequately cover our customers' costs of using PYLARIFY in PET/CT imaging procedures. We received notification that our HCPCS code, which enables streamlined billing, went into effect as of January 1, 2022. In addition, effective January 1, 2022, the CMS granted Transitional Pass-Through Payment Status in the hospital outpatient setting ("TPT Status") for PYLARIFY, enabling traditional Medicare to provide an incremental payment for PET/CT scans performed with PYLARIFY in that setting. TPT Status for PYLARIFY is expected to expire December 31, 2024. After TPT Status expires, under current Medicare rules, PYLARIFY, similar to other diagnostic radiopharmaceuticals, would not be separately reimbursed in the hospital outpatient setting but rather would be included as part of the facility fee a hospital otherwise receives for a PET/CT imaging procedure, and the facility fee does not always cover the cost of a drug used in the procedure. We can give no assurance that any CMS reimbursement in the hospital outpatient setting that follows the expiration of TPT Status will be adequate to cover the cost of PYLARIFY used in a PET/CT imaging procedure.

We actively pursue patents in connection with PYLARIFY, both in the U.S. and internationally. In the U.S. for PYLARIFY, we have four Orange Book-listed patents, including composition of matter patents, which expire in 2030 and 2037. Outside of the U.S., we are currently pursuing additional PYLARIFY patents to obtain similar patent protection as in the U.S.

PYLARIFY AI Clearance and Use

During 2021, we also announced that our subsidiary, EXINI, was granted 510(k) clearance by the FDA in the U.S. and received CE marking in Europe for aPROMISE. We commercially launched aPROMISE under the name PYLARIFY AI in the U.S. in November 2021.

PYLARIFY AI is artificial intelligence medical device software developed to assist with the reading and quantification of PYLARIFY scans. The technology automatically analyzes a PSMA PET/CT image to segment anatomical regions – 51 bones and 12 soft tissue organs. This image segmentation enables automated localization, detection and quantification of potential PSMA-avid lesions in a PSMA PET/CT image, which is then incorporated into a standardized report for physicians.

Anticipated Continued Growth of DEFINITY and Expansion of Our Ultrasound Microbubble Franchise

We believe the market opportunity for our ultrasound microbubble enhancing agent, DEFINITY, continues to be significant. DEFINITY has been our fastest growing and highest margin commercial product. We anticipate DEFINITY sales will continue to grow in the future. As we continue to educate the physician and healthcare provider community about the benefits and risks of DEFINITY, we believe we will be able to continue to grow the appropriate use of DEFINITY in suboptimal echocardiograms. In a U.S. market with three echocardiography ultrasound enhancing agents approved by the FDA, we estimate that DEFINITY had over 80% of the market as of December 31, 2021.

As we continue to pursue expanding our microbubble franchise, our activities include:

- Patents - We continue to actively pursue additional patents in connection with DEFINITY and DEFINITY RT, both in the U.S. and internationally. In the U.S. for DEFINITY, we have four Orange Book-listed method of use patents, one of which expires in 2035 and three of which expire in 2037, as well as additional manufacturing patents that are not Orange Book-listed expiring in 2023 and 2037. In the U.S. for DEFINITY RT, we have five Orange Book-listed patents, including a composition of matter patent which expires in 2035. Outside of the U.S., we are currently pursuing additional DEFINITY and DEFINITY RT patents to obtain similar patent protection as in the U.S. The Orange Book-listed patents include a patent on the use of VIALMIX RFID which expires in 2037; we have submitted additional VIALMIX RFID patent applications in major markets throughout the world.

  Hatch-Waxman Act - Even though our longest duration Orange Book-listed DEFINITY patent extends until March 2037, because our Orange Book-listed composition of matter patent expired in June 2019, we may face generic DEFINITY challengers in the near to intermediate term. Under the Hatch-Waxman Act, the FDA can approve Abbreviated New Drug Applications (“ANDAs”) for generic versions of drugs if the ANDA applicant demonstrates, among other things, that (i) its generic candidate is the same as the innovator product by establishing bioequivalence and providing relevant chemistry, manufacturing and product data, and (ii) either the marketing of that generic candidate does not infringe the Orange Book-listed patent(s) or the Orange Book-listed patent(s) is invalid. Similarly, the FDA can approve a Section 505(b)(2) NDA from an applicant that relies on some of the information required for marketing approval to come from studies which the applicant does not own or have a legal right of reference. With respect to the Orange Book-listed patent(s) covering an innovator product, the ANDA applicant or the Section 505(b)(2) applicant (if relying on studies related to the innovator product) (together, the “Applicant”) must give a notice (a “Notice”) to the innovator of its certification that its generic candidate will not infringe the innovator’s Orange Book-listed patent(s) or that the Orange Book-listed patent(s) is invalid. The innovator can then file suit against the Applicant within 45 days of receiving the Notice, and FDA approval to commercialize the generic candidate will be stayed (that is, delayed) for up to 30 months (measured from the date on which a Notice is received) while the patent dispute between the innovator and the Applicant is resolved in court. The 30-month stay could potentially expire sooner if the courts determine that no infringement had occurred or that the challenged Orange Book-listed patent is invalid or if the parties otherwise settle their dispute.

  As of the date of filing of this Annual Report on Form 10-K, we have not received any Notice from an Applicant. If we were to (i) receive any such Notice in the future, (ii) bring a patent infringement suit against the Applicant within 45 days of receiving that Notice, and (iii) successfully obtain the full 30-month stay, then the Applicant would be precluded from commercializing a generic version of DEFINITY prior to the expiration of that 30-month stay period and, potentially, thereafter, depending on how the patent dispute is resolved. Solely by way of example and not based on any knowledge we currently have, if we received a Notice from an Applicant in March 2022 and the full 30-month stay were obtained, then the Applicant would be precluded from commercialization until at least September 2024. If we received a Notice some number of months in the future and the full 30-month stay were obtained, the commercialization date would roll forward in the future by the same number of months. In the event a 505(b)(2) applicant does not rely on studies related to the innovator product, the 30-month stay would not apply, but additional clinical studies may be required.

- *DEFINITY RT* - DEFINITY RT became commercially available in the fourth quarter of 2021. A modified formulation of DEFINITY that allows both storage and shipment at room temperature, DEFINITY RT provides clinicians an additional choice and allows for greater utility of this formulation in broader clinical settings. Given its physical characteristics, we believe DEFINITY RT is also well-suited for inclusion in kits requiring microbubbles for other indications and applications (including in kits developed by third parties of the type described in the paragraph entitled *Microbubble* below).

- *VIALMIX RFID* - VIALMIX RFID, our next-generation activation device designed specifically for both DEFINITY and DEFINITY RT, became commercially available in the fourth quarter of 2021. The activation rate and time are controlled by VIALMIX RFID through the use of radio-frequency identification technology (“RFID”) to ensure reproducible activation of

DEFINITY and DEFINITY RT. The RFID tag, which is affixed to the vial label, enables the DEFINITY or DEFINITY RT vial to be appropriately activated with the VIALMIX RFID activation device.

Global Mo-99 Supply

We currently have Mo-99 supply agreements with Institute for Radioelements ("IRE"), running through December 31, 2022, with auto-renewal provisions and terminable upon notice of non-renewal, and with NTP Radioisotopes ("NTP"), acting for itself and on behalf of its subcontractor, the Australian Nuclear Science and Technology Organisation ("ANSTO"), running through March 31, 2022, and for which we are currently negotiating an extension. We also have a Xenon supply agreement with IRE which runs through December 31, 2023, with auto-renewal provisions and terminable upon notice of non-renewal.

Although we have a globally diverse Mo-99 supply with IRE in Belgium, NTP in South Africa, and ANSTO in Australia, we still face supplier and logistical challenges in our Mo-99 supply chain. The NTP processing facility had periodic outages in 2017, 2018 and 2019. When NTP was not producing, we relied on Mo-99 supply from both IRE and ANSTO to limit the impact of the NTP outages. In 2019 and 2020, ANSTO experienced multiple facility issues that resulted in ANSTO outages and volume limitations, during which time we relied on IRE and NTP to limit the impact of those outages and limitations. Because of the COVID-19 pandemic, we experienced challenges receiving regularly scheduled orders of Mo-99 from our global suppliers, particularly in the second quarter of 2020. We continue to manage these various supply chain challenges, but depending on reactor and processor schedules and operations, at times we have not been able to fill some or all of the demand for our TechneLite generators on certain manufacturing days. A prolonged disruption of service from one of our three Mo-99 processing sites or one of their main Mo-99-producing reactors could have a substantial negative effect on our business, results of operations, financial condition and cash flows.

To augment our current supply of Mo-99, we have a strategic arrangement with SHINE Medical Technologies LLC ("SHINE") for the future supply of Mo-99. Under the terms of the supply agreement, entered into in November 2014, SHINE will provide Mo-99 produced using its proprietary LEU-solution technology for use in our TechneLite generators once SHINE's facility becomes operational and receives all necessary regulatory approvals, which SHINE now estimates will occur in 2023. The term of this arrangement provides for three years of supply of Mo-99. However, we cannot assure you that SHINE will be able to produce commercial quantities of Mo-99 for our business, or that SHINE together with our current suppliers will be able to deliver a sufficient quantity of Mo-99 to meet our needs.

Inventory Supply

We obtain a substantial portion of our imaging agents from a third party supplier. JHS is currently a significant supplier of DEFINITY and our sole source manufacturer of NEUROLITE, Cardiolite and evacuation vials, the latter being an ancillary component for our TechneLite generators. In addition to JHS, we rely on SBL as our sole source manufacturer of DEFINITY RT. Our new manufacturing agreement with JHS relating to DEFINITY, NEUROLITE and Cardiolite expires in December 2027.

In 2021, we have constructed a specialized in-house manufacturing facility at our North Billerica campus for purposes of producing DEFINITY and, potentially, other sterile vial products. On February 22, 2022, we received FDA approval of our sNDA, authorizing commercial manufacturing of DEFINITY at our new facility. DEFINITY manufactured at this facility became commercially available on February 23, 2022. We believe this investment will allow us to better manage DEFINITY manufacturing and inventory, reduce our costs in a potentially more price competitive environment, and provide us with supply chain redundancy.

Radiopharmaceuticals are decaying radioisotopes with half-lives ranging from a few hours to several days. These products cannot be kept in inventory because of their limited shelf lives and are subject to just-in-time manufacturing, processing and distribution, which takes place at our facilities in North Billerica, Massachusetts and Somerset, New Jersey.

COVID-19 Pandemic

The global COVID-19 pandemic has had, and may continue to have, a material impact on our business. Towards the end of the first quarter of 2020 we began to experience, and through the date of this filing we are continuing to experience, impacts to our business and operations related to the COVID-19 pandemic, including the impact of hospital staffing challenges, vaccination mandates, employee absences due to illness, and a decline in the volume of certain procedures and treatments using our products.

Although some of the restrictions, including stay-at-home mandates, imposed in response to the COVID-19 pandemic have been lifted in much of the U.S., and there has been a rapid rollout and development of multiple vaccines and boosters, the resurgence of COVID-19 infections continued to impact certain aspects of our business during the fourth quarter of 2021. For example, we believe sales of DEFINITY were impacted by hospital nursing and sonographer shortages, and sales of AZEDRA were impacted by treatment capacity constraints in hospitals, treatment deferrals and cancellations by patients, and access restrictions by hospitals. In addition, there has been a substantial reduction in pulmonary ventilation studies in which our product, Xenon, is used because of institutional concerns and professional society guidelines relating to the possible spread of COVID-19 to technicians and other patients, because

Xenon is both inhaled and exhaled by the patient. Our Xenon sales through the fourth quarter of 2021 continued to be at reduced levels, we expect these reduced levels to continue for at least as long as COVID-19 precautions remain in place, and we can give no assurance that Xenon sales will return to historic levels.

The pandemic could still have a future negative impact on our business, particularly if there are additional resurgences as a result of mutations or other variations to the virus that further increase its communicability or its impact on certain populations, geographic regions and the healthcare system, including elective procedures and hospital access.

Research and Development Expenses

To remain a leader in the marketplace, we have historically made and will continue to make substantial investments in new product development and lifecycle management for existing products.

- For PYLARIFY, our development of PYLARIFY resulted in approval by the FDA in May 2021.
- For 1095, the ARROW Phase 2 study in mCRPC patients was paused to minimize risk to subjects and healthcare providers during the pandemic, and new enrollment in that study restarted in October 2020. In the fourth quarter of 2021, we completed an interim analysis of the ARROW Phase 2 study and are continuing that study without modifications. We currently expect to complete enrollment in the ARROW Phase 2 study later in 2022.
- For LMI 1195, we have commenced a Phase 3 clinical trial for the use of LMI 1195 for the diagnosis and management of neuroblastoma tumors in pediatric and adult populations. We expect to initiate approximately 20 clinical sites in the U.S. to enroll approximately 100 patients with known or suspected neuroblastoma.
- We are also exploring additional lifecycle management opportunities for some of our current products, including AZEDRA.

Our investments in these additional clinical activities and lifecycle management opportunities will increase our operating expenses and impact our results of operations and cash flow, and we can give no assurances as to whether any of these clinical development candidates or lifecycle management opportunities will be successful.

Strategic Partnerships and Other Revenue

We continue to seek ways to further expand our portfolio of products and product candidates and how best to optimize the value of our current assets, evaluating a number of different opportunities to collaborate with others or to acquire or in-license additional products, product candidates, businesses and technologies to drive our future growth.

Oncology

As we continue to pursue expanding our strategic partnerships, our Pharma Services activities and strategic partnerships in oncology include:

- *Prostate Cancer* - We collaborate with pharmaceutical companies developing therapies and diagnostics in prostate cancer. In January 2022, we announced a collaboration with the Prostate Cancer Clinical Trial Consortium (“PCCTC”), a premier multicenter clinical research organization that specializes in prostate cancer research. The intent of the strategic collaboration is to integrate our AI platform into PCCTC studies to advance the development and validation of novel AI-enabled biomarkers. In September 2021, we entered into a development and commercialization collaboration with RefleXion Medical, Inc. to evaluate the use of piflufolastat F 18 to enable real-time therapeutic guidance of biology-guided radiotherapy in prostate cancer using the RefleXion X1™ platform. Prior to 2021, we had also entered into several other agreements, including ones with Bayer, POINT Biopharma and Regeneron, under which we supply piflufolastat F 18 in connection with their clinical studies, and Curium, under which we licensed exclusive rights to Curium to develop and commercialize piflufolastat F 18 in Europe.
- *Immuno-Oncology* - In May 2019, we entered into a strategic collaboration and license agreement with NanoMab, a privately-held biopharmaceutical company focused on the development of next generation radiopharmaceuticals for cancer precision medicine.
- *Pan-Oncology* - In March 2021, we acquired from Ratio Therapeutics LLC (previously Noria Therapeutics, Inc.) exclusive, worldwide rights to NTI-1309, an innovative imaging biomarker that targets fibroblast activation protein, an emerging target with broad potential imaging applicability and use in oncology. Upon further clinical development, we will assess options to bring NTI-1309 to market as a diagnostic or potentially a therapeutic product.

Microbubble Franchise

In addition, as described above, we continue to expand our microbubble franchise. In April 2021, we announced a strategic collaboration with Allegheny Health Network (“AHN”), which will use our microbubbles in combination with AHN’s ultrasound-

assisted non-viral gene transfer technology for the development of a proposed treatment of xerostomia. Xerostomia is a lack of saliva production leading to dry mouth and has a variety of causes, including radiotherapy and chemotherapy, the chronic use of drugs and rheumatic and dysmetabolic diseases. Prior to 2021, we entered into microbubble collaborations with the following parties: (i) Cerevast Medical, Inc. ("Cerevast"), in which our microbubbles will be used in connection with Cerevast's ocular ultrasound device to improve blood flow in occluded retinal veins in the eye; (ii) CarThera SAS, for the use of our microbubbles in combination with SonoCloud, a proprietary implantable device in development for the treatment of recurrent glioblastoma; and (iii) Insightec Ltd. ("Insightec"), which will use our microbubbles in connection with the development of Insightec's transcranial guided focused ultrasound device for the treatment of glioblastoma as well as other neurodegenerative conditions.

Generally, our costs in connection with the strategic partnerships relate to the supply of drug and other ancillary expenses and the benefits can include possible supply, milestone and royalty payments, additional intellectual property rights and strategic relationships. We can give no assurance as to if or when or if any of these collaborations and other new initiatives will be successful or accretive to earnings.

Results of Operations

The following is a summary of our consolidated results of operations:

	Year Ended December 31,			2021 vs. 2020		2020 vs. 2019	
(in thousands)	**2021**	**2020**	**2019**	**Change $**	**Change %**	**Change $**	**Change %**
Revenues	$ 425,208	$ 339,410	$ 347,337	$ 85,798	25.3 %	$ (7,927)	(2.3)%
Cost of goods sold	237,513	200,649	172,526	36,864	18.4 %	28,123	16.3 %
Gross profit	187,695	138,761	174,811	48,934	35.3 %	(36,050)	(20.6)%
Operating expenses							
Sales and marketing	68,422	40,901	41,888	27,521	67.3 %	(987)	(2.4)%
General and administrative	150,395	69,270	61,244	81,125	117.1 %	8,026	13.1 %
Research and development	44,966	32,788	20,018	12,178	37.1 %	12,770	63.8 %
Total operating expenses	263,783	142,959	123,150	120,824	84.5 %	19,809	16.1 %
Gain on sales of assets	15,263	—	—	15,263	N/A	—	N/A
Operating (loss) income	(60,825)	(4,198)	51,661	(56,627)	1,348.9 %	(55,859)	(108.1)%
Interest expense	7,752	9,479	13,617	(1,727)	(18.2)%	(4,138)	(30.4)%
(Gain) loss on extinguishment of debt	(889)	—	3,196	(889)	N/A	(3,196)	N/A
Other loss (income)	7,350	(2,198)	6,221	9,548	(434.4)%	(8,419)	(135.3)%
(Loss) income before income taxes	(75,038)	(11,479)	28,627	(63,559)	553.7 %	(40,106)	(140.1)%
Income tax (benefit) expense	(3,759)	1,994	(3,040)	(5,753)	(288.5)%	5,034	(165.6)%
Net (loss) income	$ (71,279)	$ (13,473)	$ 31,667	$ (57,806)	429.1 %	$ (45,140)	(142.5)%

Comparison of the Periods Ended December 31, 2021 and 2020

Revenues

We classify our revenues into three product categories: precision diagnostics, radiopharmaceutical oncology, and strategic partnerships and other revenue. Precision diagnostics includes DEFINITY, TechneLite and other imaging diagnostic products. Radiopharmaceutical oncology consists primarily of PYLARIFY and AZEDRA. Strategic partnerships and other revenue includes partnerships that focus on facilitating precision medicine through the use of biomarkers, digital solutions and radiotherapeutic platforms, and on our other products, such as RELISTOR.

Revenues are summarized by product category on a net basis as follows:

	Year Ended December 31,			2021 vs. 2020	
(in thousands)	**2021**	**2020[1]**	**2019[1]**	**Change $**	**Change %**
DEFINITY	$ 232,759	$ 195,865	$ 202,398	$ 36,894	18.8 %
TechneLite	91,293	84,945	85,465	6,348	7.5 %
Other precision diagnostics	26,973	36,824	49,243	(9,851)	(26.8)%
Total precision diagnostics	351,025	317,634	337,106	33,391	10.5 %
PYLARIFY	43,414	—	—	43,414	100.0 %
Other radiopharmaceutical oncology	5,473	10,022	8,655	(4,549)	(45.4)%
Total radiopharmaceutical oncology	48,887	10,022	8,655	38,865	387.8 %
Strategic Partnerships and other revenue	25,296	11,754	1,576	13,542	115.2 %
Total revenues	$ 425,208	$ 339,410	$ 347,337	$ 85,798	25.3 %

(1) We reclassified aggregate rebates and allowances of $19.1 million and $16.6 million for the years ended December 31, 2020 and 2019, respectively, which included $17.5 million and $15.1 million for DEFINITY, $1.3 million and $1.1 million for TechneLite and $0.3 million for other precision diagnostics.

The increase in revenues for the year ended December 31, 2021, as compared to the prior year period, is primarily driven by the commercial launch of PYLARIFY, as well as increases in DEFINITY and TechneLite volume period over period as a result of the COVID-19 pandemic in the prior year, as well as the addition of the Progenics product portfolio, including RELISTOR. These increases are partially offset by continued COVID-19 related reduced volumes in our sales of Xenon throughout 2021 and the divestiture of our Puerto Rico business during the first quarter of 2021.

Rebates and Allowances

Estimates for rebates and allowances represent our estimated obligations under contractual arrangements with third parties. Rebate accruals and allowances are recorded in the same period the related revenue is recognized, resulting in a reduction to revenue and the establishment of a liability which is included in accrued expenses. These rebates and allowances result from performance-based offers that are primarily based on attaining contractually specified sales volumes and growth, Medicaid rebate programs for our products, administrative fees of group purchasing organizations and certain distributor related commissions. The calculation of the accrual for these rebates and allowances is based on an estimate of the third party's buying patterns and the resulting applicable contractual rebate to be earned over a contractual period.

An analysis of the amount of, and change in, reserves is summarized as follows:

(in thousands)	**Rebates and Allowances**
Balance, January 1, 2021	$ 9,350
Provision related to current period revenues	25,772
Adjustments relating to prior period revenues	14
Payments or credits made during the period	(24,159)
Balance, December 31, 2021	$ 10,977

Gross Profit

The increase in gross profit for the year ended December 31, 2021, as compared to the prior year period, is primarily due to an increase in volume of DEFINITY sales and the commercial launch of PYLARIFY in 2021, as well as an asset impairment loss of $7.3 million on other nuclear products that occurred in the prior year. These increases were offset, in part, by lower sales of our Xenon and increased radioisotope transportation costs, both due to COVID-19, as well as amortization expense of $2.7 million related to assets acquired in the Progenics Acquisition and accelerated recognition of asset retirement obligations of $5.4 million due to a change in useful life estimate.

Sales and Marketing

Sales and marketing expenses consist primarily of salaries and other related costs for personnel in field sales, marketing and customer service functions. Other costs in sales and marketing expenses include the development and preparation of advertising and promotional material, professional services, market research and sales meetings.

Sales and marketing expenses increased $27.5 million for the year ended December 31, 2021, as compared to the prior year period. This was primarily driven by preparation activities for the launch of PYLARIFY (including the hiring of additional employees) in 2021 and a full year of sales and marketing expenses related to AZEDRA, as well as the reduced level of marketing and promotional programs during the prior year period as a result of the COVID-19 pandemic.

General and Administrative

General and administrative expenses consist of salaries and other related costs for personnel in executive, finance, legal, information technology and human resource functions. Other costs included in general and administrative expenses are professional fees for information technology services, external legal fees, consulting and accounting services as well as bad debt expense, certain facility and insurance costs, including director and officer liability insurance.

General and administrative expenses increased $81.1 million for the year ended December 31, 2021 compared to the prior year period. This was primarily driven by the $72.4 million fair value adjustment to the contingent asset and liabilities, including the CVRs (an increase of $74.4 million from the prior year period), $9.5 million impairment charge related to the sublease of office space in the World Trade Center, and higher headcount related costs following the Progenics Acquisition, offset by acquisition-related costs associated with the Progenics Acquisition in the prior year and synergy capture in the current year.

Research and Development

Research and development expenses relate primarily to the development of new products to add to our portfolio and costs related to our medical affairs, medical information and regulatory functions.

Research and development expenses increased $12.2 million for the year ended December 31, 2021 as compared to the prior year period. This was primarily driven by additional research and development expenses related to 1095 and preparation activities for the launch of PYLARIFY, as well as higher employee-related costs in 2021 (including the hiring of additional employees) as compared to the prior year. The increase in research and development expenses during 2021 was offset by the filing fee paid in the prior year period related to the PYLARIFY New Drug Application.

Gain on Sale of Assets

We sold 100% of the stock of our Puerto Rico radiopharmacy subsidiary, resulting in a pre-tax book gain of $15.3 million for the year ended December 31, 2021.

Interest Expense

Interest expense for the year ended December 31, 2021 decreased $1.7 million as compared to the prior year period due to lower interest rates on our long-term debt together with reduced debt as a result of the voluntary repayment of the outstanding principal on our $50.0 million loan agreement (the “Royalty-Backed Loan”) between Progenics, through a wholly-owned subsidiary MNTX Royalties Sub LLC (“MNTX Royalties”), and a fund managed by HealthCare Royalty Partners III, L.P. on March 31, 2021.

Gain on Extinguishment of Debt

During the year ended December 31, 2021, we realized a $0.9 million gain on extinguishment of debt related to the voluntary repayment of the outstanding principal on the Royalty-Backed Loan on March 31, 2021.

Other (Income) Loss

Other (income) loss changed by $9.5 million for the year ended December 31, 2021 as compared to the prior year, due to the reduction of indemnified receivables related to the release of uncertain tax positions.

Income Tax (Benefit) Expense

The income tax benefit of $3.8 million for the year ended December 31, 2021 was primarily due to incurred losses before tax, the release of a portion of our uncertain tax positions, stock compensation deductions, and tax credits, offset by non-deductible expenses related to the changes in fair value of contingent assets and liabilities, the accrual of interest associated with uncertain tax positions, and the impact of an increased effective state tax rate on our ending net deferred tax assets. In accordance with our accounting policy, the change in the tax liabilities, penalties and interest associated with our uncertain tax positions (net of any offsetting federal or state benefit) is recognized within income tax benefit. The majority of our uncertain tax positions are indemnified liabilities, in accordance with the Stock and Asset Purchase Agreement entered into with Bristol-Myers ('BMS') in 2008. Changes in the liability result in offsetting changes in the indemnification receivable. Changes in the indemnification receivable are recognized within other loss (income) in the consolidated statement of operations. Assuming that the receivable from BMS continues to be considered recoverable by us, there will be no effect on net income and no net cash outflows related to these liabilities. Refer to Note 5, Income Taxes.

The income tax expense of $2.0 million for the year ended December 31, 2020 was primarily due to the accrual of interest associated with uncertain tax positions and the impact of non-deductible acquisition costs, offset by the tax benefits on losses generated in the period, the recognition of the deferred tax asset on held for sale assets, and tax credits.

We regularly assess our ability to realize our deferred tax assets. Assessing the realizability of deferred tax assets requires management judgment. In determining whether our deferred tax assets are more-likely-than-not realizable, we evaluate all available positive and negative evidence, and weigh the objective evidence and expected impact. We continue to record a valuation allowance against certain of our foreign net deferred tax assets and a small component of our domestic deferred tax assets.

Our effective tax rate for each reporting period is presented as follows:

	Year Ended December 31,	
	2021	**2020**
Effective tax rate	5.0%	(17.4)%

Our effective tax rate in fiscal 2021 differs from the U.S. statutory rate of 21% principally due to the impact of non-deductible expenses related to changes in fair value of contingent assets and liabilities, releases of uncertain tax position liabilities, and state effective tax rate changes that impacted our ending net deferred tax assets.

The change in the effective income tax rate for the year ended December 31, 2021 as compared to the prior year period is primarily due to the reduction in tax benefit resulting from the accrual of non-deductible expenses related to changes in fair value of contingent assets and liabilities.

Comparison of the Periods Ended December 31, 2020 and 2019

For a comparison of our results of operations for the fiscal years ended December 31, 2020 and December 31, 2019, see "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 fiscal year ended December 31, 2020, filed with the SEC on February 25, 2021.

Liquidity and Capital Resources

Cash Flows

The following table provides information regarding our cash flows:

(in thousands)	Year Ended December 31, 2021	2020	2019
Net cash provided by operating activities	$ 53,916	$ 16,396	$ 80,384
Net cash provided by (used in) investing activities	$ 3,683	$ (4,912)	$ (22,061)
Net cash used in financing activities	$ (39,332)	$ (21,861)	$ (78,881)

For a discussion of our liquidity and capital resources related to our cash flow activities for the fiscal year ended December 31, 2019, see "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 fiscal year ended December 31, 2020, filed with the SEC on February 25, 2021.

Net Cash Provided by Operating Activities

Net cash provided by operating activities of $53.9 million was primarily comprised of net loss adjusted for the net effect of non-cash items such as the change in fair value of contingent assets and liabilities of $72.4 million (refer to Note 4, "Fair Value of Financial Instruments", for further details on contingent consideration liabilities, including CVRs). The primary working capital sources of cash were the timing of payments to large vendors as well as an increase in billings associated with PYLARIFY sales. The primary working capital use of cash were an increase in trade receivables from timing of sale orders and an increase in collection period as well as the timing of inventory purchases.

Net cash provided by operating activities of $16.4 million in the year ended December 31, 2020 was driven primarily by a net loss of $13.5 million, a net decrease of $22.4 million related to movements in our working capital accounts during the period and a net decrease of $2.0 million in the fair value of contingent assets and liabilities offset by $24.7 million of depreciation, amortization and accretion expense, stock-based compensation expense of $14.1 million, impairment of long-lived assets of $9.9 million and a loss on disposal of assets of $2.3 million. The overall decreases in cash from our working capital accounts were primarily driven by the increase in accounts receivable due to the Progenics Acquisition and increase in collection period as well as change in inventory related to the COVID-19 impact on products and the timing of payments and payments of accruals related to general and administrative expenses in connection with the Progenics Acquisition.

Net Cash Provided by (Used in) Investing Activities

Net cash provided by investing activities during the year ended December 31, 2021 was primarily due to cash proceeds of $15.8 million received from the sale of our Puerto Rico subsidiary, which was offset by $12.1 million of capital expenditures.

Net cash used in investing activities during the year ended December 31, 2020 reflected $10.0 million in lending on a note receivable to Progenics prior to the acquisition and $12.5 million in capital expenditures offset by $17.6 million of acquired cash related to the Progenics Acquisition.

Net Cash Used in Financing Activities

Net cash used in financing activities during the year ended December 31, 2021 is primarily attributable to the payments on long-term debt and other borrowings of $43.3 million related to the 2019 Term Facility and Royalty-Backed Loan, including a voluntary repayment of the outstanding principal on the Royalty-Backed Loan and payments for minimum statutory tax withholding related to net share settlement of equity awards of $2.0 million offset by proceeds of $5.3 million from stock option exercises.

Net cash used in financing activities during the year ended December 31, 2020 is primarily attributable to the payments on long-term debt and other borrowings of $15.5 million related to the 2019 Term Facility and Royalty-Backed Loan (defined below), equity issuance costs related to the Progenics Acquisition of $3.8 million, and payments for minimum statutory tax withholding related to net share settlement of equity awards of $2.1 million.

External Sources of Liquidity

In June 2019, we refinanced our 2017 $275.0 million five-year term loan facility with the 2019 Term Facility. In addition, we replaced our $75.0 million revolving facility with the 2019 Revolving Facility. The terms of the 2019 Term Facility are set forth in the Credit Agreement, dated as of June 27, 2019, by and among us, the lenders from time to time party thereto and Wells Fargo Bank, N.A., as administrative agent and collateral agent (as amended, the "2019 Credit Agreement"). We have the right to request an increase to the 2019 Term Facility or request the establishment of one or more new incremental term loan facilities, in an aggregate principal amount of up to $100.0 million, plus additional amounts, in certain circumstances.

We are permitted to voluntarily repay the 2019 Term Loans, in whole or in part, without premium or penalty. The 2019 Term Facility requires us to make mandatory prepayments of the outstanding 2019 Term Loans in certain circumstances. The 2019 Term Facility amortizes at 5.0% per year through September 30, 2022 and 7.5% thereafter, until its June 27, 2024 maturity date.

Under the terms of the 2019 Revolving Facility, the lenders thereunder agreed to extend credit to us from time to time until June 27, 2024 consisting of revolving loans in an aggregate principal amount not to exceed $200.0 million at any time outstanding. The 2019 Revolving Facility includes a $20.0 million sub-facility for the issuance of letters of credit (the "Letters of Credit"). The 2019 Revolving Facility includes a $10.0 million sub-facility for swingline loans (the "Swingline Loans"). The Letters of Credit, Swingline Loans and the borrowings under the 2019 Revolving Facility are expected to be used for working capital and other general corporate purposes.

Please refer to Note 13, "Long-Term Debt, Net, and Other Borrowings" for further details on the 2019 Facility.

On June 19, 2020, we amended our 2019 Credit Agreement (the "Amendment") as a result of the impact of the COVID-19 pandemic on our business and operations and the near-term higher level of indebtedness resulting from our decision not to immediately repay the Progenics debt secured by the RELISTOR royalties following the Progenics Acquisition.

The Amendment provides for, among other things, modifications to our financial maintenance covenants. The covenant related to Total Net Leverage Ratio (as defined in the 2019 Credit Agreement) was waived from the date of the Amendment through December 31, 2020. The maximum total net leverage ratio and interest coverage ratio permitted by the financial covenant is displayed in the table below:

2019 Credit Agreement

Period	Total Net Leverage Ratio
Q3 2021 and thereafter	3.50 to 1.00

Period	Interest Coverage Ratio
Q2 2021 and thereafter	3.00 to 1.00

As of December 31, 2021, we were in compliance with all financial and other covenants under the 2019 Credit Agreement.

Under the 2019 Credit Agreement, loans bear interest at LIBOR plus a spread that ranges from 1.50% to 3.00% or the Base Rate plus a spread that ranges from 0.50% to 2.00%, and the commitment fee ranges from 0.15% to 0.40%, in each case based on our Total Net Leverage Ratio.

On June 19, 2020, as a result of the Progenics Acquisition, we assumed Progenics outstanding debt as of such date in the amount of $40.2 million. On November 4, 2016, Progenics, through MNTX Royalties, entered into the Royalty-Backed Loan. The Royalty-Backed Loan bore interest at an annual rate of 9.5% and was scheduled to mature on June 30, 2025. On June 22, 2020, HCRP waived the automatic acceleration of the Royalty-Backed Loan that otherwise would have been triggered by the consummation of the Progenics Acquisition and MNTX Royalties agreed not to prepay the loan until after December 31, 2020.

On March 31, 2021, we voluntarily repaid in full the entire outstanding principal on the Royalty-Backed Loan in the amount of $30.9 million, which included a prepayment amount of $0.5 million, and terminated the agreement.

Our ability to fund our future capital needs will be affected by our ability to continue to generate cash from operations and may be affected by our ability to access the capital markets, money markets or other sources of funding, as well as the capacity and terms of our financing arrangements.

We may from time to time repurchase or otherwise retire our debt and take other steps to reduce our debt or otherwise improve our balance sheet. These actions may include prepayments of our term loans or other retirements or refinancing of outstanding debt, privately negotiated transactions or otherwise. The amount of debt that may be retired, if any, could be material and would be decided at the sole discretion of our Board of Directors and will depend on market conditions, our cash position and other considerations.

Funding Requirements

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

- The level of product sales and the pricing environment of our currently marketed products, particularly DEFINITY, PYLARIFY, as well as any additional products that we may market in the future, including decreased product sales resulting from the COVID-19 pandemic;
- Revenue mix shifts and associated volume and selling price changes that could result from contractual status changes with key customers and additional competition;
- The continued costs of the PYLARIFY commercial launch and our ability to successfully commercialize PYLARIFY;
- The costs of acquiring or in-licensing, developing, obtaining regulatory approval for, and commercializing, new products, businesses or technologies, together with the costs of pursuing opportunities that are not eventually consummated;
- Our investment in the further clinical development and commercialization of products and development candidates, including AZEDRA, 1095, and LMI 1195;
- The costs of investing in our facilities, equipment and technology infrastructure;
- The costs and timing of establishing or amending manufacturing and supply arrangements for commercial supplies of our products and raw materials and components;
- Our ability to have product manufactured and released from JHS and other manufacturing sites in a timely manner in the future, or to begin and ramp up our manufacturing of DEFINITY at our in-house manufacturing facility in an amount sufficient to meet our supply needs;
- The costs of further commercialization of our existing products, particularly in international markets, including product marketing, sales and distribution and whether we obtain local partners to help share such commercialization costs;
- The extent to which we choose to establish collaboration, co-promotion, distribution or other similar arrangements for our marketed products;
- The legal costs relating to maintaining, expanding and enforcing our intellectual property portfolio, pursuing insurance or other claims and defending against product liability, regulatory compliance, intellectual property or other claims;
- The cost of interest on any additional borrowings which we may incur under our financing arrangements; and
- The impact of sustained inflation on our costs of goods sold and operating expenses.

We are vulnerable to future supply shortages, especially for our single sourced products. Disruption in our financial performance could also occur if we experience significant adverse changes in product or customer mix, broad economic downturns, sustained inflation, adverse industry or company conditions or catastrophic external events, including pandemics such as COVID-19, natural disasters and political or military conflict. If we experience one or more of these events in the future, we may be required to further implement expense reductions, such as a delay or elimination of discretionary spending in all functional areas, as well as scaling back select operating and strategic initiatives.

If our capital resources become insufficient to meet our future capital requirements, we would need to finance our cash needs through public or private equity offerings, debt financings, assets securitizations, sale-leasebacks or other financing or strategic alternatives, to the extent such transactions are permissible under the covenants of our 2019 Credit Agreement. Additional equity or debt financing, or other transactions, may not be available on acceptable terms, if at all. If any of these transactions require an amendment or waiver under the covenants in our 2019 Credit Agreement, which could result in additional expenses associated with obtaining the amendment or waiver, we will seek to obtain such a waiver to remain in compliance with those covenants. However, we cannot be assured that such an amendment or waiver would be granted, or that additional capital will be available on acceptable terms, if at all.

At December 31, 2021, our only current committed external source of funds is our borrowing availability under our 2019 Revolving Facility. We had $98.5 million of cash and cash equivalents at December 31, 2021. Our 2019 Facility, as amended, contains a number of affirmative, negative, reporting and financial covenants, in each case subject to certain exceptions and materiality thresholds. Incremental borrowings under the 2019 Revolving Facility, as amended, may affect our ability to comply with the covenants in the 2019 Facility, as amended, including the financial covenants restricting consolidated net leverage and interest coverage. Accordingly, we may be limited in utilizing the full amount of our 2019 Revolving Facility, as amended, as a source of liquidity.

The CVRs we issued in the Progenics Acquisition entitle holders thereof to future cash payments of 40% of PYLARIFY net sales over (i) $100.0 million in 2022 and (ii) $150.0 million in 2023, which, if payable, we currently intend to fund from our then-available cash. In no event will our aggregate payments under the CVRs, together with any other non-stock consideration treated as paid in connection with the Progenics Acquisition, exceed 19.9% (which we currently estimate could be approximately $100.0 million) of the total consideration we pay in the Progenics Acquisition. Refer to Note 4, “Fair Value of Financial Instruments”, for further details on contingent consideration liabilities.

Based on our current operating plans, including our prudent expense management in response to the COVID-19 pandemic, we believe our balance of cash and cash equivalents, which totaled $98.5 million as of December 31, 2021, along with cash generated by ongoing operations and continued access to our 2019 Revolving Facility, will be sufficient to satisfy our cash requirements over the next twelve months and beyond. Our material cash requirements include the following contractual and other obligations.

Debt

As of December 31, 2021, we had maturities of principal obligations related to our 2019 Term Facility for an aggregate principal amount of $175.0 million, with $11.3 million payable within twelve months. Future interest payments associated with the 2019 Term Facility total $8.3 million, with $3.6 million payable within twelve months.

Leases

We have operating lease arrangements for certain facilities, including corporate and manufacturing space. As of December 31, 2021, we had fixed operating lease payment obligations of $22.0 million, with $2.4 million payable within twelve months.

We have lease arrangements for certain equipment. As of December 31, 2021, we had fixed finance lease payment obligations of $0.8 million, with $0.4 million payable within twelve months.

Purchase Obligations

We have purchase obligations that primarily consist of noncancelable obligations related to minimum quantities of goods or services that have been committed to be purchased on an annual basis. As of December 31, 2021, we had minimum purchase obligations of $6.5 million, with $3.5 million due within twelve months.

License Agreements

We have entered into license agreements in which fixed payments have been committed to be paid on an annual basis. As of December 31, 2021, we had fixed license payments of $0.3 million, with $0.1 million due within twelve months. These amounts do not include potential milestone or contractual payment obligations contingent upon the achievement or occurrence of future milestones or events under our license agreements, because they are contingent and the amounts and timing of such potential obligations are unknown or uncertain. We may be required to pay additional amounts up to approximately $170.5 million in contingent payments under our license agreements.

Other Long-Term Liabilities

Our other long-term liabilities in the consolidated balance sheet include the fair values of contingent consideration liabilities including CVRs and contingent consideration liabilities related to a previous acquisition completed by Progenics in 2013. We may be required to pay up to approximately $100.0 million related to the CVRs and approximately $85.0 million related to the contingent consideration. As of December 31, 2021, these contingent payments were not expected to be payable within twelve months due to the uncertainty around the timing of the future cash flows.

Our other long-term liabilities in the consolidated balance sheet include unrecognized tax benefits and related interest and penalties. As of December 31, 2021, we had unrecognized tax benefits of $20.9 million, which included interest and penalties, classified as noncurrent liabilities. At this time, we are unable to make a reasonably reliable estimate of the timing of payments in individual years in connection with these tax liabilities.

Asset Retirement Obligation

We are required to provide the Massachusetts Department of Public Health and the New Jersey Department of Environmental Protection financial assurance demonstrating our ability to fund the decommissioning of our North Billerica, Massachusetts and Somerset, New Jersey production facilities upon closure, although we have no current plans to close the facilities. We have provided this financial assurance in the form of a $28.2 million surety bond (the “Surety Bond”). As of December 31, 2021, the liability, which was approximately $20.8 million, was measured at the present value of the obligation expected to be incurred of approximately $26.4 million. These contingent payments are not expected to be payable within twelve months due to the uncertainty around the timing of the future cash flows related to the decommissioning of our radioactive operations.

Off-Balance Sheet Arrangements

As noted above, we have provided the Surety Bond to the Massachusetts Department of Public Health and New Jersey Department of Environmental Protection. Since inception, we have not engaged in any other off-balance sheet arrangements, including structured finance, special purpose entities or variable interest entities.

Effects of Inflation

We do not believe that inflation has had a significant impact on our revenues or results of operations. We expect our cost of product sales and other operating expenses will change in the future in line with periodic inflationary changes in price levels. Because we intend to retain and continue to use our property and equipment, we believe that the incremental inflation related to the replacement costs of those items will not materially affect our operations. However, the rate of inflation affects our expenses, such as those for employee compensation and contract services, which could increase our level of expenses and the rate at which we use our resources. While we generally believe that we will be able to offset the effect of price-level changes by adjusting our product prices and implementing operating efficiencies, any material unfavorable changes in price levels could have a material adverse effect on our financial condition, results of operations and cash flows.

Recent Accounting Standards

Refer to Note 2, “Summary of Significant Accounting Policies,” in the accompanying consolidated financial statements located under Item 8 of this Annual Report on Form 10-K for information regarding recently issued accounting standards that may have a significant impact on our business.

Critical Accounting Estimates

The discussion and analysis of our financial condition and results of operations are based on our consolidated financial statements, which have been prepared in accordance with U.S. GAAP. The preparation of these consolidated financial statements require us to make estimates and judgments that affect our reported assets and liabilities, revenues and expenses, and other financial information. Actual results may differ materially from these estimates under different assumptions and conditions. In addition, our reported financial condition and results of operations could vary due to a change in the application of a particular accounting standard.

We believe the following represent our critical accounting estimates used in the preparation of our financial statements.

Revenue from Contracts with Customers

Revenue is measured based on a consideration specified in a contract with a customer, and excludes any sales incentives and amounts collected on behalf of third parties. We recognize revenue when we satisfy our performance obligations by transferring control over products or services to our customers. The amount of revenue we recognize reflects the consideration to which we expect to be entitled to receive in exchange for these goods or services. To achieve this core principle, we apply the following five steps: (1) identify the contracts with a customer; (2) identify the performance obligations in the contract; (3) determine the transaction price; (4) allocate the transaction price to the performance obligations in the contract; and (5) recognize revenue when (or as) we satisfy performance obligations.

We derive our revenues through arrangements with customers for product sales as well as licensing and royalty arrangements. We sell our products primarily to clinics, distributors, group practices, hospitals, integrated delivery networks, and radiopharmacies, and we consider customer purchase orders, which in some cases are governed by master sales or group purchasing organization agreements, to be contracts with our customers. In addition to these arrangements, we also enter into licensing agreements under which we license certain rights to third parties. The terms of these arrangements typically include payment to us of one or more of the following: non-refundable, up-front license fees; development, regulatory and commercial milestone payments; and royalties on net sales of licensed products. We analyze various factors requiring management judgment when applying the five-step model to our contracts with customers.

Our product revenues are recorded at the net sales price (transaction price), which represents our sales price less estimates related to reserves which are established for items such as discounts, returns, rebates and allowances that may be provided for in certain contracts with our customers. Judgment is used in determining and updating our reserves on an ongoing basis, and where appropriate, these estimates take into consideration a range of possible outcomes which are probability-weighted for relevant factors such as our historical experience, current contractual and statutory requirements, specific known market events and trends, industry data and forecasted customer buying and payment patterns. Overall, these reserves reflect our best estimates of the amount of consideration to which it is entitled based on the terms of the contract. Actual amounts of consideration ultimately received may differ from our estimates.

For our licensing and royalty arrangements, we use judgment in determining the number of performance obligations in a license agreement by assessing whether the license is distinct or should be combined with another performance obligation as well as the nature of the license. As part of the accounting for these arrangements, we develop assumptions that require judgment to determine the stand-alone selling price for each performance obligation identified in a contract. These key assumptions may include market conditions, reimbursement rates for personnel costs, development timelines and probabilities of regulatory success.

Business Combinations

We account for business combinations using the acquisition method of accounting. We recognize the assets acquired and liabilities assumed in business combinations on the basis of their fair values at the date of acquisition. We assess the fair value of assets acquired, including intangible assets, and liabilities assumed using a variety of methods. Each asset acquired and liability assumed is measured at fair value from the perspective of a market participant. The method used to estimate the fair values of intangible assets incorporates significant assumptions regarding the estimates a market participant would make in order to evaluate an asset, including a market participant's use of the asset and the appropriate discount rates. Acquired in-process research and development ("IPR&D") is recognized at fair value and initially characterized as an indefinite-lived intangible asset, irrespective of whether the acquired IPR&D has an alternative future use. Any excess purchase price over the fair value of the net tangible and intangible assets acquired is allocated to goodwill. Transaction costs and restructuring costs associated with a business combination are expensed as incurred.

The fair values assigned to tangible and intangible assets acquired and liabilities assumed are based on our estimates and assumptions, as well as other information we have compiled, including valuations that utilize customary valuation procedures and techniques. If the actual results differ from the estimates and assumptions used in these estimates, it could result in a possible impairment of the intangible assets and goodwill, a required acceleration of the amortization expense of finite-lived intangible assets or the recognition of additional consideration, which would be expensed.

During the measurement period, which extends no later than one year from the acquisition date, we may record certain adjustments to the carrying value of the assets acquired and liabilities assumed with the corresponding offset to goodwill. After the measurement period, all adjustments are recorded in the consolidated statements of operations as operating expenses or income.

Intangible and Long-Lived Assets

We test intangible and long-lived assets for recoverability whenever events or changes in circumstances suggest that the carrying value of an asset or group of assets may not be recoverable. We measure the recoverability of assets to be held and used by comparing the carrying amount of the asset to future undiscounted net cash flows expected to be generated by the asset. If those assets are considered to be impaired, the impairment equals the amount by which the carrying amount of the assets exceeds the fair value of the assets. Any impairments are recorded as permanent reductions in the carrying amount of the assets. Long-lived assets, other than goodwill and other intangible assets, that are held for sale are recorded at the lower of the carrying value or the fair market value less the estimated cost to sell.

Intangible assets, consisting of trademarks, customer relationships, currently marketed products, licenses and developed technology are amortized in a method equivalent to the estimated utilization of the economic benefit of the asset.

Our IPR&D represents intangible assets acquired in a business combination that are used in research and development activities but have not yet reached technological feasibility, regardless of whether they have alternative future use. The primary basis for determining the technological feasibility or completion of these projects is whether we have obtained regulatory approval to market the underlying products in an applicable geographic region. Because obtaining regulatory approval can include significant risks and uncertainties, the eventual realized value of the acquired IPR&D projects may vary from their fair value at the date of acquisition. We classify IPR&D acquired in a business combination as an indefinite-lived intangible asset until the completion or abandonment of the associated research and development efforts. Upon completion of the associated research and development efforts, we will determine the useful life and begin amortizing the assets to reflect their use over their remaining lives. Upon permanent abandonment, we write-off the remaining carrying amount of the associated IPR&D intangible asset. We test our IPR&D assets at least annually or when a triggering event occurs that could indicate a potential impairment and we recognize any impairment loss in our consolidated statements of operations.

Contingent Consideration Liabilities

The Progenics Acquisition included certain contingent consideration liabilities, including CVRs, as well as other contingent future payments. CVRs are based on net sales generated by PYLARIFY in both 2022 and 2023. Other contingent future payments are based on net sales targets for 1095 and AZEDRA and include a commercialization milestone for 1095. The estimated fair value of contingent consideration liabilities, initially measured and recorded on the acquisition date, are considered to be a Level 3 instrument and are reviewed quarterly, or whenever events or circumstances occur that indicate a change in fair value. The contingent

consideration liabilities are recorded at fair value at the end of each reporting period with changes in estimated fair values recorded in general and administrative expenses in the consolidated statements of operations.

The estimated fair value is determined based on probability adjusted discounted cash flows or Monte Carlo simulation models that include significant estimates and assumptions pertaining to the period of expected milestone achievement, probability of success, discount rates and sales targets. The most significant unobservable inputs are the probabilities of achieving regulatory approval of the development projects and subsequent commercial success.

Significant changes in any of the probabilities of success would result in a significantly higher or lower fair value measurement. Significant changes in the probabilities as to the periods in which milestones will be achieved would result in a significantly lower or higher fair value measurement.

Item 7A. Quantitative and Qualitative Disclosures about Market Risk

We are exposed to market risk from changes in interest rates and foreign currency exchange rates. We may from time to time use derivative financial instruments or other financial instruments to hedge these economic exposures related to foreign currencies. We do not hold or issue financial instruments for trading purposes.

Interest Rate Risk

Under our 2019 Facility, as amended, we have substantial variable rate debt. Fluctuations in interest rates may affect our business, financial condition, results of operations and cash flows. As of December 31, 2021, we had $175.0 million outstanding principal under our 2019 Term Facility with variable interest rates.

Furthermore, we are subject to interest rate risk in connection with our 2019 Revolving Facility, which is variable rate indebtedness. Interest rate changes could increase the amount of our interest payments and thus negatively impact our future earnings and cash flows. As of December 31, 2021, there was availability of $200.0 million on the 2019 Revolving Facility. Any increase in the interest rate under the 2019 Revolving Facility may have a negative impact on our future earnings to the extent we have outstanding borrowings under the 2019 Revolving Facility.

We use interest rate swaps to reduce the variability in cash flows associated with a portion of our forecasted interest payments on its variable rate debt. As of December 31, 2021, we had entered into interest rate swap contracts to fix the LIBOR rate on a notional amount of $100.0 million through May 31, 2024. The average fixed LIBOR rate on the interest rate swaps as of December 31, 2021 was approximately 0.82%. This agreement involves the receipt of floating rate amounts in exchange for fixed rate interest payments over the life of the agreement without an exchange of the underlying principal amount. Please refer to Note 14, “Derivative Instruments”, for further details on the interest rate swaps.

The effect of a 100 basis points adverse change in market interest rates on our 2019 Term Facility, in excess of applicable minimum floors, on our interest expense would be approximately $1.8 million excluding the impact of our interest rate swaps; including the impact of our interest rate swaps, the effect of a 100 basis point adverse change in market interest rates would be approximately $0.8 million.

Foreign Currency Risk

We face exposure to movements in foreign currency exchange rates whenever we, or any of our subsidiaries, enter into transactions with third parties that are denominated in currencies other than our, or that subsidiary’s, functional currency. Intercompany transactions between entities that use different functional currencies also expose us to foreign currency risk.

During the years ended December 31, 2021, 2020 and 2019, the net impact of foreign currency changes on transactions was a gain of $0.1 million, a loss of $0.3 million and a gain of less than $0.1 million, respectively. From time to time, we enter into foreign currency forward contracts primarily to reduce the effects of fluctuating foreign currency exchange rates. We may enter into additional foreign currency forward contracts when deemed appropriate. We do not enter into foreign currency forward contracts for speculative or trading purposes.

The Canadian dollar presents the primary currency risk on our earnings. At December 31, 2021, a hypothetical 10% change in value of the U.S. dollar relative to the Canadian dollar would not have materially affected our financial instruments.

Item 8. Financial Statements and Supplementary Data

LANTHEUS HOLDINGS, INC.
INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of
Lantheus Holdings, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Lantheus Holdings, Inc. and subsidiaries (the "Company") as of December 31, 2021 and 2020, the related consolidated statements of operations, comprehensive (loss) income, stockholders' equity, and cash flows, for each of the three years in the period ended December 31, 2021, 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, 2021 and 2020, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2021, 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, 2021, 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 24, 2022, 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.

Valuation of Contingent Value Rights— Refer to Notes 1 and 4 to the financial statements

Critical Audit Matter Description

As part of the acquisition of Progenics Pharmaceuticals, Inc. ("Progenics") on June 19, 2020, the Company issued contingent value rights ("CVRs") to certain stockholders of Progenics entitling them to future cash payments of 40% of U.S. net sales generated by PYLARIFY in 2022 and 2023 in excess of $100.0 million and $150.0 million, respectively.

The estimated fair value of the CVRs was determined using a Monte-Carlo simulation model that included estimates and assumptions pertaining to (1) the period of expected milestone achievement and net sales targets and (2) discount rates. The fair value determination of these CVRs therefore required management to make estimates and assumptions related the periods in which net sales targets will be achieved and the selection of the discount rates.

We identified the valuation of the contingent consideration liabilities related to the CVRs as a critical audit matter because of the estimates and assumptions used by management to determine the fair value of these CVRs. Auditing the estimates and assumptions related to the valuation of the CVRs required a high degree of auditor judgment and an increased extent of effort, including the involvement of our valuation specialists, when performing audit procedures to evaluate the reasonableness of management's estimates as to the period of expected milestone achievement and net sales targets and the selection of the discount rates.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures related to the valuation of the CVRs, including assessing the periods in which net sales targets will be achieved and the selection of discount rates included the following, among others:

- We agreed the calculation to determine the CVR amounts payable to the terms of the merger agreement.
- We tested the effectiveness of controls over the valuation of the CVRs, including management's controls over the determination of amounts and timing of net sales targets, and the selection of discount rates.
- We evaluated the reasonableness of the periods of expected milestone achievement and net sales targets by comparing these assumptions to (1) internal communications to management and the Board of Directors, (2) information obtained from individuals outside of the finance department and (3) information included in the Company's external communications.
- We evaluated management's ability to accurately estimate the periods in which net sales targets will be achieved and the reasonableness of such estimates by comparing management's historical net sales estimates to subsequent results of operations, and comparing the forecasts to internal and external data, while also taking into account any changes in market conditions.
- We evaluated whether the period of expected milestone achievement and net sales targets were consistent with evidence obtained in other areas of the audit.
- With the assistance of our fair value specialists, we evaluated the acceptability of the (1) valuation methodology and calculation and (2) discount rate by:
    - Evaluating the appropriateness of the valuation methodology and the calculation of the Monte-Carlo simulation model used by the Company.
    - Testing the source information underlying the determination of the discount rate and testing the mathematical accuracy of the calculation.
    - Developing a range of independent estimates and comparing those to the discount rate selected by management.

/s/ Deloitte & Touche LLP
Boston, Massachusetts
February 24, 2022

We have served as the Company's auditor since 2007.

Lantheus Holdings, Inc.
Consolidated Balance Sheets
(in thousands, except par value)

	December 31,	
	2021	**2020**
Assets		
Current assets		
Cash and cash equivalents	$ 98,508	$ 79,612
Accounts receivable, net	89,336	54,002
Inventory	35,129	35,744
Other current assets	12,818	9,625
Assets held for sale	—	5,242
Total current assets	235,791	184,225
Property, plant and equipment, net	116,772	120,171
Intangibles, net	348,510	376,012
Goodwill	61,189	58,632
Deferred tax assets, net	62,764	70,147
Other long-term assets	38,758	60,634
Total assets	$ 863,784	$ 869,821
Liabilities and stockholders' equity		
Current liabilities		
Current portion of long-term debt and other borrowings	$ 11,642	$ 20,701
Accounts payable	20,787	16,284
Accrued expenses and other liabilities	58,068	41,726
Liabilities held for sale	—	1,793
Total current liabilities	90,497	80,504
Asset retirement obligations	20,833	14,020
Long-term debt, net and other borrowings	163,121	197,699
Other long-term liabilities	124,894	63,393
Total liabilities	399,345	355,616
Commitments and contingencies (see Note 20)		
Stockholders' equity		
Preferred stock ($0.01 par value, 25,000 shares authorized; no shares issued and outstanding)	—	—
Common stock ($0.01 par value, 250,000 shares authorized; 67,739 and 66,875 shares issued and outstanding, respectively)	677	669
Additional paid-in capital	685,472	665,530
Accumulated deficit	(221,225)	(149,946)
Accumulated other comprehensive loss	(485)	(2,048)
Total stockholders' equity	464,439	514,205
Total liabilities and stockholders' equity	$ 863,784	$ 869,821

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

Lantheus Holdings, Inc.
Consolidated Statements of Operations
(in thousands, except per share data)

	Year Ended December 31,		
	2021	**2020**	**2019**
Revenues	$ 425,208	$ 339,410	$ 347,337
Cost of goods sold	237,513	200,649	172,526
Gross profit	187,695	138,761	174,811
Operating expenses			
Sales and marketing	68,422	40,901	41,888
General and administrative	150,395	69,270	61,244
Research and development	44,966	32,788	20,018
Total operating expenses	263,783	142,959	123,150
Gain on sales of assets	15,263	—	—
Operating (loss) income	(60,825)	(4,198)	51,661
Interest expense	7,752	9,479	13,617
(Gain) loss on extinguishment of debt	(889)	—	3,196
Other loss (income)	7,350	(2,198)	6,221
(Loss) income before income taxes	(75,038)	(11,479)	28,627
Income tax (benefit) expense	(3,759)	1,994	(3,040)
Net (loss) income	$ (71,279)	$ (13,473)	$ 31,667
Net (loss) income per common share:			
Basic	$ (1.06)	$ (0.25)	$ 0.81
Diluted	$ (1.06)	$ (0.25)	$ 0.79
Weighted-average common shares outstanding:			
Basic	67,486	54,134	38,988
Diluted	67,486	54,134	40,113

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

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

	Year Ended December 31,		
	2021	**2020**	**2019**
Net (loss) income	$ (71,279)	$ (13,473)	$ 31,667
Other comprehensive income (loss):			
Foreign currency translation	(124)	330	148
Unrealized gain (loss) on cash flow hedges, net of tax	1,687	(1,418)	—
Total other comprehensive income (loss)	1,563	(1,088)	148
Comprehensive (loss) income	$ (69,716)	$ (14,561)	$ 31,815

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

Lantheus Holdings, Inc.
Consolidated Statements of Changes in Stockholders' Equity
(in thousands)

	Common Stock		Additional Paid-In Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Total Stockholders' Equity
	Shares	Amount				
Balance, January 1, 2019	38,466	$ 385	$ 239,865	$ (168,140)	$ (1,108)	$ 71,002
Net income	—	—	—	31,667	—	31,667
Other comprehensive income	—	—	—	—	148	148
Stock option exercises and employee stock plan purchases	95	1	1,745	—	—	1,746
Vesting of restricted stock awards	796	8	(8)	—	—	—
Shares withheld to cover taxes	(106)	(1)	(2,453)	—	—	(2,454)
Stock-based compensation	—	—	12,492	—	—	12,492
Balance, December 31, 2019	39,251	393	251,641	(136,473)	(960)	114,601
Net loss	—	—	—	(13,473)	—	(13,473)
Other comprehensive loss	—	—	—	—	(1,088)	(1,088)
Stock option exercises and employee stock plan purchases	73	1	759	—	—	760
Vesting of restricted stock awards	847	8	(8)	—	—	—
Shares withheld to cover taxes	(141)	(2)	(2,127)	—	—	(2,129)
Issuance of common stock, net of $3,776 issuance costs	26,845	269	394,065	—	—	394,334
Fair value of replacement stock options related to precombination services	—	—	7,125	—	—	7,125
Stock-based compensation	—	—	14,075	—	—	14,075
Balance, December 31, 2020	66,875	669	665,530	(149,946)	(2,048)	514,205
Net loss	—	—	—	(71,279)	—	(71,279)
Other comprehensive income	—	—	—	—	1,563	1,563
Stock option exercises and employee stock plan purchases	360	3	6,059	—	—	6,062
Vesting of restricted stock awards and units	611	6	(6)	—	—	—
Shares withheld to cover taxes	(107)	(1)	(2,045)	—	—	(2,046)
Stock-based compensation	—	—	15,934	—	—	15,934
Balance, December 31, 2021	67,739	$ 677	$ 685,472	$ (221,225)	$ (485)	$ 464,439

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

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

	Year Ended December 31,		
	2021	**2020**	**2019**
Operating activities			
Net (loss) income	$ (71,279)	$ (13,473)	$ 31,667
Adjustments to reconcile net (loss) income to net cash flows from operating activities:			
Depreciation, amortization and accretion	42,288	24,689	13,379
Impairment of long-lived assets	9,729	9,935	—
ARO acceleration	5,259	—	—
Amortization of debt related costs	676	119	978
Changes in fair value of contingent assets and liabilities	72,400	(2,000)	—
(Gain) loss on extinguishment of debt	(889)	—	3,196
Provision for excess and obsolete inventory	4,057	2,365	1,851
Stock-based compensation	15,934	14,075	12,492
(Gain) loss on disposal of assets	(15,263)	2,250	286
Deferred taxes	4,437	(1,334)	9,725
Long-term indemnification receivable	7,121	(2,218)	10,635
Long-term income tax payable and other long-term liabilities	(7,912)	2,828	(13,156)
Other	2,512	1,525	282
Increases (decreases) in cash from operating assets and liabilities:			
Accounts receivable	(33,102)	(7,462)	156
Inventory	(3,549)	(8,459)	1,994
Other current assets	(73)	1,941	(2,411)
Accounts payable	5,425	(4,224)	3,233
Accrued expenses and other liabilities	16,145	(4,161)	6,077
Net cash provided by operating activities	53,916	16,396	80,384
Investing activities			
Capital expenditures	(12,140)	(12,474)	(22,061)
Proceeds from sale of assets, net	15,823	—	—
Lending on bridge loan	—	(10,000)	—
Cash acquired in acquisition of business	—	17,562	—
Net cash provided by (used in) investing activities	3,683	(4,912)	(22,061)
Financing activities			
Proceeds from issuance of common stock	767	683	573
Equity issuance costs	—	(3,777)	—
Proceeds from issuance of long-term debt	—	—	199,461
Payments on long-term debt and other borrowings	(43,348)	(15,491)	(275,376)
Deferred financing costs	—	(1,224)	(2,258)
Proceeds from stock option exercises	5,295	77	1,173
Payments for minimum statutory tax withholding related to net share settlement of equity awards	(2,046)	(2,129)	(2,454)
Net cash used in financing activities	(39,332)	(21,861)	(78,881)
Effect of foreign exchange rates on cash and cash equivalents	(310)	152	76
Net increase (decrease) in cash and cash equivalents and restricted cash	17,957	(10,225)	(20,482)
Cash and cash equivalents and restricted cash, beginning of year	82,694	92,919	113,401
Cash and cash equivalents and restricted cash, end of year	$ 100,651	$ 82,694	$ 92,919

Lantheus Holdings, Inc.
Consolidated Statements of Cash Flows (Continued)
(in thousands)

	Year Ended December 31,		
	2021	**2020**	**2019**
Reconciliation to amounts within the consolidated balance sheets			
Cash and cash equivalents	$ 98,508	$ 79,612	$ 92,919
Cash and cash equivalents included in assets held for sale	—	941	—
Restricted cash included in other long-term assets	2,143	2,141	—
Cash, cash equivalents and restricted cash at end of period	$ 100,651	$ 82,694	$ 92,919

	Year Ended December 31,		
	2021	**2020**	**2019**
Supplemental disclosure of cash flow information			
Cash paid during the period for:			
Interest	$ 6,284	$ 9,368	$ 12,253
Income taxes, net of refunds of $315, $331 and $2, respectively	$ 215	$ 340	$ 274
Schedule of non-cash investing and financing activities			
Additions of property, plant and equipment included in liabilities	$ 1,262	$ 2,227	$ 4,175
Consideration transferred in acquisition	$ —	$ 419,009	$ —

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

Lantheus Holdings, Inc.
Notes to Consolidated Financial Statements

1. Description of Business

Lantheus Holdings, Inc., a Delaware corporation, is the parent company of Lantheus Medical Imaging, Inc. ("LMI") and Progenics Pharmaceuticals, Inc., a Delaware corporation ("Progenics"). See "Progenics Acquisition".

The Company develops, manufactures and commercializes innovative diagnostic and therapeutic products that assist clinicians in the diagnosis and treatment of heart disease, cancer and other diseases. The Company believes its diagnostic products result in improved diagnostic information that enables healthcare providers to better detect and characterize, or rule out, disease, potentially achieving improved patient outcomes, reducing patient risk and limiting overall costs for payors and throughout the healthcare system.

The Company's commercial products are used by cardiologists, internal medicine physicians, nuclear medicine physicians, oncologists, radiologists, sonographers, technologists and urologists working in a variety of clinical settings.

The Company produces and markets its products throughout the U.S., selling primarily to clinics, group practices, hospitals, integrated delivery networks and radiopharmacies. The Company sells its products outside the U.S. through a combination of direct distribution in Canada and third party distribution relationships in Europe, Canada, Australia, Asia-Pacific, Central America and South America.

Sales of the Company's microbubble ultrasound enhancing agent, DEFINITY, are generated in the U.S. and Canada through a DEFINITY direct sales team. Sales of the Company's prostate cancer diagnostic imaging agent, PYLARIFY (as defined below), are generated in the U.S. through a PYLARIFY direct sales team and a sales team at some of our positron emission tomography ("PET") manufacturing facilities ("PMF") partners. In the U.S., the Company's other nuclear imaging products, including TechneLite, Xenon, NEUROLITE and Cardiolite, are primarily sold to commercial radiopharmacies, the majority of which are controlled by or associated with GE Healthcare, Cardinal, UPPI, Jubilant Radiopharma and PharmaLogic. A small portion of the Company's nuclear imaging product sales in the U.S. are generated through the Company's direct sales force to hospitals and clinics that maintain their own in-house radiopharmaceutical preparation capabilities. AZEDRA sales are generated in the U.S. through an AZEDRA direct sales team. We have licensed RELISTOR to Bausch, and the Company collects quarterly royalties based on those sales.

The Company also maintains its own direct sales force in Canada for certain of its products. In Europe, Australia, Asia-Pacific, Central America and South America, the Company generally relies on third party distributors to market, sell and distribute its nuclear imaging and ultrasound enhancing agent products, either on a country-by-country basis or on a multi-country regional basis. The Company's headquarters are located in North Billerica, MA, with additional offices in Somerset, NJ, Montreal, Canada and Lund, Sweden.

Progenics Acquisition

On June 19, 2020 (the "Closing Date"), pursuant to the Amended and Restated Agreement and Plan of Merger, dated as of February 20, 2020 (the "Merger Agreement"), by and among Holdings, Plato Merger Sub, Inc., a wholly-owned subsidiary of Holdings ("Merger Sub"), and Progenics, Holdings completed the acquisition of Progenics by means of a merger of Merger Sub with and into Progenics, with Progenics surviving such merger as a wholly-owned subsidiary of Holdings (the "Progenics Acquisition").

In accordance with the Merger Agreement, at the effective time of the Progenics Acquisition (the "Effective Time"), each share of Progenics common stock, par value $0.0013 per share, issued and outstanding immediately prior to the Effective Time (other than shares of Progenics common stock owned by Holdings, Progenics or any of their wholly-owned subsidiaries) was automatically cancelled and converted into the right to receive (i) 0.31 (the "Exchange Ratio") of a share of Holdings common stock, par value $0.01 per share, and (ii) one contingent value right (a "CVR") tied to the financial performance of PyL (18F-DCFPyL), Progenics' prostate-specific membrane antigen ("PSMA") targeted imaging agent designed to visualize prostate cancer. This agent was approved by the U.S. Food and Drug Administration ("FDA") on May 26, 2021 under the name PYLARIFY (piflufolastat F 18), and the commercial launch of this agent has begun. Each CVR will entitle its holder to receive a pro rata share of aggregate cash payments equal to 40% of U.S. net sales generated by PYLARIFY in 2022 and 2023 in excess of $100.0 million and $150.0 million, respectively. In no event will the Company's aggregate payments in respect of the CVRs, together with any other non-stock consideration treated as paid in connection with the Progenics Acquisition, exceed 19.9% of the total consideration the Company pays in the Progenics Acquisition (which the Company currently estimates could be approximately $100.0 million). The Company will issue the aforementioned cash payments related to the CVRs during the first quarter of 2023 and the first quarter of 2024 respectively. No fractional shares of Holdings common stock were issued in the Progenics Acquisition, and Progenics' former stockholders have received cash in lieu of any fractional shares of Holdings common stock. In addition, in accordance with the Merger Agreement, at the Effective Time, each Progenics stock option with a per share exercise price less than or equal to $4.42 (an "in-the-money Progenics stock option") received in exchange for each such in-the money Progenics stock option: (i) an option to purchase Holdings common stock (each, a

"Replacement Stock Option") converted based on the Exchange Ratio, and (ii) a vested or unvested CVR depending on whether the underlying in-the-money Progenics stock option was vested at the Effective Time. Each Progenics stock option with a per share exercise price greater than $4.42 (an "out-of-the-money Progenics stock option") received in exchange for such out-of-the-money Progenics stock options a Replacement Stock Option converted at an exchange ratio determined based on the average of the volume weighted average price per share of common stock of Progenics and Lantheus Holdings prior to the Effective Time, which exchange ratio was 0.31, the same as the Exchange Ratio. As a result of the acquisition, Holdings issued 26,844,877 shares of Holdings common stock and 86,630,633 CVRs to former Progenics stockholders.

Please refer to Note 8, "Business Combinations", for further details on the acquisition.

PYLARIFY Approval and Commercial Launch

On May 27, 2021, the Company announced that the FDA had approved PYLARIFY, a fluorine-18- ("F 18") labeled PET imaging agent targeting prostate-specific membrane antigen ("PSMA"). PYLARIFY is a radioactive diagnostic agent indicated for PET imaging of PSMA-positive lesions in men with prostate cancer with suspected metastasis who are candidates for initial definitive therapy and with suspected recurrence based on elevated serum prostate-specific antigen ("PSA") levels. PYLARIFY is a product in the Company's radiopharmaceutical oncology product category. The Company commenced its commercial launch of PYLARIFY in the U.S. in June 2021.

Upon commercial launch in June 2021, PYLARIFY was immediately available in select parts of the U.S. Over the course of the remainder of 2021, PYLARIFY availability expanded into additional regions and is now broadly available nationwide. The Company continues to expand its geographic coverage, customer contracting and market access coverage to serve its customers and the U.S. prostate cancer community.

The commercial launch of PYLARIFY is complex and expensive. During 2021, the Company hired additional employees to assist it with the commercialization of PYLARIFY, including in sales, marketing, reimbursement, quality and medical affairs. To manufacture PYLARIFY, the Company assembled and qualified a nationwide network of PMFs with radioisotope-producing cyclotrons that make F 18, which has a 110-minute half-life, so PYLARIFY is manufactured and distributed rapidly to end-users. After being made on a cyclotron at a PMF, the F 18 is then combined with certain chemical ingredients in specially designed chemistry synthesis boxes to manufacture PYLARIFY. The finished PYLARIFY is then quality control tested and transferred to a radiopharmacist who prepares and dispenses patient-specific doses of the final product. Because each of the PMFs manufacturing these products is deemed by the FDA to be a separate manufacturing site, each has to be approved by the FDA. Although PYLARIFY is now broadly available nationwide, the Company can give no assurance that the FDA will continue to approve PMFs in accordance with the Company's planned roll-out schedule. If FDA approval of manufacturing sites is delayed or withdrawn, the Company's future business, results of operations, financial condition and cash flows could be adversely affected.

The Company's commercial launch also required the Company to obtain adequate coding and coverage for PYLARIFY, including not only coverage from Medicare, Medicaid and other government payors, as well as private payors, but also appropriate payment levels, which adequately cover our customers' costs of using PYLARIFY in PET/CT imaging procedures. We received notification that our HCPCS code, which enables streamlined billing, went into effect as of January 1, 2022. In addition, effective January 1, 2022, CMS granted Transitional Pass-Through Payment Status in the hospital outpatient setting ("TPT Status") for PYLARIFY, enabling traditional Medicare to provide an incremental payment for PET/CT scans performed with PYLARIFY in this setting. TPT Status for PYLARIFY is expected to expire December 31, 2024. After TPT Status expires, under current Medicare rules, PYLARIFY, similar to other diagnostic radiopharmaceuticals, would not be separately reimbursed in the hospital outpatient setting but rather would be included as part of the facility fee a hospital otherwise receives for a PET/CT imaging procedure, and the facility fee does not always cover the cost of a drug used in the procedure. The Company can give no assurance that any CMS reimbursement in the hospital outpatient setting that follows the expiration of TPT Status will be adequate to cover the cost of PYLARIFY used in a PET/CT imaging procedure.

COVID-19 Pandemic

The Company experienced operational and financial impacts from the COVID-19 pandemic beginning late in the first quarter of 2020 and through the date of this filing, including the impact of hospital staffing challenges, vaccination mandates, employee absences due to illness, and a decline in the volume of certain procedures and treatments using the Company's products. For example, we believe that during the fourth quarter of 2021 sales of DEFINITY were impacted by hospital nursing and sonographer shortages, and sales of AZEDRA were impacted by treatment capacity constraints in hospitals, treatment deferrals and cancellations by patients, and access restrictions by hospitals. There has also been a substantial reduction in pulmonary ventilation studies in which the Company's product, Xenon, is used. As a result of the COVID-19 pandemic, the Company undertook a thorough analysis of all its discretionary expenses. In the first quarter of 2020, the Company implemented certain cost reduction initiatives. For most of the second quarter of 2020, the Company reduced the Company's work week from five days to four days and reduced the pay for employees by varying amounts depending on level of seniority.

During the second quarter of 2020, Progenics also implemented certain cost reduction initiatives and paused new enrollment in the ARROW Phase 2 study of 1095, a PSMA-targeted therapeutic, in metastatic castrate-resistant prostate cancer ("mCRPC") patients to minimize the risk to subjects and healthcare providers during the pandemic. New enrollment in that study restarted in October 2020. GE Healthcare Limited ("GE Healthcare"), the Company's development and commercialization partner for flurpiridaz fluorine-18 F 18, also delayed enrollment in the second Phase 3 clinical trial of flurpiridaz F 18 because of the pandemic and resumed enrollment in the third quarter of 2020.

Although some of the restrictions, including stay-at-home mandates, imposed in response to the COVID-19 pandemic have been lifted in much of the United States (the "U.S."), and there has been a rapid rollout and development of multiple vaccines and boosters, the resurgence of COVID-19 infections continued to impact certain aspects of the Company's business during 2021 and the pandemic could still have a future negative impact on the Company's business, particularly if there are additional resurgences as a result of mutations or other variations to the virus that increase its communicability or its impact on certain populations, geographic regions and the healthcare system, including elective procedures and hospital access.

2. Summary of Significant Accounting Policies

Basis of Presentation and Principles of Consolidation

The accompanying consolidated financial statements have been prepared in accordance with U.S. GAAP. The consolidated financial statements include the accounts of the Company and its direct and indirect wholly-owned subsidiaries. All intercompany accounts and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of consolidated financial statements in conformity with U.S. GAAP requires management to make certain estimates and assumptions that affect the reported amounts of assets and liabilities at the date of the consolidated financial statements, and the reported amounts of revenues and expenses during the reporting period. The more significant estimates reflected in the Company's consolidated financial statements include, but are not limited to, certain judgments regarding revenue recognition, goodwill, tangible and intangible asset valuation, inventory valuation, asset retirement obligations, contingent assets and liabilities, income tax liabilities and related indemnification receivable, deferred tax assets and liabilities and accrued expenses. Actual results could materially differ from those estimates or assumptions.

Revenue Recognition

The Company recognizes revenue when it transfers control of promised goods or services to its customers in an amount that reflects the consideration to which the Company expects to be entitled to in exchange for those goods and services. See Note 3, "Revenue from Contracts with Customers" for further discussion on revenues.

Accounts Receivable, net

Accounts receivable consist of amounts billed and currently due from customers. The Company maintains an allowance for doubtful accounts for estimated losses. In determining the allowance, consideration includes the probability of recoverability based on past experience and general economic factors. Certain accounts receivable may be fully reserved when the Company becomes aware of any specific collection issues. The Company periodically reviews the aging of receivables, payment history and customer creditworthiness to determine if adjustments to the allowance for bad debt is necessary. Allowance for bad debt has been immaterial for all years presented.

Income Taxes

The Company accounts for income taxes using an asset and liability approach. Income tax expense (benefit) represents income taxes paid or payable for the current year plus the change in deferred taxes during the year. Deferred taxes result from differences between the financial and tax bases of the Company's assets and liabilities. Deferred tax assets and liabilities are measured using the currently enacted tax rates that apply to taxable income in effect for the years in which those tax attributes are expected to be recovered or paid, and are adjusted for changes in tax rates and tax laws when such changes are enacted.

The Company recognizes deferred tax assets to the extent that the Company believes that these assets are more-likely-than-not to be realized. Valuation allowances are recorded to reduce deferred tax assets when it is more-likely-than-not that the future tax benefit will not be realized. The assessment of whether or not a valuation allowance is required involves weighing both positive and negative evidence, including both historical and prospective information, with greater weight given to evidence that is objectively verifiable. A history of recent losses is negative evidence that is difficult to overcome with positive evidence. In evaluating prospective information there are four sources of taxable income: reversals of taxable temporary differences, items that can be carried back to prior tax years (such as net operating losses), pre-tax income, and prudent and feasible tax planning strategies. Adjustments to the deferred tax valuation allowances are made in the period when those assessments are made.

The Company accounts for uncertain tax positions using a two-step recognition threshold and measurement analysis method to determine the financial statement impact of uncertain tax positions taken or expected to be taken in a tax return. Differences between tax positions taken in a tax return and amounts recognized in the financial statements are recorded as adjustments to other long-term assets and liabilities, or adjustments to deferred taxes, or both. The Company records the related interest and penalties to income tax (benefit) expense.

Net Income (Loss) per Common Share

Basic earnings per common share is computed by dividing net income by the weighted-average number of shares of common stock outstanding during the period. Diluted earnings per common share is computed by dividing net income by the weighted-average number of shares of common stock outstanding during the period, plus the potential dilutive effect of other securities as if those securities were converted or exercised. During periods in which the Company incurs net losses, both basic and diluted loss per common share is calculated by dividing the net loss by the weighted-average shares of common stock outstanding and potentially dilutive securities are excluded from the calculation because their effect would be antidilutive.

Cash and Cash Equivalents

Cash and cash equivalents include savings deposits, certificates of deposit and money market funds that have original maturities of three months or less when purchased.

Restricted Cash

Restricted cash as of December 31, 2021 and 2020, represents primarily collateral for a letter of credit securing a lease obligation and a security deposit. The Company believes the carrying value of these assets approximates fair value.

Concentration of Risks and Limited Suppliers

Financial instruments which potentially subject the Company to concentrations of credit risk consist principally of trade accounts receivable. The Company periodically reviews its accounts receivable for collectability and provides for an allowance for doubtful accounts to the extent that amounts are not expected to be collected. The Company sells primarily to clinics, distributors, group practices, hospitals, integrated delivery networks and radiopharmacies.

As of December 31, 2021 and 2020, no customer accounted for greater than 10% of accounts receivable, net. No customer accounted for greater than 10% of revenues for the years ended December 31, 2021, 2020 and 2019.

The Company relies on certain materials used in its development and manufacturing processes, some of which are procured from only one or a few sources. The failure of one of these suppliers to deliver on schedule could delay or interrupt the manufacturing or commercialization process and would adversely affect the Company's operating results. In addition, a disruption in the commercial supply of, or a significant increase in the cost of one of the Company's materials from these sources could have a material adverse effect on the Company's business, financial position and results of operations.

The Company has Mo-99 supply agreements with IRE of Belgium, running through December 31, 2022, with auto-renewal provisions and terminable upon notice of non-renewal, and with NTP and its subcontractor ANSTO, running through March 31, 2022, and for which the Company is currently negotiating an extension. The Company also has a Xenon supply agreement with IRE which runs through December 31, 2023, with auto-renewal provisions and terminable upon notice of non-renewal. The Company currently relies on IRE as the sole supplier of bulk-unprocessed Xenon which the Company processes and finishes for its customers. The Company currently relies on JHS as its significant manufacturer of DEFINITY and its sole source manufacturer of NEUROLITE, Cardiolite and evacuation vials for TechneLite.

The following table sets forth revenues for each of the Company's products representing 10% or more of revenues:

	Year Ended December 31,		
	2021	**2020**	**2019**
DEFINITY	54.7 %	62.8 %	62.6 %
TechneLite	21.5 %	25.4 %	24.9 %
PYLARIFY	10.2 %	— %	— %

Inventory

Inventory includes material, direct labor and related manufacturing overhead and is stated at the lower of cost and net realizable value on a first-in, first-out basis. The Company records inventory when the Company takes title to the product.

The Company assesses the recoverability of inventory to determine whether adjustments for excess and obsolete inventory are required. Inventory that is in excess of future requirements is written down to its estimated net realizable value based on product shelf life, forecasted demand and other factors.

Inventory costs associated with product that has not yet received regulatory approval are capitalized if the Company believes there is probable future commercial use of the product and future economic benefits of the asset. If future commercial use of the product is not probable, then inventory costs associated with such product are expensed as incurred. As of December 31, 2021 and 2020, the Company had $6.1 million and no capitalized inventories associated with product that did not have regulatory approval, respectively.

Property, Plant and Equipment, net

Property, plant & equipment are stated at cost. Replacements of major units of property are capitalized, and replaced properties are retired. Replacements of minor components of property and repair and maintenance costs are charged to expense as incurred. Certain costs to obtain or develop computer software are capitalized and amortized over the estimated useful life of the software. Depreciation and amortization is computed on a straight-line basis over the estimated useful lives of the related assets and recorded throughout costs of goods sold and operating expenses in the associated functional expense category which utilizes the associated asset. The estimated useful lives of the major classes of depreciable assets are as follows:

Class	Range of Estimated Useful Lives
Buildings	10 - 50 years
Land improvements	15 - 40 years
Machinery and equipment	3 - 15 years
Furniture and fixtures	15 years
Leasehold improvements	Lesser of lease term or 15 years
Computer software	3 - 5 years

Upon retirement or other disposal of property, plant & equipment, the cost and related amount of accumulated depreciation are removed from the asset and accumulated depreciation accounts, respectively. The difference, if any, between the net asset value and the proceeds is included in operating income.

Included within machinery, equipment and fixtures are spare parts. Spare parts include replacement parts relating to plant & equipment and are either recognized as an expense when consumed or reclassified and capitalized as part of the related asset and depreciated over the remaining useful life of the related asset.

Business Combinations

The Company accounts for business combinations using the acquisition method of accounting. The Company recognizes the assets acquired and liabilities assumed in business combinations on the basis of their fair values at the date of acquisition. The Company assesses the fair value of assets acquired, including intangible assets, and liabilities assumed using a variety of methods. Each asset acquired and liability assumed is measured at fair value from the perspective of a market participant. The method used to estimate the fair values of intangible assets incorporates significant assumptions regarding the estimates a market participant would make in order to evaluate an asset, including a market participant’s use of the asset and the appropriate discount rates. Acquired IPR&D is recognized at fair value and initially characterized as an indefinite-lived intangible asset, irrespective of whether the acquired IPR&D has an alternative future use. Any excess purchase price over the fair value of the net tangible and intangible assets acquired is allocated to goodwill. Transaction costs and restructuring costs associated with a business combination are expensed as incurred.

During the measurement period, which extends no later than one year from the acquisition date, the Company may record certain adjustments to the carrying value of the assets acquired and liabilities assumed with the corresponding offset to goodwill. After the measurement period, all adjustments are recorded in the consolidated statements of operations as operating expenses or income. The Company recorded a measurement period adjustment of $2.6 million related to deferred taxes for the three months ended March 31, 2021, which finalized all measurement period adjustments related to the Progenics Acquisition.

Goodwill

Goodwill is not amortized but is instead tested for impairment at least annually and whenever events or circumstances indicate that it is more likely-than-not that they may be impaired. The Company has elected to perform the annual test for goodwill impairment as of October 31 of each year.

In performing the Company's annual assessment, the Company is permitted to first perform a qualitative test and if necessary, perform a quantitative test. If the Company is required to perform the quantitative impairment test of goodwill, the Company compares the fair value of a reporting unit to its carrying value. If the reporting unit's carrying value exceeds its fair value, the Company would record an impairment loss to the extent that the carrying value of goodwill exceeds its implied fair value. The Company estimates the fair value of its reporting units using discounted cash flow or other valuation models, such as comparative transactions and market multiples. The Company did not recognize any goodwill impairment charges during the years ended December 31, 2021, 2020 or 2019.

Intangible and Long-Lived Assets

The Company tests intangible and long-lived assets for recoverability whenever events or changes in circumstances suggest that the carrying value of an asset or group of assets may not be recoverable. The Company measures the recoverability of assets to be held and used by comparing the carrying amount of the asset to future undiscounted net cash flows expected to be generated by the asset. If those assets are considered to be impaired, the impairment equals the amount by which the carrying amount of the assets exceeds the fair value of the assets. Any impairments are recorded as permanent reductions in the carrying amount of the assets. See Note 7, "Property, Plant and Equipment, Net" for further details on impairment. Long-lived assets, other than goodwill and other intangible assets that are held for sale are recorded at the lower of the carrying value or the fair market value less the estimated cost to sell.

Intangible assets, consisting of patents, trademarks, customer relationships, a currently marketed product, licenses and developed technology related to the Company's products are amortized in a method equivalent to the estimated utilization of the economic benefit of the asset.

The Company's in-process research and development ("IPR&D") represents intangible assets acquired in a business combination that are used in research and development activities but have not yet reached technological feasibility, regardless of whether they have alternative future use. The primary basis for determining the technological feasibility or completion of these projects is obtaining regulatory approval to market the underlying products in an applicable geographic region. Because obtaining regulatory approval can include significant risks and uncertainties, the eventual realized value of the acquired IPR&D projects may vary from their fair value at the date of acquisition. The Company classifies IPR&D acquired in a business combination as an indefinite-lived intangible asset until the completion or abandonment of the associated research and development efforts. Upon completion of the associated research and development efforts, the Company will determine the useful life and begin amortizing the assets to reflect their use over their remaining lives. Upon permanent abandonment, the Company writes-off the remaining carrying amount of the associated IPR&D intangible asset. IPR&D assets are tested at least annually as of October 31 or when a triggering event occurs that could indicate a potential impairment and any impairment loss is recognized in the Company's consolidated statements of operations. See Note 11, "Intangibles, net and Goodwill" for further details on impairment.

Contingencies

In the normal course of business, the Company is subject to loss contingencies, such as legal proceedings and claims arising out of its business, that cover a wide range of matters, including, among others, product and environmental liability. The Company records accruals for those loss contingencies when it is probable that a liability will be incurred and the amount of loss can be reasonably estimated. The Company does not recognize gain contingencies until realized.

Fair Values of Financial Instruments

The estimated fair values of the Company's financial instruments, including its cash and cash equivalents, accounts receivable, accounts payable and accrued expenses approximate the carrying values of these instruments due to their short term nature. The estimated fair value of the Company's long term debt approximates its carrying values as the applicable interest rates are subject to change with market interest rates. The estimated fair value of the Company's royalty-backed long-term debt approximates its carrying value as the interest rate is in line with the market interest rates for this type of debt with the respective underlining collateral value. See Note 4, "Fair Value of Financial Instruments".

Contingent Consideration Liabilities

The estimated fair value of contingent consideration liabilities, initially measured and recorded on the acquisition date, are considered to be a Level 3 instrument and are reviewed quarterly, or whenever events or circumstances occur that indicate a change in

fair value. The contingent consideration liabilities are recorded at fair value at the end of each reporting period with changes in estimated fair values recorded in general and administrative expenses in the consolidated statements of operations.

The estimated fair value is determined based on probability adjusted discounted cash flows and Monte Carlo simulation models that include significant estimates and assumptions pertaining to commercialization events and sales targets. The most significant unobservable inputs are the probabilities of achieving regulatory approval of the development projects and subsequent commercial success.

Significant changes in any of the probabilities of success would result in a significantly higher or lower fair value measurement. Significant changes in the probabilities as to the periods in which milestones will be achieved would result in a significantly lower or higher fair value measurement.

Derivative Instruments

The Company uses interest rate swaps to reduce the variability in cash flows associated with a portion of the Company's forecasted interest payments on its variable rate debt. To qualify for hedge accounting, the hedging instrument must be highly effective at reducing the risk from the exposure being hedged. Further, the Company must formally document the hedging relationship at inception and, on at least a quarterly basis, continually reevaluate the relationship to ensure it remains highly effective throughout the life of the hedge. The Company does not enter into derivative financial instruments for speculative or trading purposes.

Advertising and Promotion Costs

Advertising and promotion costs are expensed as incurred. During the years ended December 31, 2021, 2020 and 2019, the Company incurred $17.5 million, $5.2 million and $3.8 million, respectively in advertising and promotion costs, which are included in sales and marketing in the consolidated statements of operations.

Research and Development

Research and development costs are expensed as incurred and relate primarily to the development of new products to add to the Company's portfolio and costs related to its medical affairs and medical information functions. Nonrefundable advance payments for goods or services that will be used or rendered for future research and development activities are deferred and recognized as an expense as the goods are delivered or the related services are performed.

Foreign Currency

The consolidated statements of operations of the Company's foreign subsidiaries are translated into U.S. Dollars using weighted-average exchange rates. The net assets of the Company's foreign subsidiaries are translated into U.S. Dollars using the end of period exchange rates. The impact from translating the net assets of these subsidiaries at changing rates are recorded in the foreign currency translation adjustment account, which is included in accumulated other comprehensive loss in the consolidated balance sheets.

Remeasurement of the Company's foreign currency denominated transactions are included in net income. Transaction gains and losses are reported as a component of other (income) loss in the consolidated statements of operations.

Stock-Based Compensation

The Company's stock-based compensation cost is measured at the grant date of the stock-based award based on the fair value of the award and is recognized as expense over the requisite service period, which generally represents the vesting period, and includes an estimate of the awards that will be forfeited. The Company estimates the fair value of each stock-based award on its measurement date using either the current market price of the stock, the Black-Scholes option valuation model or the Monte Carlo simulation valuation model, whichever is most appropriate. The Black-Scholes and Monte Carlo simulation valuation models incorporate assumptions such as stock price volatility, the expected life of options or awards, a risk-free interest rate and dividend yield.

Expected volatility is based on the historical volatility of the Company's stock price. The risk-free interest rates are based on quoted U.S. Treasury rates for securities with maturities approximating the awards' expected lives. Expected lives are principally based on the Company's historical exercise experience with previously issued awards. The expected dividend yield is zero as the Company has never paid dividends and does not currently anticipate paying any in the foreseeable future.

Expense for performance restricted stock awards is recognized based upon the fair value of the awards on the date of grant and the number of shares expected to vest based on the terms of the underlying award agreement and the requisite service period(s).

Other Loss (Income)

Other loss (income) consisted of the following:

(in thousands)	Year Ended December 31, 2021	2020	2019
Foreign currency losses (gains)	$ 274	$ 260	$ (33)
Tax indemnification expense (income), net	7,121	(2,218)	10,635
Interest income	(45)	(238)	(686)
Arbitration award	—	—	(3,453)
Other	—	(2)	(242)
Total other loss (income)	$ 7,350	$ (2,198)	$ 6,221

Comprehensive (Loss) Income

Comprehensive (loss) income consists of net (loss) income and other gains and losses affecting stockholders' equity that, under U.S. GAAP, are excluded from net income. For the Company, other comprehensive (loss) income consists of foreign currency translation gains and losses as well as unrealized gains and losses on cash flow hedges related to the Company's interest rate swaps. The accumulated other comprehensive loss balance consists entirely of foreign currency translation gains and losses and unrealized gains and losses on cash flow hedges related to the Company's interest rate swaps.

Asset Retirement Obligations

The Company's compliance with federal, state, local and foreign environmental laws and regulations may require it to remove or mitigate the effects of the disposal or release of chemical substances in jurisdictions where it does business or maintains properties. The Company establishes accruals when those costs are legally obligated and can be reasonably estimated. Accrual amounts are estimated, which may include the assistance of third party environmental specialists, and are based on currently available information, regulatory requirements, remediation strategies, historical experience, the relative shares of the total remediation costs, a relevant discount rate, and the time periods of when estimated costs can be reasonably predicted. Changes in these assumptions could impact the Company's future reported results.

The Company has production facilities which manufacture and process radioactive materials at its North Billerica, Massachusetts site. The Company considers its legal obligation to remediate its facilities upon a decommissioning of its radioactive-related operations as an asset retirement obligation. The fair value of a liability for asset retirement obligations is recognized in the period in which the liability is incurred. The liability is measured at the present value of the obligation expected to be incurred and is adjusted in subsequent periods as accretion expense is recorded. The corresponding asset retirement costs are capitalized as part of the carrying values of the related long-lived assets and depreciated over the assets' useful lives.

The Company has identified conditional asset retirement obligations related to the future removal and disposal of asbestos contained in certain of the buildings located on the Company's North Billerica, Massachusetts campus. The Company believes the asbestos is appropriately contained and it is compliant with all applicable environmental regulations. If these properties undergo major renovations or are demolished, certain environmental regulations are in place, which specify the manner in which asbestos must be handled and disposed. The Company is required to record the fair value of these conditional liabilities if they can be reasonably estimated. As of December 31, 2021 and 2020, sufficient information was not available to estimate a liability for such conditional asset retirement obligations as the obligations to remove the asbestos from these properties have indeterminable settlement dates. As such, no liability for conditional asset retirement obligations has been recorded in the accompanying consolidated balance sheets as of December 31, 2021 and 2020.

Self-Insurance Reserves

The Company's consolidated balance sheets at December 31, 2021 and 2020 include $0.7 million and $0.6 million of accrued liabilities associated with employee medical costs that are retained by the Company, respectively. The Company estimates the required liability of those claims on an undiscounted basis based upon various assumptions which include, but are not limited to, the Company's historical loss experience and projected loss development factors. The required liability is also subject to adjustment in the future based upon changes in claims experience, including changes in the number of incidents (frequency) and change in the ultimate cost per incident (severity).

Recent Accounting Pronouncements

Standard	Description	Effective Date for Company	Effect on the Consolidated Financial Statements
Accounting Standards Adopted During the Year Ended December 31, 2021			
ASU 2020-06, "Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging - Contracts in Entity's Own Equity (Subtopic 815-40)"	This ASU provides guidance to simplify the complexity associated with accounting for convertible instruments and derivatives. For convertible instruments, the number of major separation models required were reduced. Consequently, more convertible debt instruments will be reported as a single liability instrument with no separate accounting for embedded conversion features. This ASU further amends the guidance for the derivatives scope exception for contracts in an entity's own equity to reduce form-over-substance-based accounting conclusions. The ASU simplifies the diluted net income per share calculation in certain areas as well.	January 1, 2021	The adoption of this standard did not have a material impact on the Company's consolidated financial statements.

3. Revenue from Contracts with Customers

Revenue Recognition

Revenue is recognized when a customer obtains control of promised goods or services. The amount of revenue recognized reflects the consideration to which the Company expects to be entitled to receive in exchange for these goods or services. To achieve this core principle, the Company applies the following five steps: (1) identify the contracts with a customer; (2) identify the performance obligations in the contract; (3) determine the transaction price; (4) allocate the transaction price to the performance obligations in the contract; and (5) recognize revenue when (or as) the Company satisfies a performance obligation.

Disaggregation of Revenue

The following table summarizes revenue by revenue source as follows:

	Year Ended December 31,		
Major Products/Service Lines (in thousands)	**2021**	**2020**	**2019**
Product revenue, net[1]	$ 400,356	$ 327,695	$ 345,276
License and royalty revenues	24,852	11,715	2,061
Total revenues	$ 425,208	$ 339,410	$ 347,337

(1) The Company's principal products include DEFINITY, TechneLite and PYLARIFY and are categorized within product revenue, net. The Company applies the same revenue recognition policies and judgments for all of its principal products.

The Company classifies its revenues into three product categories: precision diagnostics, radiopharmaceutical oncology, and strategic partnerships and other revenue. Precision diagnostics includes DEFINITY, TechneLite and other imaging diagnostic products. Radiopharmaceutical oncology consists primarily of PYLARIFY and AZEDRA. Strategic partnerships and other revenue includes strategic partnerships and other arrangements related to other products of the Company, including RELISTOR.

Revenue by product category on a net basis is as follows:

	Year Ended December 31,		
(in thousands)	**2021**	**2020[1]**	**2019[1]**
DEFINITY	$ 232,759	$ 195,865	$ 202,398
TechneLite	91,293	84,945	85,465
Other precision diagnostics	26,973	36,824	49,243
Total precision diagnostics	351,025	317,634	337,106
PYLARIFY	43,414	—	—
Other radiopharmaceutical oncology	5,473	10,022	8,655
Total radiopharmaceutical oncology	48,887	10,022	8,655
Strategic Partnerships and other revenue	25,296	11,754	1,576
Total revenues	$ 425,208	$ 339,410	$ 347,337

(1) The Company reclassified aggregate rebates and allowances of $19.1 million and $16.6 million for the years ended December 31, 2020 and 2019, respectively, which included $17.5 million and $15.1 million for DEFINITY, $1.3 million and $1.1 million for TechneLite and $0.3 million for other precision diagnostics.

Product Revenue, Net

The Company sells its products principally to clinics, distributors, group practices, hospitals, integrated delivery networks and radiopharmacies. The Company considers customer purchase orders, which in some cases are governed by master sales or group purchasing organization agreements, to be the contracts with a customer.

For each contract, the Company considers the promise to transfer products, each of which is distinct, to be the identified performance obligations. In determining the transaction price, the Company evaluates whether the price is subject to refund or adjustment to determine the net consideration to which the Company expects to be entitled.

The Company typically invoices customers upon satisfaction of identified performance obligations. As the Company's standard payment terms are 30 to 60 days from invoicing, the Company has elected to use the significant financing component practical expedient.

The Company allocates the transaction price to each distinct product based on their relative standalone selling price. The product price as specified on the purchase order is considered the standalone selling price as it is an observable input which depicts the price as if sold to a similar customer in similar circumstances.

Revenue is recognized when control of the product is transferred to the customer (i.e., when the Company's performance obligation is satisfied), which typically occurs upon delivery to the customer. Further, in determining whether control has transferred, the Company considers if there is a present right to payment and legal title, along with risks and rewards of ownership having transferred to the customer.

Frequently, the Company receives orders for products to be delivered over multiple dates that may extend across several reporting periods. The Company invoices for each delivery upon shipment and recognizes revenues for each distinct product delivered, assuming transfer of control has occurred.

The Company generally does not separately charge customers for shipping and handling costs, but any shipping and handling costs charged to customers are included in product revenue, net. Taxes collected from customers relating to product sales and remitted to governmental authorities are excluded from revenues.

Variable Consideration

Revenues from product sales are recorded at the net sales price (transaction price), which includes estimates of variable consideration for which reserves are established for discounts, returns, rebates and allowances that are offered within contracts between the Company and its customers. These reserves are based on the amounts earned or to be claimed on the related sales and are classified as a current liability. Where appropriate, these estimates take into consideration a range of possible outcomes which are probability-weighted for relevant factors such as the Company's historical experience, current contractual and statutory requirements, specific known market events and trends, industry data and forecasted customer buying and payment patterns. Overall, these reserves reflect the Company's best estimates of the amount of consideration to which it is entitled based on the terms of the contract. The amount of variable consideration which is included in the transaction price may be constrained, and is included in the net sales price only to the extent that it is probable that a significant reversal in the amount of the cumulative revenue recognized will not occur in a future period. Actual amounts of consideration ultimately received may differ from the Company's estimates. If actual results in the future vary from the Company's estimates, the Company adjusts these estimates, which would affect product revenue and earnings in the period such variances become known.

Rebates and Allowances: The Company provides certain customers with rebates and allowances that are explicitly stated in the Company's contracts and are recorded as a reduction of revenue in the period the related product revenue is recognized. The Company establishes a liability for such amounts, which is included in accrued expenses in the accompanying consolidated balance sheets. These rebates and allowances result from performance-based offers that are primarily based on attaining contractually specified sales volumes and administrative fees the Company is required to pay to group purchasing organizations. The Company estimates the amount of rebates and allowances that are explicitly stated in the Company's contracts based on a combination of actual purchases and an estimate of the customer's buying patterns.

Product Returns: The Company generally offers customers a limited right of return due to non-conforming product. The Company estimates the amount of its product sales that may be returned by its customers and records this estimate as a reduction of revenue in the period the related product revenue is recognized. The Company currently estimates product return liabilities using its historical product return information and considers other factors that it believes could significantly impact its expected returns, including product recalls. Reserves for product returns are not significant to the Company due to the nature of its products including radiopharmaceutical products with limited half-lives.

An analysis of the amount of, and change in, reserves is summarized as follows:

(in thousands)	Rebates and Allowances
Balance, January 1, 2020	$ 6,985
Provision related to current period revenues	19,675
Adjustments relating to prior period revenues	(604)
Payments or credits made during the period	(16,706)
Balance, December 31, 2020	9,350
Provision related to current period revenues	25,772
Adjustments relating to prior period revenues	14
Payments or credits made during the period	(24,159)
Balance, December 31, 2021	$ 10,977

License and Royalty Revenues

The Company has entered into licensing agreements, under which it licenses certain rights to third parties. The terms of these arrangements typically include payment to the Company of one or more of the following: non-refundable, up-front license fees; development, regulatory and commercial milestone payments; and royalties on net sales of licensed products. The Company also has distribution licenses which are treated as combined performance obligations with the delivery of its products and are classified as product revenue, net.

In determining the appropriate amount of revenue to be recognized as it fulfills its obligations under each of its agreements, the Company performs the five-step approach stated earlier. The Company uses judgment in determining the number of performance obligations in a license agreement by assessing whether the license is distinct or should be combined with another performance obligation, as well as the nature of the license. As part of the accounting for these arrangements, the Company must develop assumptions that require judgment to determine the stand-alone selling price for each performance obligation identified in the contract. The Company uses key assumptions to determine the stand-alone selling price, which may include market conditions, reimbursement rates for personnel costs, development timelines and probabilities of regulatory success.

Licenses of intellectual property: If the license to the Company's intellectual property is determined to be distinct from the other performance obligations identified in the arrangement, the Company recognizes revenues from non-refundable, up-front fees allocated to the license when the license is transferred to the customer and the customer is able to use and benefit from the license. For licenses that are bundled with other promises, the Company utilizes judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue from non-refundable, up-front fees. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition.

Milestone Payments: At the inception of each arrangement that includes development or sales milestone payments, the Company evaluates whether the milestones are considered probable of being reached and estimates the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal would not occur, the associated milestone value is included in the transaction price. Milestone payments that are outside the control of the Company or the licensee, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. The transaction price is then allocated to each performance obligation on a relative stand-alone selling price basis, for which the Company recognizes revenue as or when the performance obligations under the contract are satisfied. At the end of each subsequent reporting period, the Company re-evaluates the probability of achievement of such milestones and any related constraint, and if necessary, adjusts its estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect license and royalty revenues and earnings in the period of adjustment. At December 31, 2021, the Company is constraining variable consideration related to development milestone payments requiring regulatory approvals and sales milestone payments related to achievement of certain sales targets.

Royalty Revenues: For arrangements that include sales-based royalties, including milestone payments based on the level of sales, and the license is deemed to be the predominant item to which the royalties relate, the Company recognizes revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied).

Contract Costs

The Company recognizes an asset for incremental costs of obtaining a contract with a customer if it expects to recover those costs. The Company's sales incentive compensation plans qualify for capitalization since these plans are directly related to sales achieved during a period of time. However, the Company has elected the practical expedient to expense the costs as they are incurred, within sales and marketing expenses, since the amortization period is less than one year.

The Company recognized certain revenues as follows:

	Year Ended December 31,	
(in thousands)	**2021**	**2020**
Amounts included in the contract liability at the beginning of the period	$ 33	$ 33

The Company did not record any revenue related to performance obligations satisfied (or partially satisfied) in previous periods during the years ended December 31, 2021 and 2020.

The Company's performance obligations are typically part of contracts that have an original expected duration of one year or less. As such, the Company is not disclosing the aggregate amount of the transaction price allocated to performance obligations that are unsatisfied (or partially satisfied) as of the end of the reporting period.

4. 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 in an orderly transaction between market participants at the measurement date. In order to increase consistency and comparability of fair value measurements, financial instruments are categorized based on a hierarchy that prioritizes observable and unobservable inputs used to measure fair value into three broad levels, which are described below:

- *Level 1* — Inputs are unadjusted quoted prices in active markets for identical assets or liabilities that the Company has the ability to access at the measurement date.
- *Level 2* — Inputs include quoted prices for similar assets and liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active, inputs other than quoted prices that are observable for the asset or liability (i.e., interest rates, yield curves, etc.) and inputs that are derived principally from or corroborated by observable market data by correlation or other means (market corroborated inputs).
- *Level 3* — Unobservable inputs that reflect a Company's estimates about the assumptions that market participants would use in pricing the asset or liability. The Company develops these inputs based on the best information available, including its own data.

The Company's financial assets and liabilities measured at fair value on a recurring basis consist of money market funds, interest rate swaps, a contingent receivable and contingent consideration liabilities. The Company invests excess cash from its operating cash accounts in overnight investments and reflects these amounts in cash and cash equivalents in the consolidated balance sheets at fair value using quoted prices in active markets for identical assets. The fair value of the interest rate swaps is determined based on observable market-based inputs, including interest rate curves and reflects the contractual terms of these instruments, including the period to maturity. Please refer to Note 14, "Derivative Instruments", for further details on the interest rate swaps. The Company recorded a contingent receivable and the contingent consideration liabilities resulting from the Progenics Acquisition at fair value based on inputs that are not observable in the market. Please refer to Note 8, "Business Combinations", for further details on the acquisition.

The tables below present information about the Company's assets and liabilities measured at fair value on a recurring basis:

	December 31, 2021			
(in thousands)	**Total Fair Value**	**Level 1**	**Level 2**	**Level 3**
Assets:				
Money market	$ 40,140	$ 40,140	$ —	$ —
Interest rate swaps	357	—	357	—
Contingent receivable	9,300	—	—	9,300
Total assets	$ 49,797	$ 40,140	$ 357	$ 9,300
Liabilities:				
Contingent consideration liabilities	$ 86,200	$ —	$ —	$ 86,200
Total liabilities	$ 86,200	$ —	$ —	$ 86,200

	December 31, 2020			
(in thousands)	**Total Fair Value**	**Level 1**	**Level 2**	**Level 3**
Assets:				
Money market	$ 35,457	$ 35,457	$ —	$ —
Contingent receivable	11,300	—	—	11,300
Total assets	$ 46,757	$ 35,457	$ —	$ 11,300
Liabilities:				
Interest rate swaps	$ 1,908	$ —	$ 1,908	$ —
Contingent consideration liabilities	15,800	—	—	15,800
Total liabilities	$ 17,708	$ —	$ 1,908	$ 15,800

During the years ended December 31, 2021 and 2020, there were no transfers into or out of Level 3.

As part of the Progenics Acquisition, the Company acquired the right to receive certain future milestone and royalty payments due to Progenics from CytoDyn Inc. related to a prior sale of certain intellectual property. The Company has the right to receive $5.0 million upon regulatory approval and a 5% royalty on net sales of approved products. The Company considers the contingent receivable a Level 3 instrument (one with significant unobservable inputs) in the fair value hierarchy. The estimated fair value was determined based on probability adjusted discounted cash flows that included significant estimates and assumptions pertaining to regulatory events and sales targets. The most significant unobservable inputs are the probabilities of achieving regulatory approval of the development projects and subsequent commercial success.

As part of the Progenics Acquisition, the Company issued CVRs and recorded the fair value as part of consideration transferred. Each CVR will entitle its holder to receive a pro rata share of aggregate cash payments equal to 40% of U.S. net sales generated by PYLARIFY in 2022 and 2023 in excess of $100.0 million and $150.0 million, respectively. Refer to Note 1, “Description of Business” for further details on the CVRs. Additionally, the Company assumed contingent consideration liabilities related to a previous acquisition completed by Progenics in 2013 (“2013 Acquisition”). These contingent consideration liabilities include potential payments of up to $70.0 million if the Company attains certain net sales targets primarily for AZEDRA and 1095 and a $5.0 million 1095 commercialization milestone. Additionally, there is a potential payment of up to $10.0 million related to a 1404 commercialization milestone. The Company’s total potential payments related to the 2013 Acquisition are approximately $85.0 million. The Company considers the contingent consideration liabilities relating to the CVRs and the 2013 Acquisition, each a Level 3 instrument (one with significant unobservable inputs) in the fair value hierarchy. The estimated fair value of these was determined based on probability adjusted discounted cash flows and Monte Carlo simulation models that included significant estimates and assumptions pertaining to commercialization events and sales targets. The most significant unobservable inputs are the probabilities of achieving regulatory approval of the development projects and subsequent commercial success.

Significant changes in any of the probabilities of success, the probabilities as to the periods in which sales targets and milestones will be achieved, discount rates or underlying revenue forecasts would result in a significantly higher or lower fair value measurement. The Company records the contingent consideration liability at fair value with changes in estimated fair values recorded in general and administrative expenses in the consolidated statements of operations. The Company can give no assurance that the actual amounts paid, if any, in connection with the contingent consideration liabilities, including the CVRs, will be consistent with any recurring fair value estimate of such contingent consideration liabilities.

The following tables summarize quantitative information and assumptions pertaining to the fair value measurement of assets and liabilities using Level 3 inputs as of December 31, 2021.

	Fair Value as of				Assumptions	
(in thousands)	December 31, 2021	December 31, 2020	Valuation Technique	Unobservable Input	December 31, 2021	December 31, 2020
Contingent receivable:						
Regulatory milestone	$ 2,500	$ 3,200	Probability adjusted discounted cash flow model	Period of expected milestone achievement	2022	2021
				Probability of success	70 %	90 %
				Discount rate	17 %	24 %
Royalties	6,800	8,100	Probability adjusted discounted cash flow model			
				Probability of success	10% - 60%	13% - 77%
				Discount rate	17 %	24 %
Total	$ 9,300	$ 11,300				

(in thousands)	Fair Value as of December 31, 2021	Fair Value as of December 31, 2020	Valuation Technique	Unobservable Input	Assumptions December 31, 2021	Assumptions December 31, 2020
Contingent consideration liability:						
Net sales targets - PYLARIFY (CVRs)	$ 73,200	$ 4,200	Monte Carlo simulation	Period of expected milestone achievement and sales targets	2022 - 2023	2022 - 2023
				Discount rate	17 %	24 %
1095 commercialization milestone	1,900	2,200	Probability adjusted discounted cash flow model			
				Period of expected milestone achievement	2026	2026
				Probability of success	40 %	45 %
				Discount rate	1.3 %	0.5 %
Net sales targets - AZEDRA and 1095	11,100	9,400	Monte Carlo simulation			
				Probability of success and sales targets	40% - 100%	40% - 100%
				Discount rate	16% - 17%	23% - 24%
Total	$ 86,200	$ 15,800				

For those financial instruments with significant Level 3 inputs, the following table summarizes the activities for the periods indicated:

(in thousands)	Financial Assets Years Ended December 31, 2021	Financial Assets Years Ended December 31, 2020	Financial Liabilities Years Ended December 31, 2021	Financial Liabilities Years Ended December 31, 2020
Fair value, beginning of period	$ 11,300	$ —	$ 15,800	$ —
Progenics acquisition	—	10,100	—	16,600
Changes in fair value included in net loss	(2,000)	1,200	70,400	(800)
Fair value, end of period	$ 9,300	$ 11,300	$ 86,200	$ 15,800

The change in fair value of the contingent financial asset and contingent financial liabilities, including the CVRs, resulted in an expense of $72.4 million for the year ended December 31, 2021 and was primarily due to changes in revenue forecasts, changes in market conditions, a decrease in discount rates and the passage of time.

5. Income Taxes

The components of income before income taxes is summarized as follows:

(in thousands)	Year Ended December 31, 2021	2020	2019
U.S.	$ (76,389)	$ (5,495)	$ 25,432
International	1,351	(5,984)	3,195
(Loss) income before income taxes	$ (75,038)	$ (11,479)	$ 28,627

The income tax (benefit) expense is summarized as follows:

(in thousands)	Year Ended December 31, 2021	2020	2019
Current			
Federal	$ —	$ —	$ 287
State	(8,166)	3,158	(13,166)
International	(30)	170	114
	(8,196)	3,328	(12,765)
Deferred			
Federal	1,048	(1,506)	8,712
State	3,058	(178)	790
International	331	350	223
	4,437	(1,334)	9,725
Income tax (benefit) expense	$ (3,759)	$ 1,994	$ (3,040)

The reconciliation of income taxes at the U.S. federal statutory rate to the actual income taxes is as follows:

(in thousands)	Year Ended December 31, 2021	2020	2019
U.S. statutory rate	$ (15,758)	$ (2,411)	$ 6,012
Permanent items	1,764	1,176	3,210
Acquisition costs - Progenics	—	2,723	—
Recognition of deferred tax asset - assets held for sale	—	(3,000)	—
Section 162(m)	1,028	717	527
Uncertain tax positions	(8,952)	2,818	(13,156)
Other tax credits	(990)	(1,065)	(1,685)
State and local taxes	656	1,457	1,914
Impact on deferred taxes of change in tax rate	3,049	—	—
Non-deductible changes in fair value of contingent assets and liabilities	15,015	230	—
Foreign tax rate differential	23	(254)	(238)
Valuation allowance	(400)	(318)	(22)
Benefit of windfall related to stock compensation	(1,164)	(128)	(2,768)
Change in indemnification deferred tax asset	1,786	(590)	2,531
Other	184	639	635
Income tax (benefit) expense	$ (3,759)	$ 1,994	$ (3,040)

The components of deferred income tax assets (liabilities) are as follows:

(in thousands)	December 31, 2021	2020
Deferred Tax Assets		
Federal benefit of state tax liabilities	$ 4,292	$ 5,867
Reserves, accruals and other	27,159	32,030
Inventory obsolescence	297	404
Capitalized research and development	768	2,553
Amortization of intangibles other than goodwill	502	1,325
Net operating loss carryforwards	122,944	127,369
Depreciation	1,102	1,014
Deferred tax assets	157,064	170,562
Deferred Tax Liabilities		
Reserves, accruals and other	(3,026)	(5,676)
Intangible assets	(87,351)	(91,283)
Deferred tax liability	(90,377)	(96,959)
Less: valuation allowance	(3,923)	(3,456)
	$ 62,764	$ 70,147
Recorded in the accompanying consolidated balance sheets as:		
Noncurrent deferred tax assets, net	$ 62,764	$ 70,147

On June 19, 2020, the Company completed the Progenics Acquisition in a transaction that is expected to qualify as a tax-deferred reorganization under Section 368 of the Internal Revenue Code. The transaction resulted in an ownership change of Progenics under Section 382 of the Internal Revenue Code, and a limitation on the utilization of Progenics' precombination tax attributes. All of Progenics' precombination research credits and Orphan drug credits have been removed from the balance sheet, and the gross carrying value of the tax loss carryforwards reduced to their realizable value on the opening balance sheet, in accordance with the Section 382 limitation. Deferred tax liabilities of $92.3 million on acquired identified intangibles were recorded at acquisition resulting in a small net overall deferred tax liability for Progenics after the application of acquisition accounting. The Company also acquired estimated utilizable U.S. federal loss carryforwards of $338.7 million, tax-effected state loss carryforwards of $12.5 million and state tax credits of $2.5 million as a result of the Progenics acquisition. The utilization of these losses and credits is subject to annual limitations based on Sections 382 and 383 of the Internal Revenue Code.

The Company regularly assesses its ability to realize its deferred tax assets. Assessing the realizability of deferred tax assets requires significant management judgment. In determining whether its deferred tax assets are more-likely-than-not realizable, the Company evaluated all available positive and negative evidence, and weighed the objective evidence and expected impact. The Company continues to record valuation allowances of $1.2 million against the net deferred tax assets of its U.K. subsidiary, $1.9 million against the net deferred tax assets of its Sweden subsidiary, and $0.8 million against certain domestic state tax credits and state loss carryforwards.

The Company will continue to assess the level of the valuation allowance required. If the weight of negative evidence exists in future periods to again support the recording of a partial or full valuation allowance against the Company's deferred tax assets, there would likely be a material negative impact on the Company's results of operations in that future period.

A summary of the changes in the Company's valuation allowance is summarized below:

(in thousands)	Amount
Balance, January 1, 2020	$ 1,238
Charged to income tax (benefit) expense	311
Foreign currency	31
Increase due to Progenics acquisition	2,479
Release valuation allowance	(603)
Balance, December 31, 2020	3,456
Charged to income tax (benefit) expense	(189)
Adjustment related to Progenics acquired deferred assets	867
Foreign currency	(211)
Balance, December 31, 2021	$ 3,923

The Company's U.S. federal income tax returns are subject to examination for three years after the filing date of the return. The state and foreign income tax returns are subject to examination for periods varying from three to four years after filing, depending on the specific jurisdictions' statutes of limitation, and in the case of Sweden, up to six years after the end of the financial year.

At December 31, 2021, the Company has U.S. federal net operating loss carryovers of approximately $476.2 million, $338.1 million of which will expire between 2022 and 2037, and $138.0 million of which can be carried forward indefinitely. The Company's state net operating losses are $17.4 million on a tax-effected basis, which will expire between 2022 and 2040. The Company also has U.S. federal research credits carryforwards of $3.4 million which will begin to expire in 2037. The Company has state research credit carryforwards of $3.1 million, which will expire between 2024 and 2036. The Company has state investment tax credit carryforwards of $1.7 million net of federal impact, $0.7 million of which have no expiration date, and $1.0 million of which will expire between 2022 and 2024.

A reconciliation of the Company's changes in uncertain tax positions for 2021 and 2020 is as follows:

(in thousands)	Amount
Balance of uncertain tax positions as of January 1, 2020	$ 5,292
Additions related to current year tax positions	—
Reductions related to prior year tax positions	—
Settlements	—
Lapse of statute of limitations	—
Balance of uncertain tax positions as of December 31, 2020	5,292
Additions related to current year tax positions	—
Reductions related to prior year tax positions	(188)
Settlements	(1,446)
Lapse of statute of limitations	—
Balance of uncertain tax positions as of December 31, 2021	$ 3,658

In connection with the Company's acquisition of the medical imaging business from Bristol-Myers Squibb ("BMS") in 2008, the Company recorded a liability for uncertain tax positions related to the acquired business and simultaneously entered into a tax indemnification agreement with BMS under which BMS agreed to indemnify the Company for any payments made to settle those uncertain tax positions with the taxing authorities. A long-term receivable is recorded within other long-term assets to account for the expected value to the Company of future indemnification payments, net of actual tax benefits received, to be paid on behalf of the Company by BMS.

In accordance with the Company's accounting policy, the change in the tax liability, penalties and interest associated with these obligations (net of any offsetting federal or state benefit) is recognized within income tax expense. As these reserves change, adjustments are included in income tax expense while the offsetting adjustment is included in other income. Assuming that the receivable from BMS continues to be considered recoverable by the Company, there will be no effect on net income and no net cash outflows related to these liabilities.

As of December 31, 2021 and 2020, total liabilities for uncertain tax positions including interest and penalties were $20.9 million and $29.9 million, respectively, consisting of uncertain tax positions of $3.7 million and $5.3 million, respectively, interest accruals of

$16.5 million and $23.5 million, respectively, and penalty accruals of $0.8 million and $1.0 million, respectively. As of December 31, 2021 and 2020, these liabilities were included in other long-term liabilities. Included in the 2021, 2020 and 2019 tax provisions are a benefit of $9.0 million, an expense of $2.8 million and a benefit of $13.2 million, respectively, relating to accrual of interest, net of benefits for reversals of uncertain tax positions recognized upon settlements, effective settlements, or lapses of relevant statutes of limitation.

The total long-term asset related to the indemnification was $13.5 million and $20.8 million at December 31, 2021 and 2020, respectively. Included in other (income) loss for the years ended December 31, 2021, 2020 and 2019, is tax indemnification expense (income), net of $7.1 million, $(2.2) million and $10.6 million, respectively.

The Coronavirus Aid, Relief, and Economic Security Act, also known as the CARES Act, was passed by the Congress and signed into law on March 27, 2020. The Company has reviewed the relevant measures of the Act. No material impacts of the Cares Act have been identified nor are any anticipated. On December 27, 2020, the Taxpayer Certainty and Disaster Tax Relief Act of 2020 was signed into law, modifying certain aspects of the CARES Act. The Company has analyzed the CARES Act and determined that the Act to date has had no material impact on the Company's income taxes.

6. Inventory

Inventory consisted of the following:

	December 31,	
(in thousands)	**2021**	**2020**
Raw materials	$ 15,505	$ 16,000
Work in process	13,042	11,212
Finished goods	6,582	8,532
Total inventory	$ 35,129	$ 35,744

Inventory costs associated with products that have not yet received regulatory approval are capitalized if the Company believes there is probable future commercial use of the product and future economic benefit of the asset. If future commercial use of the product is not probable, then inventory costs associated with such product are expensed during the period the costs are incurred. As of December 31, 2021, the Company had $6.1 million of such product costs included in inventories related to DEFINITY that have been manufactured through the Company's in-house manufacturing capabilities, which is awaiting regulatory approval.

7. Property, Plant and Equipment, Net

Property, plant and equipment, net, consisted of the following:

	December 31,	
(in thousands)	**2021**	**2020**
Land	$ 13,450	$ 13,450
Buildings	73,559	70,381
Machinery, equipment and fixtures	83,608	77,854
Computer software	24,384	23,644
Construction in progress	10,686	11,254
	205,687	196,583
Less: accumulated depreciation and amortization	(88,915)	(76,412)
Total property, plant and equipment, net	$ 116,772	$ 120,171

Depreciation and amortization expense related to property, plant & equipment, net, was $13.2 million, $12.5 million and $10.3 million for the years ended December 31, 2021, 2020 and 2019, respectively.

The Company tests long-lived assets for recoverability whenever events or changes in circumstances suggest that the carrying value of an asset or group of assets may not be recoverable. During the year ended December 31, 2021, the Company reviewed certain facts relating to an asset group that included the right-of-use ("ROU") asset associated with the lease of office space in the World Trade Center (the "WTC lease") in New York City and resulted in a change to the asset group due to the negotiation of a sublease. Please refer to Note 17, "Leases" for further details.

During the three months ended March 31, 2020, as a result of a decline in expected future cash flows and the effect of the COVID-19 pandemic related to certain other nuclear legacy manufacturing assets, the Company determined certain impairment triggers had occurred. Accordingly, the Company performed an undiscounted cash flow analysis as of March 31, 2020. Based on the undiscounted cash flow analysis, the Company determined that the manufacturing assets had net carrying values that exceeded their estimated undiscounted future cash flows. The Company then estimated the fair values of the asset group based on their discounted cash flows. The carrying value exceeded the fair value and as a result, the Company recorded a non-cash impairment of $7.3 million for the year ended December 31, 2020 in cost of goods sold in the consolidated statement of operations.

In connection with a contract termination in the fourth quarter of 2020, the Company transferred ownership of certain manufacturing assets and recorded a non-cash loss on disposal of assets of $1.8 million as well as paid $0.5 million, all of which is recorded in cost of goods sold in the consolidated statement of operations.

8. Business Combinations

On June 19, 2020, the Company completed the Progenics Acquisition. The acquisition combined the commercialization, supply chain and manufacturing expertise of the Company with the currently commercialized products and research and development pipeline of Progenics. Progenics brought to the Company several commercial products and a pipeline of product candidates that further diversify the Company's commercial and clinical development portfolios.

Under the terms of the Merger Agreement, the Company acquired all the issued and outstanding shares of Progenics common stock for a purchase price of $419.0 million by means of an all-stock transaction, which includes options to purchase Holdings common stock ("Replacement Stock Options") for precombination services as well as CVRs.

The CVRs were accounted for as contingent consideration, the fair value of which was determined using a Monte Carlo simulation. Additionally, the fair value of the Replacement Stock Options was recorded as a component of consideration transferred. Finally, as a result of the Progenics Acquisition, Lantheus effectively settled an existing bridge loan with Progenics at the recorded amount (principal and accrued interest) of $10.1 million, representing the effective settlement of a preexisting relationship. This effective settlement of the bridge loan was treated as a component of consideration transferred. The Company determined that the bridge loan was at market terms and no gain or loss was recorded upon settlement.

The acquisition date fair value of the consideration transferred in the acquisition consisted of the following:

(in thousands)	Amount
Issuance of common stock	$ 398,110
Fair value of replacement stock options	7,125
Fair value of bridge loan settled at close	10,074
Fair value of contingent considerations (CVRs)	3,700
Total consideration transferred	$ 419,009

The transaction was accounted for as a business combination which requires that assets acquired and liabilities assumed be recognized at their fair value as of the acquisition date. While the Company uses its best estimates and assumptions as part of the purchase price allocation process to value the assets acquired and liabilities assumed on the acquisition date, its estimates and assumptions are subject to refinement. Fair value estimates are based on a complex series of judgments about future events and uncertainties and rely heavily on estimates and assumptions. The judgments used to determine the estimated fair value assigned to each class of assets acquired and liabilities assumed, as well as asset lives, can materially impact the Company's results of operations. The Company recorded a measurement period adjustment of $2.6 million related to deferred taxes for the three months ended March 31, 2021, which finalized all measurement period adjustments related to the Progenics Acquisition.

The following table summarizes the provisional amounts recognized for assets acquired and liabilities assumed as of the acquisition date, as well as measurement period adjustments made to the amounts initially recorded in June 2020. The measurement period adjustments primarily resulted from finalizing the fair values of certain intangible assets and liabilities, deferred taxes and other changes to certain tangible assets and liability accounts. Measurement period adjustments were recognized in the reporting period in which the adjustments were determined and calculated as if the accounting had been completed at the acquisition date. The related impact to net loss that would have been recognized in previous periods if the adjustments were recognized as of the acquisition date is immaterial to the consolidated financial statements.

(in thousands)	Amounts Recognized as of Acquisition Date (as previously reported)	Measurement Period Adjustments	Amounts Recognized as of Acquisition Date (as adjusted)
Cash and cash equivalents	$ 15,421	$ —	$ 15,421
Accounts receivable	5,787	—	5,787
Inventory	915	160	1,075
Other current assets	3,250	434	3,684
Property, plant and equipment	14,972	—	14,972
Identifiable intangible assets (weighted-average useful life):		—	—
Currently marketed product (15 years)	142,100	800	142,900
Licenses (11.5 years)	87,500	(1,700)	85,800
Developed technology (9 years)	3,000	(600)	2,400
IPR&D	150,900	200	151,100
Other long-term assets	37,631	—	37,631
Accounts payable	(1,616)	—	(1,616)
Accrued expenses and other liabilities	(8,207)	(80)	(8,287)
Other long-term liabilities	(30,778)	(380)	(31,158)
Long-term debt and other borrowings	(40,200)	—	(40,200)
Deferred tax liabilities	(3,717)	(2,258)	(5,975)
Goodwill	42,051	3,424	45,475
Total consideration transferred	$ 419,009	$ —	$ 419,009

Intangible assets acquired consist of currently marketed products, licenses, developed technology and in-process research and development ("IPR&D"). The fair value of the acquired intangible assets was determined based on estimated future revenues, royalty rates and discount rates, among other variables and estimates. The acquired intangible assets subject to amortization were assigned useful lives based on the expected use of the assets and the regulatory and economic environment within which they are being used and are being amortized on a straight-line basis over the respective estimated useful lives. The estimated fair values of the IPR&D assets were determined based on the present values of the expected cash flows to be generated by the respective underlying assets. The Company used a discount rate of 23.0% and cash flows that have been probability adjusted to reflect the risks of product commercialization, which the Company believes are appropriate and representative of market participant assumptions.

As part of the Progenics Acquisition, the Company acquired the right to receive certain future milestone and royalty payments due to Progenics, related to a prior sale of certain intellectual property. The estimated fair value of the acquired contingent receivable of $10.1 million was determined by applying a probability adjusted discounted cash flow model based on estimated future expected payments and recorded in other long-term assets.

The goodwill recognized is attributable to future technologies that are not separately identifiable that could potentially add to the currently developed and pipeline products and Progenics' assembled workforce. Future technologies did not meet the criteria for recognition separately from goodwill because they are part of the future development and growth of the business. Goodwill of $45.5 million recognized in connection with the acquisition is not deductible for tax purposes.

The Company recognized $11.9 million of acquisition-related costs, including legal, accounting, compensation arrangements and other related fees that were expensed when incurred in the year ended December 31, 2020, respectively. These costs are recorded in general and administrative expenses in the consolidated statements of operations.

Progenics Pro Forma Financial Information

Progenics has been included in the Company's consolidated financial statements since the acquisition date. Progenics contributed revenues of $12.4 million, as well as a net loss of $27.1 million to the Company's consolidated statement of operations for the year ended December 31, 2020.

The following unaudited pro forma financial information presents the Company's results as if the Progenics Acquisition had occurred on January 1, 2019:

(in thousands)	Year Ended December 31, 2020 Amount	Year Ended December 31, 2019 Amount
Pro forma revenue	$ 350,315	$ 382,323
Pro forma net loss	$ 29,190	$ 42,032

The unaudited pro forma financial information for all periods presented adjusts for the effects of material business combination items, including amortization of acquired intangible assets, transaction-related costs, adjustments to interest expense related to the assumption of long-term debt, retention and severance bonuses and the corresponding income tax effects of each. These pro forma results have been prepared for comparative purposes only and do not purport to be indicative of the operating results of the Company that would have been achieved had the Progenics Acquisition actually taken place on January 1, 2019. In addition, these results are not intended to be a projection of future results and do not reflect events that may occur after the Progenics Acquisition, including, but not limited to, revenue enhancements, cost savings or operating synergies that the combined company may achieve as a result of the Progenics Acquisition.

9. Sale of Puerto Rico Subsidiary

During the fourth quarter of 2020, the Company entered into a stock purchase agreement (the “SPA”) with one of its existing radiopharmacy customers to sell all the stock of its Puerto Rico radiopharmacy subsidiary. The assets were classified as held for sale and the Company determined that the fair value of the net assets being sold significantly exceeded the carrying value as of December 31, 2020. The transaction was consummated on January 29, 2021.

The purchase price for the stock sale was $18.0 million in cash, which included a holdback amount of $1.8 million that was remitted to the Company as of December 31, 2021, and paid in the first quarter of 2022; the purchase price also included a working capital adjustment. The SPA contained customary representations, warranties and covenants by each of the parties. Subject to certain limitations, the buyer will be indemnified for damages resulting from breaches or inaccuracies of the Company’s representations, warranties and covenants in the SPA.

As part of the transaction, the Company and the buyer also entered into a customary transition services agreement and a long-term supply contract under which the Company will supply the buyer with certain of the Company’s products on commercial terms and under which the buyer has agreed to certain product minimum purchase commitments.

The Company does not believe this sale of certain net assets, reported as held for sale as of December 31, 2020, constituted a strategic shift that would have a major effect on its operations or financial results. As a result, this transaction is not classified as discontinued operations in the Company’s accompanying consolidated financial statements.

The following table summarizes the major classes of assets and liabilities sold as of January 29, 2021 (date of sale) and held for sale as of December 31, 2020:

(in thousands)	January 29, 2021	December 31, 2020
Current Assets:		
Cash and cash equivalents	$ 540	$ 941
Accounts receivable, net	1,959	2,191
Inventory	530	420
Other current assets	65	43
Total current assets	3,094	3,595
Non-Current Assets:		
Property, plant & equipment, net	780	761
Intangibles, net	96	96
Other long-term assets	774	790
Total assets held for sale	$ 4,744	$ 5,242
Current Liabilities:		
Accounts payable	$ 185	$ 224
Accrued expense and other liabilities	369	661
Total current liabilities	554	885
Non-Current Liabilities:		
Asset retirement obligations	306	302
Other long-term liabilities	588	606
Total liabilities held for sale	$ 1,448	$ 1,793

The sale resulted in a pre-tax book gain of $15.3 million, which was recorded within operating (loss) income in the consolidated statements of operations for the year ended December 31, 2021.

10. Asset Retirement Obligations

The Company considers its legal obligation to remediate its facilities upon a decommissioning of its radioactive-related operations as an asset retirement obligation. The Company has production facilities which manufacture and process radioactive materials at its North Billerica, Massachusetts and Somerset, New Jersey sites. As of December 31, 2021, the liability is measured at the present value of the obligation expected to be incurred, of approximately $26.4 million.

The Company previously operated a production facility which manufactured and processed radioactive materials at its San Juan, Puerto Rico site. As of December 31, 2020, the liability for the San Juan, Puerto Rico site was recorded in liabilities held for sale and the sale was consummated on January 29, 2021.

The following table provides a summary of the changes in the Company's asset retirement obligations:

(in thousands)	Amount
Balance, January 1, 2021	$ 14,020
Change in useful life estimate	5,259
Accretion expense	1,554
Balance, December 31, 2021	$ 20,833

In December 2021, the Company evaluated the accretion timeline of an asset group due to a revision in the planned period of use at the North Billerica site. As a result of the accelerated timeline, the Company determined the asset group's present value exceeded the current value recorded as of December 31, 2021. Accordingly, the Company recorded a non-cash adjustment of $5.3 million to anticipate a revision in the end of useful life by the end of 2022.

The Company is required to provide the Massachusetts Department of Public Health and New Jersey Department of Environmental Protection financial assurance demonstrating the Company's ability to fund the decommissioning of its North Billerica, Massachusetts and Somerset, New Jersey production facilities upon closure, although the Company has no current plans to close the facilities. The Company has provided this financial assurance in the form of a $28.2 million surety bond.

11. Intangibles, Net and Goodwill

Intangibles, net, consisted of the following:

	December 31, 2021				
(in thousands)	**Useful Lives (in years)**	**Amortization Method**	**Cost**	**Accumulated Amortization**	**Net**
Trademarks	15 - 25	Straight-Line	$ 13,540	$ (11,510)	$ 2,030
Customer relationships	15 - 25	Accelerated	96,880	(94,630)	2,250
Currently marketed product	9 - 15	Straight-Line	275,700	(23,345)	252,355
Licenses	11 - 16	Straight-Line	85,800	(11,555)	74,245
Developed technology	9	Straight-Line	2,400	(410)	1,990
IPR&D	N/A	N/A	15,640	—	15,640
Total			$ 489,960	$ (141,450)	$ 348,510

	December 31, 2020				
(in thousands)	**Useful Lives (in years)**	**Amortization Method**	**Cost**	**Accumulated Amortization**	**Net**
Trademarks	15 - 25	Straight-Line	$ 13,540	$ (10,958)	$ 2,582
Customer relationships	15 - 25	Accelerated	96,865	(93,770)	3,095
Currently marketed product	15	Straight-Line	142,900	(5,053)	137,847
Licenses	11 - 16	Straight-Line	85,800	(4,008)	81,792
Developed technology	9	Straight-Line	2,400	(144)	2,256
IPR&D	N/A	N/A	148,440	—	148,440
Total			$ 489,945	$ (113,933)	$ 376,012

The Company recorded amortization expense for its intangible assets of $27.5 million, $10.8 million and $1.8 million for the years ended December 31, 2021, 2020 and 2019, respectively.

In May 2021, PyL (18F-DCFPyL) was approved by the FDA under the name PYLARIFY. Accordingly, the Company reclassified the associated asset of $132.8 million from IPR&D to currently marketed products and commenced amortization of the asset.

The Company performed its annual impairment test of its IPR&D assets as of October 31, 2020. As a result of a timing delay in the development of an AZEDRA IPR&D asset due to the impact of COVID-19, the Company determined that the carrying value of $18.3 million exceeded the fair value of the asset. Accordingly, the Company recorded a non-cash impairment charge of $2.7 million for the year ended December 31, 2020 in research and development expenses in the consolidated statements of operations. The estimated fair value of the AZEDRA IPR&D asset was determined based on the present values of the expected cash flows. The Company used a discount rate of 23.0% and cash flows that have been probability adjusted to reflect the risks of product commercialization, which the Company believes are appropriate and representative of market participant assumptions.

The below table summarizes the estimated aggregate amortization expense expected to be recognized on the above intangible assets:

(in thousands)	Amount
2022	$ 33,229
2023	32,634
2024	32,563
2025	32,508
2026	32,497
2027 and thereafter	169,439
Total	$ 332,870

Changes in the carrying amounts of goodwill for the years ended December 31, 2021 and 2020, were as follows:

	December 31,	
(in thousands)	2021	2020
Balance, Beginning of year	$ 58,632	$ 15,714
Increase from acquisition	2,557	42,918
Balance, End of year	$ 61,189	$ 58,632

12. Accrued Expenses and Other Liabilities and Other Long-Term Liabilities

Accrued expenses and other liabilities and other long-term liabilities are comprised of the following:

	December 31,	
(in thousands)	2021	2020
Compensation and benefits	$ 22,730	$ 17,669
Freight, distribution and operations	16,157	5,653
Accrued rebates, discounts and chargebacks	10,977	9,350
Accrued professional fees	2,850	2,925
Other	5,354	6,129
Total accrued expenses and other liabilities	$ 58,068	$ 41,726
Operating lease liabilities (Note 17)	$ 16,546	$ 17,501
Long-term contingent liability (Note 4)	86,200	15,800
Other long-term liabilities	22,148	30,092
Total other long-term liabilities	$ 124,894	$ 63,393

13. Long-Term Debt, Net, and Other Borrowings

As of December 31, 2021, the Company’s maturities of principal obligations under its long-term debt and other borrowings are as follows:

(in thousands)	Amount
2022	$ 11,250
2023	15,000
2024	148,750
Total principal outstanding	175,000
Unamortized debt discount	(498)
Unamortized debt issuance costs	(430)
Finance lease liabilities	691
Total	174,763
Less: current portion	(11,642)
Total long-term debt, net, and other borrowings	$ 163,121

In June 2019, the Company refinanced its previous $275.0 million five-year term loan agreement (the "2017 Term Facility") with a new five-year $200.0 million term loan facility (the "2019 Term Facility" and the loans thereunder, the "2019 Term Loans"). In addition, the Company replaced its previous $75.0 million five-year revolving credit facility (the "2017 Revolving Facility") with a new $200.0 million five-year revolving credit facility (the "2019 Revolving Facility" and, together with the 2019 Term Facility, the "2019 Facility"). The terms of the 2019 Facility are set forth in the Credit Agreement, dated as of June 27, 2019 (as amended, the "2019 Credit Agreement"), by and among Holdings, the Company, the lenders from time to time party thereto and Wells Fargo Bank, N.A., as administrative agent and collateral agent. The Company has the right to request an increase to the 2019 Term Facility or request the establishment of one or more new incremental term loan facilities, in an aggregate principal amount of up to $100.0 million, plus additional amounts, in certain circumstances.

The net proceeds of the 2019 Term Facility, together with approximately $73.0 million of cash on hand, were used to refinance in full the aggregate remaining principal amount of the loans outstanding under the 2017 Term Facility and pay related interest, transaction fees and expenses. No amounts were outstanding under the 2017 Revolving Facility at that time. The Company accounted for the refinancing of the 2017 Term Facility as a debt extinguishment and the 2017 Revolving Facility as a debt modification by evaluating the refinancing on a creditor by creditor basis. The Company recorded a loss on extinguishment of debt of $3.2 million related to the write-off of unamortized debt issuance costs and debt discounts. In addition, the Company incurred and capitalized $2.8 million of new debt issuance costs and debt discounts related to the refinancing.

2019 Term Facility

The 2019 Term Loans under the 2019 Term Facility bear interest, with pricing based from time to time at the Company's election at (i) LIBOR plus a spread ranging from 1.25% to 2.25% as determined by the Company's total net leverage ratio (as defined in the 2019 Credit Agreement) or (ii) the Base Rate (as defined in the 2019 Credit Agreement) plus a spread ranging from 0.25% to 1.25% as determined by the Company's total net leverage ratio. The use of LIBOR, as it relates to the Company's 2019 Term Facility, is expected to be phased out by the end of June 2023. The 2019 Credit Agreement allows for a mutually agreed replacement interest rate in the event the LIBOR is phased out.

The Company is permitted to voluntarily repay the 2019 Term Loans, in whole or in part, without premium or penalty. The 2019 Term Facility requires the Company to make mandatory prepayments of the outstanding 2019 Term Loans in certain circumstances. The 2019 Term Loans mature in June 2024. At December 31, 2021, the Company's interest rate under the 2019 Term Facility was 2.1%.

2019 Revolving Facility

Under the terms of the 2019 Revolving Facility, the lenders thereunder agreed to extend credit to the Company from time to time until June 27, 2024 consisting of revolving loans (the "Revolving Loans" and, together with the 2019 Term Loans, the "Loans") in an aggregate principal amount not to exceed $200.0 million (the "Revolving Commitment") at any time outstanding. The 2019 Revolving Facility includes a $20.0 million sub-facility for the issuance of Letters of Credit. The 2019 Revolving Facility includes a $10.0 million sub-facility for Swingline Loans. The Letters of Credit, Swingline Loans and the borrowings under the 2019 Revolving Facility are expected to be used for working capital and other general corporate purposes.

The Revolving Loans under the 2019 Revolving Facility bear interest, with pricing based from time to time at the Company's election at (i) LIBOR plus a spread ranging from 1.25% to 2.25% as determined by the Company's total net leverage ratio or (ii) the Base Rate plus a spread ranging from 0.25% to 1.25% as determined by the Company's total net leverage ratio. The 2019 Revolving Facility also includes a commitment fee, which ranges from 0.15% to 0.30% as determined by the Company's total net leverage ratio.

The Company is permitted to voluntarily prepay the Revolving Loans, in whole or in part, or reduce or terminate the Revolving Commitment, in each case, without premium or penalty. On any business day on which the total amount of outstanding Revolving Loans and Letters of Credit exceeds the total Revolving Commitment, the Company must prepay the Revolving Loans in an amount equal to such excess. As of December 31, 2021, there were no outstanding borrowings under the 2019 Revolving Facility.

2019 Facility Covenants

The 2019 Facility contains a number of affirmative, negative, reporting and financial covenants, in each case subject to certain exceptions and materiality thresholds. The 2019 Facility requires the Company to be in quarterly compliance, measured on a trailing four quarter basis, with two financial covenants. The minimum interest coverage ratio, commencing with the fiscal quarter ended September 30, 2019, must be at least 3.00 to 1.00.

The Company may elect to increase the maximum total net leverage ratio by 0.50 to 1.00 (subject to a maximum of 4.25 to 1.00) up to two separate times during the term of the 2019 Facility in connection with any Material Acquisition (as defined in the Credit Agreement).

The 2019 Facility contains usual and customary restrictions on the ability of the Company and its subsidiaries to: (i) incur additional indebtedness (ii) create liens; (iii) consolidate, merge, sell or otherwise dispose of all or substantially all of its assets; (iv) sell certain assets; (v) pay dividends on, repurchase or make distributions in respect of capital stock or make other restricted payments; (vi) make certain investments; (vii) repay subordinated indebtedness prior to stated maturity; and (viii) enter into certain transactions with its affiliates.

Upon an event of default, the administrative agent under the Credit Agreement will have the right to declare the Loans and other obligations outstanding immediately due and payable and all commitments immediately terminated or reduced.

The 2019 Facility is guaranteed by Holdings, Progenics and Lantheus MI Real Estate, LLC, and obligations under the 2019 Facility are generally secured by first priority liens over substantially all of the assets of each of LMI, Holdings, Progenics and Lantheus MI Real Estate, LLC (subject to customary exclusions set forth in the transaction documents) owned as of June 27, 2019 or thereafter acquired.

2020 Amendment

On June 19, 2020, the Company amended its 2019 Credit Agreement (the “Amendment”) as a result of the impact of the COVID-19 pandemic on the business and operations of the Company and the near-term higher level of indebtedness resulting from the Company’s decision not to immediately repay the Progenics debt secured by the RELISTOR royalties following the Progenics Acquisition. The Company accounted for the Amendment as a debt modification and capitalized $1.2 million of associated costs.

The Amendment provides for, among other things, modifications to LMI’s financial maintenance covenants. The covenant related to Total Net Leverage Ratio (as defined in the Amended Credit Agreement) was waived from the date of the Amendment through December 31, 2020. The maximum total net leverage ratio and interest coverage ratio permitted by the financial covenant is displayed in the table below:

2019 Credit Agreement

Period	Total Net Leverage Ratio
Q3 2021 and thereafter	3.50 to 1.00

Period	Interest Coverage Ratio
Q2 2021 and thereafter	3.00 to 1.00

Under the 2019 Credit Agreement, loans bear interest at LIBOR plus a spread that ranges from 1.50% to 3.00% or the Base Rate plus a spread that ranges from 0.50% to 2.00%, and the commitment fee ranges from 0.15% to 0.40%, in each case based on LMI’s Total Net Leverage Ratio.

Royalty-Backed Loan

On June 19, 2020, as a result of the acquisition, the Company assumed Progenics outstanding debt as of such date in the amount of $40.2 million. Progenics, through a wholly-owned subsidiary MNTX Royalties Sub LLC (“MNTX Royalties”), entered into a $50.0 million loan agreement (the “Royalty-Backed Loan”) with a fund managed by HealthCare Royalty Partners III, L.P. (“HCRP”) on November 4, 2016. The Royalty-Backed Loan bore interest at a per annum rate of 9.5% and was scheduled to mature on June 30, 2025. On June 22, 2020, HCRP waived the automatic acceleration of the Royalty-Backed Loan that otherwise would have been

triggered by the consummation of the Progenics Acquisition and MNTX Royalties agreed not to prepay the loan until after December 31, 2020.

On March 31, 2021, the Company voluntarily repaid in full the entire outstanding principal on the Royalty-Backed Loan in the amount of $30.9 million, which included a prepayment amount of $0.5 million, and terminated the agreement governing the Royalty-Backed Loan. The Company recorded a gain on extinguishment of debt of $0.9 million related to the write-off of an unamortized debt premium offset by the prepayment amount.

14. Derivative Instruments

The Company uses interest rate swaps to reduce the variability in cash flows associated with a portion of the Company's forecasted interest payments on its variable rate debt. In March 2020, the Company entered into interest rate swap contracts to fix the LIBOR rate on a notional amount of $100.0 million through May 31, 2024. The average fixed LIBOR rate on the interest rate swaps is approximately 0.82%. This agreement involves the receipt of floating rate amounts in exchange for fixed rate interest payments over the life of the agreement without an exchange of the underlying principal amount. The interest rate swaps were designated as cash flow hedges. In accordance with hedge accounting, the interest rate swaps are recorded on the Company's consolidated balance sheets at fair value, and changes in the fair value of the swap agreements are recorded to other comprehensive loss and reclassified to interest expense in the period during which the hedged transaction affected earnings or it will become probable that the forecasted transaction would not occur. At December 31, 2021, accumulated other comprehensive loss included $0.3 million of pre-tax deferred losses that are expected to be reclassified to earnings during the next 12 months.

The following table presents the location and fair value amounts of derivative instruments reported in the consolidated balance sheet:

(in thousands)		December 31, 2021	December 31, 2020
Derivatives type	**Classification**		
Assets:			
Interest rate swap	Other long-term assets	$ 357	$ —
Liabilities:			
Interest rate swap	Accrued expenses and other liabilities	$ —	$ 1,908

15. Accumulated Other Comprehensive Loss

The components of Accumulated Other Comprehensive Loss, net of tax of $0.1 million and $0.5 million for the year ended December 31, 2021 and 2020, respectively, consisted of the following:

(in thousands)	Foreign currency translation	Unrealized loss on cash flow hedges	Accumulated other comprehensive loss
Balance at January 1, 2021	$ (630)	$ (1,418)	$ (2,048)
Other comprehensive income (loss) before reclassifications	(124)	962	838
Amounts reclassified to earnings	—	725	725
Balance at December 31, 2021	$ (754)	$ 269	$ (485)
Balance at January 1, 2020	$ (960)	$ —	$ (960)
Other comprehensive income (loss) before reclassifications	330	(1,833)	(1,503)
Amounts reclassified to earnings	—	415	415
Balance at December 31, 2020	$ (630)	$ (1,418)	$ (2,048)

16. Stock-Based Compensation

Equity Incentive Plans

As of December 31, 2021, the Company's approved equity incentive plans included the 2015 Equity Incentive Plan ("2015 Plan"), the 2013 Equity Incentive Plan ("2013 Plan"), and the 2008 Equity Incentive Plan ("2008 Plan"). These plans are administered by the Board of Directors and permit the granting of stock options, stock appreciation rights, restricted stock, restricted stock units and dividend equivalent rights to employees, officers, directors and consultants of the Company.

The Company has certain stock option and restricted stock awards outstanding under each of its equity incentive plans but, upon adoption of the 2015 Plan, no longer grants new equity awards under its 2008 and 2013 Plans. The Company adopted its 2015 Plan in June 2015 and subsequently amended the plan in April 2016, 2017, 2019 and 2021, which increased the common stock reserved for issuance under the plan to an aggregate 9,180,277 shares. The Company assumed Progenics equity plans due to the acquisition as discussed in Note 1, "Description of Business".

Stock-based compensation expense recognized in the consolidated statements of operations is summarized below:

	Year Ended December 31,		
(in thousands)	**2021**	**2020**	**2019**
Cost of goods sold	$ 2,370	$ 2,820	$ 2,091
Sales and marketing	2,472	1,821	1,953
General and administrative	9,092	7,333	6,990
Research and development	2,000	2,101	1,458
Total stock-based compensation expense	$ 15,934	$ 14,075	$ 12,492

Stock Options

Stock option awards under the 2015 Plan are granted with an exercise price equal to the fair value of the Company's common stock at the date of grant. All option awards have a ten-year contractual term.

A summary of option activity for 2021 is presented below:

	Total Stock Options	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value
Balance at January 1, 2021	1,575,219	$ 19.03		
Options granted	—	$ —		
Options exercised	(318,662)	$ 16.62		
Options cancelled and forfeited	(283,618)	$ 22.74		
Outstanding at December 31, 2021	972,939	$ 18.73	4.7	10,145,135
Exercisable at December 31, 2021	860,461	$ 19.12	4.3	8,672,206

No stock options were granted during the fiscal year ended December 31, 2021.

During the years ended December 31, 2021, 2020 and 2019, 318,662, 8,868 and 67,558 options were exercised having aggregate intrinsic values of $1.6 million, $0.1 million and $0.6 million, respectively.

As of December 31, 2021, there was $0.6 million of unrecognized compensation expense related to outstanding stock options, which is expected to be recognized over a weighted-average period of 1.6 years.

Restricted Stock

A summary of restricted stock awards and restricted stock units activity for 2021 is presented below:

	Shares	Weighted-Average Grant Date Fair Value Per Share
Nonvested balance at January 1, 2021	1,107,866	$ 16.58
Granted	1,000,259	$ 20.14
Vested	(524,117)	$ 16.72
Forfeited	(253,634)	$ 17.40
Nonvested balance at December 31, 2021	1,330,374	$ 19.04

Restricted stock generally vest over 3 years. As of December 31, 2021, there was $17.0 million of unrecognized compensation expense related to outstanding restricted stock, which is expected to be recognized over a weighted-average period of 2.0 years.

The weighted average grant-date fair value for restricted stock granted during the fiscal years ended December 31, 2021, 2020 and 2019 was $20.14, $15.00 and $23.33 per share, respectively. The total fair value of restricted stock vested in fiscal years 2021, 2020 and 2019 was $8.8 million, $7.6 million and $6.8 million, respectively.

Total Stockholder Return Restricted Stock Awards ("TSR Awards")

During the years ended December 31, 2021, 2020 and 2019, the Company granted total stockholder return ("TSR") Awards that include a three-year market condition where the performance measurement period is three years. Vesting of the TSR Awards is based on the Company's level of attainment of specified TSR targets relative to the percentage appreciation of a specified index of companies for the respective three-year period and is also subject to the continued employment of the grantees. The number of shares that are earned over the performance period ranges from 0% to 200% of the initial award. The fair value of these awards are based on a Monte Carlo simulation valuation model with the following assumptions:

	Year Ended December 31,		
	2021	2020	2019
Expected volatility	54.0 %	53.3 %	71.7 %
Risk-free interest rate	0.3 %	0.7 %	2.4 %
Expected life (in years)	2.8	2.8	2.9
Expected dividend yield	—	—	—

A summary of TSR Award activity for 2021 is presented below:

	Shares	Weighted-Average Grant Date Fair Value Per Share
Nonvested balance at January 1, 2021	491,771	$ 27.58
Granted	260,748	$ 31.25
Vested	(86,513)	$ 22.76
Forfeited	(75,933)	$ 30.02
Nonvested balance at December 31, 2021	590,073	$ 30.49

As of December 31, 2021, there was $9.3 million of unrecognized compensation expense related to outstanding performance restricted stock which is expected to be recognized over a weighted-average period of 1.7 years.

The weighted average grant-date fair value for TSR Awards granted during the fiscal years ended December 31, 2021, 2020 and 2019 was $31.25, $23.43 and $39.92 per share, respectively.

17. Leases

The Company determines if an arrangement is a lease at inception. The Company has operating and finance leases for vehicles, corporate offices and certain equipment.

Operating lease right-of-use ("ROU") assets and operating lease liabilities are recognized based on the present value of the future minimum lease payments over the lease term at commencement date. Lease agreements with lease and non-lease components are accounted for separately. As the Company's leases do not provide an implicit rate, the Company used the incremental borrowing rate based on the information available at commencement date in determining the present value of future payments. The operating lease ROU asset also includes any lease payments made and excludes lease incentives and initial direct costs incurred. The lease terms may include options to extend or terminate the lease when it is reasonably certain that the Company will exercise that option. Lease expense for minimum lease payments is recognized on a straight-line basis over the lease term. The Company assumed two operating leases as a result of the Progenics acquisition related to office space at the World Trade Center in New York City, pursuant to a lease agreement expiring in September 2030 (the "WTC Lease"), and a radiopharmaceutical manufacturing facility in Somerset, New Jersey, under a sublease agreement expiring in November 2028, which were recorded as of June 19, 2020, for $18.6 million and $0.6 million, respectively. The Company entered into an operating lease related to office space in Somerset, New Jersey, under a lease agreement expiring in August 2026, which was recorded in October 2021 for $0.7 million. The Company excluded the Puerto Rico operating lease amounts classified as held for sale as of December 31, 2020.

Leases with an initial term of 12 months or less are not recorded on the balance sheet as the Company has elected to apply the short-term lease exemption. The Company recognizes lease expense for these leases on a straight-line basis over the lease term.

Operating and finance lease assets and liabilities are as follows:

(in thousands)	Classification	December 31, 2021	December 31, 2020
Assets			
Operating	Other long-term assets	$ 8,788	$ 18,441
Finance	Property, plant and equipment, net	556	525
Total leased assets		$ 9,344	$ 18,966
Liabilities			
Current			
Operating	Accrued expenses and other liabilities	$ 1,599	$ 1,164
Finance	Current portion of long-term debt and other borrowings	392	249
Noncurrent			
Operating	Other long-term liabilities	16,546	17,501
Finance	Long-term debt, net and other borrowings	299	246
Total leased liabilities		$ 18,836	$ 19,160

In the third quarter of 2021, with respect to the office space in the World Trade Center, the Company negotiated a sublease agreement with an unrelated third party that was signed on October 11, 2021 (the "Sublease") and has a term of nine years, which represents the remaining term of the WTC Lease. Both the WTC Lease and the Sublease are classified by the Company as operating leases. As a result of the negotiations of the Sublease, the Company determined that an impairment triggering event had occurred. Accordingly, the Company performed an undiscounted cash flow analysis related to the asset group as of September 30, 2021. Based on the undiscounted cash flow analysis, the Company determined that the asset group, including the ROU asset, had net carrying values that exceeded their estimated undiscounted future cash flows. The Company then estimated the fair value of the asset group based on its discounted cash flows. The carrying value exceeded the fair value and, as a result, the Company recorded a non-cash impairment of $9.5 million for the year ended December 31, 2021 in general and administrative expenses in the consolidated statements of operations.

The components of lease expense were as follows:

(in thousands)	Year Ended December 31, 2021	Year Ended December 31, 2020
Operating lease expense	$ 2,312	$ 1,471
Finance lease expense		
Amortization of ROU assets	330	196
Interest on lease liabilities	28	21
Short-term lease expense	8	70
Total lease expense	$ 2,678	$ 1,758

Other information related to leases were as follows:

	December 31, 2021	December 31, 2020
Weighted-average remaining lease term (Years):		
Operating leases	8.6	9.7
Finance leases	2.2	2.4
Weighted-average discount rate:		
Operating leases	4.4%	4.4%
Finance leases	4.6%	5.3%

(in thousands)	Year Ended December 31, 2021	Year Ended December 31, 2020
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows from operating leases	$ 2,071	$ 1,202
Operating cash flows from finance leases	28	21
Financing cash flows from finance leases	339	207
ROU assets obtained in exchange for lease obligations:		
Operating leases	683	19,210
Finance leases	556	373

Future minimum lease payments under non-cancellable leases as of December 31, 2021 were as follows:

(in thousands)	Operating Leases	Finance Leases
2022	$ 2,359	$ 406
2023	2,404	268
2024	2,450	105
2025	2,497	—
2026	2,491	—
Thereafter	9,786	—
Total future minimum lease payments	21,987	779
Less: interest	3,842	88
Total	$ 18,145	$ 691

18. Other Assets

Other assets are comprised of the following:

	December 31,	
(in thousands)	2021	2020
Prepaid Expenses	$ 10,113	$ 9,175
Current Contingent Asset (Note 4)	2,500	—
Other Current Assets	205	450
Total other current assets	$ 12,818	$ 9,625
ROU Asset (Note 17)	$ 8,788	$ 18,441
Long-term Contingent Asset (Note 4)	6,800	11,300
Other Long-Term Assets	23,170	30,893
Total other long-term assets	$ 38,758	$ 60,634

19. Net (Loss) Income Per Common Share

A summary of net (loss) income per common share is presented below:

(in thousands, except per share amounts)	Year Ended December 31, 2021	2020	2019
Net (loss) income	$ (71,279)	$ (13,473)	$ 31,667
Basic weighted-average common shares outstanding	67,486	54,134	38,988
Effect of dilutive stock options	—	—	75
Effect of dilutive restricted stock	—	—	1,050
Diluted weighted-average common shares outstanding	67,486	54,134	40,113
Basic (loss) income per common share	$ (1.06)	$ (0.25)	$ 0.81
Diluted (loss) income per common share	$ (1.06)	$ (0.25)	$ 0.79
Antidilutive securities excluded from diluted net (loss) income per common share	2,893	3,175	50

20. Commitments and Contingencies

Purchase Commitments

The Company has entered into purchasing arrangements in which minimum quantities of goods or services have been committed to be purchased on an annual basis.

As of December 31, 2021, future payments required under purchase commitments are as follows:

(in thousands)	Amount
2022	$ 3,483
2023	3,000
Total	$ 6,483

The Company has entered into agreements which contain certain percentage volume purchase requirements. The Company has excluded these future purchase commitments from the table above since there are no minimum purchase commitments or payments under these agreements.

License Agreements

The Company has entered into license agreements in which fixed payments have been committed to be paid on an annual basis.

As of December 31, 2021, future fixed payments required under license agreements are $0.3 million. The Company may be required to pay additional amounts up to approximately $170.5 million in contingent payments under the Company's license agreements. These contingent payments include potential milestone or contractual payment obligations contingent upon the achievement or occurrence of future milestones or events and the amounts and timing of such potential obligations are unknown or uncertain.

Legal Proceedings

From time to time, the Company is a party to various legal proceedings arising in the ordinary course of business. In addition, the Company has in the past been, and may in the future be, subject to investigations by governmental and regulatory authorities, which expose it to greater risks associated with litigation, regulatory or other proceedings, as a result of which the Company could be required to pay significant fines or penalties. The costs and outcome of litigation, regulatory or other proceedings cannot be predicted with certainty, and some lawsuits, claims, actions or proceedings may be disposed of unfavorably to the Company and could have a material adverse effect on the Company's results of operations or financial condition. In addition, intellectual property disputes often have a risk of injunctive relief which, if imposed against the Company, could materially and adversely affect its financial condition or results of operations. If a matter is both probable to result in material liability and the amount of loss can be reasonably estimated, the Company estimates and discloses the possible material loss or range of loss. If such loss is not probable or cannot be reasonably estimated, a liability is not recorded in its consolidated financial statements.

As of December 31, 2021, the Company had the following material ongoing litigation in which the Company was a party:

On January 31, 2022, the Company entered into a global settlement agreement with Pharma AG ("Novartis"), Advanced Accelerator Applications USA, Inc. ("AAA"), Endocyte, Inc. ("Endocyte") and certain of their affiliates (the "Novartis Agreement") to settle certain disputes between the parties, as further described below:

German PSMA-617 Litigation

On November 8, 2018, Molecular Insight Pharmaceuticals, Inc., a subsidiary of Progenics ("MIP"), filed a complaint against the University of Heidelberg (the "University") in the District Court in Mannheim, Germany (the "German District Court" and, such litigation, the "German Litigation"). In this Complaint, MIP claimed that the discovery and development of PSMA-617 was related to work performed under a research collaboration sponsored by MIP. MIP alleged that the University breached certain contracts with MIP and that MIP is the co-owner of inventions embodied in certain worldwide patent filings related to PSMA-617 that were filed by the University. On February 27, 2019, Endocyte, a wholly owned subsidiary of Novartis, filed a motion to intervene in the German Litigation. Endocyte is the exclusive licensee of the patent rights that are the subject of the German proceedings.

In connection with this dispute, MIP filed a Confirmation of Ownership with the United States Patent and Trademark Office ("USPTO") for certain U.S. patent applications filed by the University to support MIPs claim that it is the co-owner of these pending U.S. patent applications (the "Ownership Claim").

On February 27, 2019, the German District Court set €0.4 million as the amount MIP must deposit with the German District Court as security in the event of an unfavorable final decision on the merits of the dispute. On August 24, 2020, the German District Court issued its decision dismissing MIP's claims, stating that MIP failed to discharge its burden of proof in the matter.

MIP filed a Notice of Appeal of the German District Court's decision on September 24, 2020 and filed its appeal brief on November 26, 2020. The University and Endocyte each filed oppositions to MIP's Notice of Appeal on March 12, 2021 and an oral hearing for the appeal was scheduled for September 28, 2022, at the Higher Regional Court Karlsruhe.

Pursuant to the terms of the Novartis Agreement, the German Litigation was dismissed and the Ownership Claim withdrawn.

Post-Grant Review Proceeding

On February 4, 2021, AAA, a wholly-owned subsidiary of Novartis and parent of Endocyte, filed a petition for post-grant review of U.S. Patent No. 10,640,461 (the "'461 patent") with the Patent Trial and Appeal Board ("PTAB") of the USPTO. The '461 patent is owned by MIP. In the petition, AAA challenged the patentability of certain claims of the '461 patent. The PTAB instituted Post-Grant Review proceedings (the "PGR Proceeding") on July 29, 2021. Pursuant to the terms of the Novartis Agreement, the PGR Proceeding will be terminated.

Global Settlement Agreement

In addition to the dismissal of the German Litigation, the withdrawal of the Ownership Claim and the termination of the PGR Proceeding, under the Novartis Agreement, the parties will, among other things, cross-license certain patent rights to one another, and Novartis will make a $24.0 million lump sum payment to the Company and also reimburse the Company for certain fees and expenses the Company is required to pay to the University in connection with the German Litigation.

RELISTOR European Opposition Proceedings

In October 2015, Progenics received notices of opposition to three European patents relating to methylnaltrexone: EP1615646, EP2368553 and EP2368554. Notices of opposition were filed separately at the European Patent Office (the "EPO") by each of Actavis Group PTC ehf and Fresenius Kabi Deutschland GmbH. Between May 11, 2017 and July 4, 2017, the Opposition Division of the EPO (the "Opposition Division") provided notice that the three European patents would be revoked. Each of these matters was appealed to the Appeal Board of the EPO. On November 13, 2020, Progenics withdrew the appeal for EP2368553 and EP2368554. Notices of termination of the proceedings with revocation of the patent were issued on November 23, 2020 for both patents.

Progenics continued its appeal on the revocation of the third patent, EP1615646. Oral proceedings for EP1615646 were held at the Appeal Board of the EPO on September 22, 2020. The revocation decision under appeal was set aside and the case was remitted to the Opposition Division for further prosecution. An oral hearing was held before the Opposition Division on September 27, 2021. The Opposition Division issued its final written opinion on November 11, 2021, indicating that the patent will be maintained in amended form. The final written decision of the Opposition Division was appealable to the Appeal Board of the EPO by either party. Progenics appealed this decision on January 20, 2022 to hold open its option to file Grounds for Appeal. Given that neither opponent filed an Notice of Appeal, Progenics intends to withdraw its notice to allow the patent to issue in amended form.

21. 401(k) Plan

The Company maintains a qualified 401(k) plan (the "401(k) Plan") for its U.S. employees. The 401(k) Plan covers U.S. employees who meet certain eligibility requirements. Under the terms of the 401(k) Plan, the employees may elect to make tax-deferred contributions through payroll deductions within statutory and plan limits, and the Company may elect to make non-elective discretionary contributions. The Company may also make optional contributions to the 401(k) Plan for any plan year at its discretion.

Expense recognized by the Company for matching contributions made to the 401(k) Plan was $2.6 million, $0.8 million and $2.1 million for the years ended December 31, 2021, 2020 and 2019, respectively.

22. Segment Information

In the first quarter of 2021, the Company completed the evaluation of its operating and reporting structure, including the impact on the Company's business of the acquisition of Progenics described in Notes 1 and 8, and the sale of the Puerto Rico subsidiary in the first quarter, which resulted in a change in operating and reportable segments. The Company now operates as one business segment: the development, manufacture and sale of innovative diagnostic and therapeutic products that assist clinicians in the diagnosis and treatment of heart disease, cancer and other diseases. This conclusion reflects the Company's focus on the performance of the business on a consolidated worldwide basis. The results of this operating segment are regularly reviewed by the Company's chief operating decision maker, the President and Chief Executive Officer. The Company's chief operating decision maker does not manage any part of the Company separately, and the allocation of resources and assessment of performance are based on the Company's consolidated operating results.

23. Subsequent Events

On January 31, 2022, the Company entered into a global settlement agreement with Novartis, AAA, Endocyte and their affiliates to settle certain disputes between the parties. Under the Novartis Agreement, Novartis will make a lump sum payment and reimburse the Company for certain fees and expenses in connection with the German Litigation. See Note 20, "Commitments and Contingencies", for further details.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

Not applicable.

Item 9A. Controls and Procedures

Disclosure Controls and Procedures

The Company's management, with the participation of the Company's Chief Executive Officer ("CEO") and Chief Financial Officer ("CFO"), its principal executive officer and principal financial officer, respectively, has evaluated the effectiveness of the Company's disclosure controls and procedures as defined in Rule 13a-15(e) and 15d-15(e) of the Exchange Act. Based on that evaluation, the Company's CEO and CFO concluded that the Company's disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) were effective as of the period covered by this report.

Management's Annual Report on Internal Control Over Financial Reporting

Our management, with the participation of our CEO and CFO, is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. Our internal control system is designed to provide reasonable assurance to our management and Board of Directors regarding the preparation and fair presentation of published financial statements.

Our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2021. In making its assessment of internal control over financial reporting, our management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in Internal Control—Integrated Framework (2013). Based on this assessment, management concluded that, as of December 31, 2021, our internal control over financial reporting was effective.

Deloitte & Touche LLP, an independent registered public accounting firm that audited our financial statements for the fiscal year ended December 31, 2021, included in this report, has issued an attestation report on the effectiveness of our internal control over financial reporting. This report is set forth below:

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of Lantheus Holdings, Inc.

Opinion on Internal Control over Financial Reporting

We have audited the internal control over financial reporting of Lantheus Holdings, Inc. and subsidiaries (the "Company") as of December 31, 2021, 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, 2021, 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 financial statements as of and for the year ended December 31, 2021, of the Company and our report dated February 24, 2022, 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's Annual 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

Boston, Massachusetts
February 24, 2022

Changes in Internal Controls Over Financial Reporting

There were no changes in our internal control over financial reporting for the quarter ended December 31, 2021 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

We are continually monitoring and assessing the status of the COVID-19 pandemic to determine any potential impact on the design and operating effectiveness of our internal controls over financial reporting.

Item 9B. Other Information

JHS Manufacturing and Supply Agreement

On February 23, 2022, our wholly-owned subsidiary, LMI, entered into a Manufacturing and Supply Agreement (the "MSA") with JHS, effective as of February 23, 2022, pursuant to which JHS will manufacture, and LMI will purchase, our DEFINITY, NEUROLITE, Cardiolite and evacuation vial products. The new MSA supersedes all of the prior agreements of the parties. The initial term of the MSA runs through December 31, 2027 and can be further extended by mutual agreement of the parties. The MSA requires LMI to purchase from JHS specified percentages of its total requirements for DEFINITY, as well as specified quantities of NEUROLITE, Cardiolite and evacuation vial products, each year during the contract term. Either party can terminate the MSA upon the occurrence of certain events, including, but not limited to, the material breach or bankruptcy of the other party.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections

Not Applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

Pursuant to Section 406 of the Sarbanes-Oxley Act of 2002, we have adopted a code of conduct and ethics (our "Code of Conduct") for all of our employees, including our CEO, CFO and other senior financial officers, or persons performing similar functions, and each of the non-employee directors on our Board of Directors. Our Code of Conduct is currently available on our website, www.lantheus.com. The information on our web site is not part of, and is not incorporated into, this Annual Report on Form 10-K. We intend to provide any required disclosure of any amendment to or waiver from such code that applies to our CEO, CFO and other senior financial officers, or persons performing similar functions, in a Current Report on Form 8-K filed with the SEC.

The additional information required with respect to this item will be incorporated herein by reference to our Definitive Proxy Statement for our 2022 Annual Meeting of Stockholders or an amendment of this report to be filed with the SEC no later than 120 days after the close of our year ended December 31, 2021.

Item 11. Executive Compensation

The information required with respect to this item will be incorporated herein by reference to our Definitive Proxy Statement for our 2022 Annual Meeting of Stockholders or an amendment of this report to be filed with the SEC no later than 120 days after the close of our year ended December 31, 2021.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information required with respect to this item will be incorporated herein by reference to our Definitive Proxy Statement for our 2022 Annual Meeting of Stockholders or an amendment of this report to be filed with the SEC no later than 120 days after the close of our year ended December 31, 2021.

Item 13. Certain Relationships and Related Transactions, and Director Independence

The information required with respect to this item will be incorporated herein by reference to our Definitive Proxy Statement for our 2022 Annual Meeting of Stockholders or an amendment of this report to be filed with the SEC no later than 120 days after the close of our year ended December 31, 2021.

Item 14. Principal Accountant Fees and Services

The information required with respect to this item will be incorporated herein by reference to our Definitive Proxy Statement for our 2022 Annual Meeting of Stockholders or an amendment of this report to be filed with the SEC no later than 120 days after the close of our year ended December 31, 2021.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a)(1) Financial Statements

The following consolidated financial statements of Lantheus Holdings, Inc. are filed as part of this Annual Report on Form 10-K under Part II, Item 8. Financial Statements and Supplementary Data:

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Report of Independent Registered Public Accounting Firm (PCAOB ID No. 34)	77
Consolidated Balance Sheets	79
Consolidated Statements of Operations	80
Consolidated Statements of Comprehensive Income	81
Consolidated Statements of Changes in Stockholders' Equity (Deficit)	82
Consolidated Statements of Cash Flows	83
Notes to Consolidated Financial Statements	85

(a)(2) Schedules

All schedules are omitted because they are not applicable, not required, or because the required information is included in the consolidated financial statements or notes thereto.

(a)(3) Exhibits

EXHIBIT INDEX

Exhibit Number	Description of Exhibits	Incorporated by Reference			
		Form	File Number	Exhibit	Filing Date
2.1	Agreement and Plan of Merger, dated as of October 1, 2019, among Lantheus Holdings, Inc., Plato Merger Sub, Inc. and Progenics Pharmaceuticals, Inc.	8-K	001-36569	10.1	October 2, 2019
3.1	Amended and Restated Certificate of Incorporation of Lantheus Holdings, Inc.	8-K	001-36569	3.1	April 27, 2018
3.2	Amended and Restated Bylaws of Lantheus Holdings, Inc.	8-K	001-36569	3.2	December 27, 2021
4.1	Common Stock Certificate.	8-K	001-36569	4.1	June 30, 2015
4.2*	Description of Registrant's Securities				
10.4+	Lantheus Holdings, Inc. 2008 Equity Incentive Plan.	S-4	333-169785	10.18	October 6, 2010
10.5+	Amendment No. 1 to Lantheus Holdings, Inc. 2008 Equity Incentive Plan.	S-4	333-169785	10.19	October 6, 2010
10.6+	Amendment No. 2 to Lantheus Holdings, Inc. 2008 Equity Incentive Plan.	S-4	333-169785	10.20	October 6, 2010
10.7+	Form of Option Grant Award Agreement.	S-4	333-169785	10.21	October 6, 2010
10.9†	Manufacturing and Supply Agreement, dated as of February 1, 2012, for the manufacture of DEFINITY® by and between Lantheus Medical Imaging, Inc. and Jubilant HollisterStier LLC.	10-Q	333-169785	10.2	May 15, 2012
10.10†	First Amendment to Manufacturing and Supply Agreement, dated as of May 3, 2012, for the manufacture of DEFINITY® by and between Lantheus Medical Imaging, Inc. and Jubilant HollisterStier LLC.	10-Q	333-169785	10.1	August 14, 2012
10.12+	Lantheus Holdings, Inc. 2013 Equity Incentive Plan.	8-K	333-169785	10.1	May 6, 2013
10.13+	Form of Employee Option Grant Award Agreement.	8-K	333-169785	10.2	May 6, 2013
10.14+	Form of Non-Employee Director Option Grant Award Agreement.	8-K	333-169785	10.3	May 6, 2013
10.15+	2015 Equity Incentive Plan of Lantheus Holdings, Inc.	S-1	333-196998	10.37	June 24, 2015
10.16+	Form of 2015 Restricted Stock Agreement of Lantheus Holdings, Inc.	S-1	333-196998	10.38	June 24, 2015
10.17+	Form of 2015 Option Award Agreement of Lantheus Holdings, Inc.	S-1	333-196998	10.39	June 24, 2015
10.18+	Form of Amendment to the Lantheus Holdings, Inc. 2013 Equity Incentive Plan.	S-1	333-196998	10.40	June 24, 2015
10.19+	Form of Amendment to the Lantheus Holdings, Inc. 2008 Equity Incentive Plan.	S-1	333-196998	10.41	June 24, 2015
10.20+	Amendment to Lantheus Holdings, Inc. 2015 Equity Incentive Plan.	8-K	001-36569	10.1	April 28, 2016
10.21†	Second Amendment, effective September 2, 2016, to the Manufacturing and Supply Agreement, dated as of February 1, 2012 and amended on May 3, 2012, by and between Lantheus Medical Imaging, Inc. and Jubilant HollisterStier LLC.	10-Q	001-36569	10.2	November 1, 2016

Exhibit Number	Description of Exhibits	Incorporated by Reference			
		Form	File Number	Exhibit	Filing Date
10.22+	Second Amendment to Lantheus Holdings, Inc. 2015 Equity Incentive Plan	8-K	001-36569	10.1	April 28, 2017
10.23+	Lantheus Holdings, Inc. 2017 Employee Stock Purchase Plan	8-K	001-36569	10.2	April 28, 2017
10.24†	Collaboration and License Agreement by and between Lantheus Medical Imaging, Inc. and GE Healthcare Limited dated April 25, 2017.	10-Q	001-36569	10.1	August 1, 2017
10.25+	Second Amended and Restated Employment Agreement, effective January 25, 2019, by and between Lantheus Medical Imaging, Inc. and Mary Anne Heino.	10-K	001-36569	10.68	February 20, 2019
10.26+	Employment Agreement dated as of November 22, 2013, by and between Lantheus Medical Imaging, Inc. and Michael Duffy.	10-K	001-36569	10.69	February 20, 2019
10.27+	Form of Severance Agreement (executives with existing employment agreements).	10-K	001-36569	10.70	February 20, 2019
10.28+	Form of Severance Agreement (executives without existing employment agreements).	10-K	001-36569	10.71	February 20, 2019
10.29+	Third Amendment to Lantheus Holdings, Inc. 2015 Equity Incentive Plan	10-Q	001-36569	10.1	April 30, 2019
10.30+	Fourth Amendment to Lantheus Holdings, Inc. 2015 Equity Incentive Plan	10-Q	001-36569	10.2	July 25, 2019
10.31	Credit Agreement dated as of June 27, 2019 by and among Wells Fargo Bank, N.A., as administrative agent and collateral agent, each of the lenders from time to time party thereto, Lantheus Medical Imaging, Inc., as borrower, and Lantheus Holdings, Inc.	10-Q	001-36569	10.3	July 25, 2019
10.32	Amendment No. 1 to Credit Agreement, dated as of June 19, 2020, among Lantheus Medical Imaging, Inc., as borrower, Lantheus Holdings, Inc. and Wells Fargo Bank, N.A., as administrative agent and collateral agent*	10-Q	001-36539	10.2	July 31, 2020
10.33	Contingent Value Rights Agreement dated as of June 19, 2020, by and between Lantheus Holdings, Inc. and Computershare Trust Company, N.A., as rights agent.	8-K	001-36569	10.1	June 22, 2020
10.34+	Lantheus Holdings, Inc. 2005 Stock Incentive Plan (f/k/a Progenics Pharmaceuticals, Inc. 2005 Stock Incentive Plan).	S-8	333-239491	4.4	June 26, 2020
10.35+	Lantheus Holdings, Inc. 2018 Performance Incentive Plan (f/k/a Progenics Pharmaceuticals, Inc. 2018 Performance Incentive Plan).	S-8	333-239491	4.5	June 26, 2020
10.36	License Agreement, dated February 3, 2011, by and between Salix Pharmaceuticals, Inc., the Registrant, Progenics Pharmaceuticals Nevada, Inc. and Excelsior Life Sciences Ireland Limited.	10-Q	000-23143	10.37(16)	May 10, 2011
10.37	Lease, dated December 31, 2015, between the Registrant and WTC TOWER 1 LLC.	8-K	000-23143	10.46 (21)	January 5, 2016
10.38+	Consulting Agreement by and between Lantheus Medical Imaging, Inc. and Michael P. Duffy, dated as of March 31, 2021	8-K	001-36569	10.1	April 1, 2021
10.39+	Fifth Amendment to Lantheus Holdings, Inc. 2015 Equity Incentive Plan	8-K	001-36569	10	April 29, 2021
21.1*	Subsidiaries of Lantheus Holdings, Inc.				
23.1*	Consent of Independent Registered Public Accounting Firm.				
24.1*	Power of Attorney (included as part of the signature page hereto).				
31.1*	Certification of Chief Executive Officer pursuant to Exchange Act Rule 13a-14(a).				
31.2*	Certification of Chief Financial Officer pursuant to Exchange Act Rule 13a-14(a).				
32.1**	Certification pursuant to 18 U.S.C. Section 1350.				
101.INS*	Inline XBRL Instance Document				
101.SCH*	Inline XBRL Taxonomy Extension Schema Document				
101.CAL*	Inline XBRL Taxonomy Extension Calculation Linkbase Document				
101.DEF*	Inline XBRL Taxonomy Extension Definition Linkbase Document				
101.LAB*	Inline XBRL Taxonomy Extension Labels Linkbase Document				
101.PRE*	Inline XBRL Taxonomy Extension Presentation Linkbase Document				
104*	Cover Page Interactive Data File (embedded within the Inline XBRL document)				

* Filed herewith.

** Furnished herewith.

†† Portions of this exhibit have been omitted for confidential treatment pursuant to Item 601(b)(10)(iv) of Regulation S-K.

\+ Indicates management contract or compensatory plan or arrangement.

† Confidential treatment requested as to certain portions, which portions have been filed separately with the Securities and Exchange Commission

Item 16. Form 10-K Summary

None.

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.

LANTHEUS HOLDINGS, INC.

By:	/S/ MARY ANNE HEINO
Name:	Mary Anne Heino
Title:	President and Chief Executive Officer
Date:	February 24, 2022

We, the undersigned directors and officers of Lantheus Holdings, Inc., hereby severally constitute and appoint Mary Anne Heino, Robert J. Marshall, Jr. and Daniel Niedzwiecki, and each of them individually, with full powers of substitution and resubstitution, our true and lawful attorneys, with full powers to them and each of them to sign for us, in our names and in the capacities indicated below, any and all amendments to this Annual Report on Form 10-K filed with the SEC, granting unto said attorneys-in-fact and agents, each acting alone, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming that any such attorney-in-fact and agent, or his substitute or substitutes, may lawfully do or cause to be done by virtue 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/ MARY ANNE HEINO Mary Anne Heino	Chief Executive Officer, President and Director (Principal Executive Officer)	February 24, 2022
/S/ ROBERT J. MARSHALL, JR. Robert J. Marshall, Jr.	Chief Financial Officer and Treasurer (Principal Financial Officer)	February 24, 2022
/S/ ANDREA SABENS Andrea Sabens	Chief Accounting Officer (Principal Accounting Officer)	February 24, 2022
/S/ BRIAN MARKISON Brian Markison	Chairman of the Board of Directors	February 24, 2022
/S/ GÉRARD BER Gérard Ber	Director	February 24, 2022
/S/ SAMUEL R. LENO Samuel R. Leno	Director	February 24, 2022
/S/ HEINZ MÄUSLI Heinz Mäusli	Director	February 24, 2022
/S/ JULIE H. MCHUGH Julie H. McHugh	Director	February 24, 2022
/S/ GARY J. PRUDEN Gary J. Pruden	Director	February 24, 2022
/S/ DR. JAMES H. THRALL Dr. James H. Thrall	Director	February 24, 2022

Exhibit 4.2

DESCRIPTION OF THE REGISTRANT'S SECURITIES
REGISTERED PURSUANT TO SECTION 12 OF THE
SECURITIES EXCHANGE ACT OF 1934

The following description sets forth certain material terms and provisions of Lantheus Holdings, Inc.'s (the "Company", "us", "we", or "our") securities that are registered under Section 12 of the Securities Exchange Act of 1934, as amended.

DESCRIPTION OF CAPITAL STOCK

The following summary description sets forth some of the general terms and provisions of the capital stock. Because this is a summary description, it does not contain all of the information that may be important to you. For a more detailed description of the preferred and common stock, you should refer to the provisions of our amended and restated certificate of incorporation and our bylaws, as amended and restated, each of which is an exhibit to the Annual Report on Form 10-K to which this description is an exhibit.

General

Our authorized capital stock consists of 250,000,000 shares of common stock, par value $0.01 per share, and 25,000,000 shares of preferred stock, par value $0.01 per share. The shares of common stock currently outstanding are fully paid and nonassessable. No shares of preferred stock are currently outstanding.

Common Stock

Holders of our common stock are entitled to the following rights:

Voting Rights

Each share of common stock entitles the holder to one vote with respect to each matter presented to our stockholders on which the holders of common stock are entitled to vote; provided, however, that the Board of Directors may issue or grant shares of common stock that are subject to vesting or forfeiture and that restrict or eliminate voting rights with respect to such shares until any such vesting criteria is satisfied or such forfeiture provisions lapse. Our common stock votes as a single class on all matters relating to the election and removal of directors on our Board of Directors and as provided by law. Holders of our common stock do not have cumulative voting rights. Except as otherwise provided in our amended and restated certificate of incorporation or our bylaws or required by law, all matters to be voted on by our stockholders must be approved by a majority of the shares present in person or by proxy at the meeting and entitled to vote on the subject matter.

Dividend Rights

Holders of common stock share equally on a per share basis in any dividend declared by our Board of Directors, subject to any preferential rights of the holders of any outstanding preferred stock.

Liquidation Rights

In the event of any voluntary or involuntary liquidation, dissolution or winding up of our affairs, holders of our common stock would be entitled to share ratably in our assets that are legally available for distribution to stockholders after payment of liabilities. If we have any preferred stock outstanding at that time, holders of the preferred stock may be entitled to distribution and/or liquidation preferences. In either case, we must pay the applicable distribution to the holders of our preferred stock before we may pay distributions to the holders of our common stock.

Other Rights

Our stockholders have no subscription privileges. Our common stock does not entitle its holders to preemptive rights for additional shares. All of the outstanding shares of our common stock are fully paid and nonassessable. The rights, preferences and privileges of the holders of our common stock are subject to the rights of the holders of shares of any series of preferred stock which we may issue.

Preferred Stock

Our Board of Directors is authorized to provide for the issuance of preferred stock in one or more series and to fix the preferences, powers and relative, participating, optional or other special rights, and qualifications, limitations or restrictions thereof, including the dividend rate, conversion rights, voting rights, redemption rights and liquidation preference and to fix the number of shares to be included in any such series without any further vote or action by our stockholders. Any preferred stock so issued may rank senior to our common stock with respect to the payment of dividends or amounts upon liquidation, dissolution or winding up, or both. In addition, any such shares of preferred stock may have class or series voting rights. The issuance of preferred stock may have the effect of delaying, deferring or preventing a change in control of our Company without further action by the stockholders and may adversely affect the voting and other rights of the holders of our common stock.

Anti-takeover Provisions

Our amended and restated certificate of incorporation and bylaws contain provisions that delay, defer or discourage transactions involving an actual or potential change in control of us or change in our management. We expect that these provisions, which are summarized below, will discourage coercive takeover practices or inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of us to first negotiate with our Board of Directors, which we believe may result in an improvement of the terms of any such acquisition in favor of our stockholders. However, they also give our board the power to discourage transactions that some stockholders may favor, including transactions in which stockholders might otherwise receive a premium for their shares or transactions that our stockholders might otherwise deem to be in their best interests. Accordingly, these provisions could adversely affect the price of our common stock.

Classified Board

Our amended and restated certificate of incorporation provides that our board is comprised of such number of directors as may be fixed from time to time by resolution of at least a majority of our Board of Directors then in office and that our board is divided into three classes, with one class being elected at each annual meeting of stockholders. Each director serves a three-year term, with expiration staggered according to class.

The classification of our board could make it more difficult for a third-party to acquire, or discourage a third party from seeking to acquire, control of our Company.

Requirements for Advance Notification of Stockholder Meetings, Nominations and Proposals

Our bylaws provide that special meetings of the stockholders may be called only upon the request of a majority of our board or upon the request of the chairman of our Board of Directors or our Chief Executive Officer.

Our bylaws establish advance notice procedures with respect to stockholder proposals and the nomination of candidates for election as directors, other than nominations made by or at the direction of our board or a committee of our board. In order for any matter to be “properly brought” before a meeting, a stockholder will have to comply with the advance notice requirements of directors. Our bylaws allow our Board of Directors to adopt such rules and regulations for the conduct of the meetings as they may deem proper, which may be delegated to a chairperson of the meeting and which may have the effect of precluding the conduct of certain business at a meeting if the rules and regulations are not followed. These provisions may also defer, delay or discourage a potential acquirer from conducting a solicitation of proxies to elect the acquirer’s own slate of directors or otherwise attempting to obtain control of our Company.

No Stockholder Action by Written Consent

Our amended and restated certificate of incorporation provides that, subject to the rights of any holders of preferred stock to act by written consent instead of a meeting, stockholder action may be taken only at an annual meeting or special meeting of stockholders and may not be taken by written consent instead of a meeting, unless the action to be taken by written consent of stockholders and the taking of this action by written consent has been unanimously approved in advance by our board. Failure to satisfy any of the requirements for a stockholder meeting could delay, prevent or invalidate stockholder action.

Section 203 of the Delaware General Corporation Law, as amended (“DGCL”)

Our amended and restated certificate of incorporation provides that the provisions of Section 203 of the DGCL, which relate to business combinations with interested stockholders, do not apply to us. Section 203 of the DGCL prohibits a publicly held

Delaware corporation from engaging in a business combination transaction with an interested stockholder (a stockholder who owns more than 15% of our common stock) for a period of three years after the interested stockholder became such unless the transaction fits within an applicable exemption, such as board approval of the business combination or the transaction that resulted in such stockholder becoming an interested stockholder. These provisions would apply even if the business combination could be considered beneficial by some stockholders. Although we have elected to opt out of the statute's provisions, we could elect to be subject to Section 203 in the future.

Exclusive Forum

Our amended and restated certificate of incorporation provides that, unless we consent in writing in advance to the selection of an alternative forum, the Delaware Court of Chancery shall, to the fullest extent permitted by law, be the sole and exclusive forum for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim of breach of a fiduciary duty owed by, or any wrongdoing by, any of our directors, officers or employees to our stockholders, (iii) any action asserting a claim arising pursuant to any provision of the DGCL, our amended and restated certificate of incorporation (including as it may be amended from time to time) or our bylaws, (iv) any action to interpret, apply, enforce or determine the validity of our amended and restated certificate of incorporation or our bylaws, or (v) any action asserting a claim governed by the internal affairs doctrine. Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock shall be deemed to have notice of and to have consented to the provisions of our amended and restated certificate of incorporation described above. This 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 lawsuits with respect to such claims. However, it is possible that a court could rule that this provision is unenforceable or inapplicable.

Listing

Our common stock is listed on the NASDAQ Global Market under the symbol "LNTH."

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is Computershare Trust Company, N.A.

Exhibit 21.1

LANTHEUS HOLDINGS, INC.
SUBSIDIARIES

Subsidiary	State or Other Jurisdiction of Organization
Lantheus Medical Imaging, Inc.	Delaware
Lantheus MI Canada, Inc.	Canada
Lantheus MI Real Estate, LLC	Delaware
Lantheus MI UK Limited	England and Wales
Lantheus EU Limited	Ireland
Progenics Pharmaceuticals, Inc.	Delaware
Molecular Insight Pharmaceuticals, Inc.	Delaware
MNTX Royalties Sub LLC	Delaware
EXINI Diagnostics AB	Sweden
Excelsior Life Sciences Ireland Limited	Ireland
Progenics Pharmaceuticals Nevada, Inc.	Nevada
PSMA Development Company LLC	Delaware

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in Registration Statement Nos. 333-258454, 333-239491, 333-214343, 333-205211, 333-220049, 333-220050 and 333-232919 on Form S-8 of our reports dated February 24, 2022, relating to the financial statements of Lantheus Holdings, Inc. and the effectiveness of Lantheus Holdings, Inc.'s internal control over financial reporting appearing in this Annual Report on Form 10-K for the year ended December 31, 2021.

/s/ Deloitte & Touche LLP

Boston, Massachusetts
February 24, 2022

Exhibit 31.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER PURSUANT TO EXCHANGE ACT RULE 13a-14(a)

I, Mary Anne Heino, certify that:

1. I have reviewed this Annual Report on Form 10-K of Lantheus Holdings, 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 fourth fiscal quarter 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 24, 2022

/s/ MARY ANNE HEINO

Name: Mary Anne Heino

Title: *President and Chief Executive Officer*

Exhibit 31.2

CERTIFICATION OF CHIEF FINANCIAL OFFICER PURSUANT TO EXCHANGE ACT RULE 13a-14(a)

I, Robert J. Marshall, certify that:

1. I have reviewed this Annual Report on Form 10-K of Lantheus Holdings, 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 fourth fiscal quarter 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 24, 2022

/s/ ROBERT J. MARSHALL, JR.

Name: Robert J. Marshall, Jr.

Title: *Chief Financial Officer and Treasurer*
(Principal Financial Officer)

Exhibit 32.1

CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350

Pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, Mary Anne Heino, the Chief Executive Officer, and Robert J. Marshall, Jr., the Chief Financial Officer, of Lantheus Holdings, Inc. (the "Company"), hereby certify, that, to their knowledge:

1. The Annual Report on Form 10-K for the fiscal year ended December 31, 2021 (the "Report") of the Company fully complies with the requirements of Section 13(a) of the Securities Exchange Act of 1934; and

2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 24, 2022

/s/ MARY ANNE HEINO

Name: Mary Anne Heino

Title: *President and Chief Executive Officer*
(Principal Executive Officer)

Date: February 24, 2022

/s/ ROBERT J. MARSHALL, JR.

Name: Robert J. Marshall, Jr.

Title: *Chief Financial Officer and Treasurer*
(Principal Financial Officer)

A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.