Lantheus Holdings, Inc.
Form 424B7
March 15, 2017
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Filed Pursuant to Rule 424(b)(7)
Registration No. 333-215055

PROSPECTUS SUPPLEMENT

(to Prospectus dated December 12, 2016)

3,000,000 Shares

Lantheus Holdings, Inc.

Common Stock

This prospectus supplement relates to the sale of 3,000,000 shares of common stock of Lantheus Holdings, Inc. by the selling stockholders identified in this prospectus supplement under the heading Selling Stockholders .

The selling stockholders will receive all of the proceeds from the sale of their shares. We will not receive any of the proceeds from the sale of the shares sold by the selling stockholders.

Our common stock is listed on NASDAQ Global Market under the symbol LNTH. On March 13, 2017, the closing price of our common stock was $14.05 per share.

We are an emerging growth company as defined by the Jumpstart Our Business Startups Act of 2012 and, as such, we have elected to comply with certain reduced public company reporting requirements for this prospectus supplement and future filings. See Prospectus Supplement Summary The Company Emerging Growth Company.

You should read this prospectus supplement and the accompanying prospectus, including any information incorporated herein by reference, carefully before you invest.

Investing in our common stock involves a high degree of risk. See Risk Factors on page S-6 of this prospectus supplement and page 5 of the accompanying prospectus, and in our Annual Report on Form 10-K for the fiscal year ended December 31, 2016, as well as the other information contained in such report (which Form 10-K is incorporated by reference herein) to read about factors you should consider before making a decision to invest

in our common stock.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

The underwriter has agreed to purchase shares of our common stock from the selling stockholders at a price of $12.20 per share, which will result in approximately $36,600,000 of proceeds to the selling stockholders before expenses. The underwriter may offer the shares of common stock from time to time for sale in one or more transactions on the NASDAQ Global Market, in the over-the-counter market, through negotiated transactions or otherwise at market prices prevailing at the time of sale, at prices related to prevailing market prices or at negotiated prices, subject to receipt and acceptance by it and subject to its right to reject any order in whole or in part. We have agreed to reimburse the underwriter for certain expenses in connection with this offering. See Underwriting.

The underwriter expects to deliver the shares against payment on or about March 17, 2017.

Credit Suisse

March 13, 2017

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TRADEMARKS

We own or have the rights to various trademarks, service marks and trade names, including, among others, the following: DEFINITY®, TechneLite®, Cardiolite®, Neurolite®, Quadramet® and Lantheus Medical Imaging® referred to in this prospectus. Solely for convenience, we refer to trademarks, service marks and trade names in this prospectus 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, service marks and trade names.

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ABOUT THIS PROSPECTUS SUPPLEMENT

This document consists of two parts. The first part is this prospectus supplement, which describes the specific terms of this offering. The second part, the accompanying prospectus, gives more general information, some of which may not apply to this offering. Generally, when we refer only to the prospectus, we are referring to both parts combined. This prospectus supplement may add to, update or change information in the accompanying prospectus and the documents incorporated by reference into this prospectus supplement or the accompanying prospectus.

If information in this prospectus supplement is inconsistent with the accompanying prospectus, you should rely on this prospectus supplement. This prospectus supplement, the accompanying prospectus and the documents incorporated into each by reference include important information about us, the shares of common stock being offered and other information you should know before investing in these securities.

You should rely only on the information contained in this prospectus supplement, the accompanying prospectus or in any free-writing prospectus we may authorize to be delivered or made available to you. Neither we, nor the selling stockholders, nor the underwriter (nor any of our or their respective affiliates) have authorized anyone to provide any information other than that contained or incorporated by reference in this prospectus supplement, the accompanying prospectus or in any free writing prospectus prepared by or on behalf of us or to which we have referred you. Neither we, nor the selling stockholders, nor the underwriter (or any of our or their respective affiliates) take any responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. The selling stockholders and the underwriter (or any of their respective affiliates) are offering to sell, and seeking offers to buy, shares of common stock only in jurisdictions where offers and sales are permitted. The information contained in this prospectus supplement and the accompanying prospectus is only accurate as of the date on the front cover page of this prospectus supplement. Our business, financial condition, results of operations and prospects may have changed since that date.

Unless otherwise indicated or unless the context requires otherwise, all references in this prospectus supplement to Lantheus, the Company, we, us and our refer to Lantheus Holdings, Inc.

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PROSPECTUS SUPPLEMENT SUMMARY

The following is a summary of selected information about us contained elsewhere or incorporated by reference in this prospectus supplement and the accompanying prospectus. It does not contain all of the information that you should consider before buying our securities. You should read this entire prospectus supplement and accompanying prospectus carefully, as well as the documents incorporated by reference and any free writing prospectus we provide to you, including the information referred to under the heading Risk Factors.

THE COMPANY

We are a global leader in the development, manufacture and commercialization of innovative diagnostic medical imaging agents and products that assist clinicians in the diagnosis and treatment of cardiovascular and other diseases. Clinicians use our imaging agents and products across a range of imaging modalities, including echocardiography and nuclear imaging. We believe that the resulting improved diagnostic information 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 payers and the entire healthcare system.

Our Commercial Products:

Our commercial products are used by cardiologists, nuclear physicians, radiologists, internal medicine physicians, sonographers and technologists working in a variety of clinical settings. We sell our products in the United States to radiopharmacies, integrated delivery networks, hospitals, clinics and group practices and internationally to third party distributors. In addition to our U.S. operations, we have production and distribution operations in Puerto Rico, direct distribution operations in Canada and third-party distribution relationships in Europe, Canada, Australia, Asia Pacific and Latin America.

Our principal products are:

DEFINITY is an ultrasound contrast agent used in ultrasound exams of the heart, also known as echocardiography exams. DEFINITY contains perflutren-containing lipid microspheres and is indicated in the United States 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. Outside of the United States and Canada, we are expanding our sales of DEFINITY in Europe and Asia. We currently estimate that, assuming a successful regulatory process (including clinical trials), the timing of approval of DEFINITY in China could be as soon as 2018. We launched DEFINITY in 2001, its composition of matter patent will expire in 2019, its manufacturing patent will expire in 2021, and patents and regulatory extensions in numerous foreign jurisdictions will expire in 2019. We also have an active next generation development program for this agent.

TechneLite is a technetium generator which provides the essential nuclear material used by radiopharmacies to radiolabel Neurolite, Cardiolite and other technetium-based radiopharmaceuticals used in nuclear medicine procedures. TechneLite uses Molybdenum-99, or Moly, as its main active ingredient.

Xenon is a radiopharmaceutical gas that is inhaled and used to assess pulmonary function and also cerebral blood flow. Xenon is manufactured by a third party as a bi-product of Moly production and is processed and

finished by us. In addition to the products listed above, our portfolio of commercial products also includes important imaging agents in specific market segments, which provide a stable base of recurring revenue.

Neurolite is an injectable, technetium-labeled imaging agent used with SPECT technology to identify the area within the brain where blood flow has been blocked or reduced due to stroke.

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Cardiolite is an injectable, technetium-labeled imaging agent, also known by its generic name sestamibi, used with single-photon emission computed tomography, or SPECT, technology in myocardial perfusion imaging, or MPI, procedures that assess blood flow to the muscle of the heart. Launched in 1991, Cardiolite has the highest cumulative revenue of any branded radiopharmaceutical in history.

Thallium Tl 201 is an injectable radiopharmaceutical imaging agent used in MPI studies to detect coronary artery disease and is manufactured by us using cyclotron-based technology.

Fludeoxyglucose F 18, or FDG, is an injectable, fluorine-18-labeled imaging agent used with PET technology to identify and characterize tumors in patients undergoing oncologic diagnostic procedures.

Gallium Ga 67 is an injectable radiopharmaceutical imaging agent used to detect certain infections and cancerous tumors, especially lymphoma, and is manufactured by us using cyclotron technology.

Quadramet, our only therapeutic product, is an injectable radiopharmaceutical used to treat severe bone pain associated with certain kinds of cancer, and is manufactured by us.

Our Agents in Development:

In February of 2017, we announced entering into a term sheet with GE Healthcare relating to the continued development and worldwide commercialization of flurpiridaz F 18, our Phase 3 clinical candidate for use in PET MPI to assess blood flow to the muscle of the heart. We are also continuing to advance our earlier stage clinical candidates, including 18F LMI 1195, a PET imaging agent to assess cardiac sympathetic nerve function, and LMI 1174, a magnetic resonance imaging agent to assess atherosclerotic plaque.

Our History:

We were founded in 1956 as New England Nuclear Corporation, and our medical imaging business was purchased by E. I. du Pont de Nemours and Company, or DuPont, in 1981. Bristol-Myers Squibb Company, or BMS, subsequently acquired our medical imaging business from DuPont 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, or collectively, Avista, acquired our medical imaging business from BMS through Lantheus Holdings, Inc. Lantheus Holdings, Inc. is a Delaware corporation, which was incorporated in 2007 for purposes of acquiring our medical imaging business and operating it through its wholly owned subsidiary, Lantheus Medical Imaging, Inc. Our principal executive offices are located at 331 Treble Cove Road, North Billerica, Massachusetts 01862, and our telephone number at that address is (978) 671-8001. Our corporate website is www.lantheus.com. The information contained in, and that can be accessed through, our website is not incorporated into and does not form a part of this prospectus supplement or the accompanying prospectus.

Emerging Growth Company

We are an emerging growth company, as defined in the Jumpstart Our Business Startup Act of 2012. We will remain an emerging growth company until the earlier of (1) December 31, 2020 (the last day of the fiscal year following the fifth anniversary of our initial public offering), (2) the last day of the fiscal year in which we have total annual gross revenue of at least $1.0 billion, (3) the last day of the fiscal year in which we are deemed to be a large accelerated

filer, which means the market value of our common stock that is held by non-affiliates exceeds $700 million as of the prior June 30th, and (4) the date on which we have issued more than $1.0 billion in non-convertible debt during the prior three-year period. We refer to the Jumpstart Our Business Startup Act of 2012 herein as the JOBS Act, and references herein to emerging growth company shall have the meaning associated with it in the JOBS Act.

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As an emerging growth company, we may take advantage of specified reduced disclosure and other requirements that are otherwise applicable generally to public companies. These provisions include, among other matters:

- exemption from the auditor attestation requirement on the effectiveness of our system of internal control over financial reporting;
- exemption from the requirement to seek non-binding advisory votes on executive compensation and golden parachute arrangements; and
- reduced disclosure about executive compensation arrangements.

In addition, Section 107 of the JOBS Act also provides that an emerging growth company can take advantage of the extended transition period provided in Section 7(a)(2)(B) of the Securities Act of 1933, or the Securities Act, for complying with new and revised accounting standards. An emerging growth company can, therefore, delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. However, we chose to opt out of that extended transition period and, as a result, we comply with new and revised accounting standards on the relevant dates on which adoption of those standards is required for non-emerging growth companies. Section 107 of the JOBS Act provides that our decision to opt out of the extended transition period for complying with new and revised accounting standards is irrevocable.

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THE OFFERING

The following summary contains basic information about our common stock and the offering and is not intended to be complete. It does not contain all the information that may be important to you. For a more complete understanding of our common stock, you should read the section in the accompanying prospectus entitled Description of Capital Stock and the documents referred to therein.

Issuer	Lantheus Holdings, Inc.
Common stock offered by the selling stockholders	3,000,000 shares
Common stock to be outstanding after this offering	37,075,304 shares
Use of proceeds	We will not receive any of the proceeds from the sale of shares of common stock by the selling stockholders. See Use of Proceeds.
Dividend Policy	We do not anticipate paying any dividends on our common stock; however, we may change this policy in the future. See Dividend Policy.
NASDAQ ticker symbol	LNTH
Risk factors	Investing in our common stock involves a high degree of risk. You should consider the matters referred to under the heading Risk Factors on page S-6 of this prospectus supplement, page 5 of the accompanying prospectus and the risk factors incorporated by reference from our filings with the Securities and Exchange Commission, or the SEC, or the Commission.

The number of shares of our common stock to be outstanding after this offering is based on 37,075,304 shares of our common stock outstanding as of March 10, 2017.

The number of shares of our common stock to be outstanding after this offering excludes the following, each as of March 10, 2017:

- 1,048,076 shares of our common stock issuable upon exercise of outstanding stock options, with a weighted average exercise price of $10.58 per share; and
- 1,704,992 shares of our common stock reserved for the future issuance of grants under our 2015 Equity Incentive Plan.

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RISK FACTORS

Investment in our securities involves a high degree of risk. For a discussion of the cautionary information you should carefully consider before deciding to purchase any of our securities, please review the risk factors included in the documents incorporated by reference in this prospectus supplement and the accompanying prospectus, including Part I, Item 1A Risk Factors in our Annual Report on Form 10-K for the fiscal year ended December 31, 2016, filed with the SEC on February 23, 2017 as well as other documents that we file with the SEC that are incorporated by reference. Each of these risk factors, as well as any additional risks and uncertainties not known to us or currently deemed immaterial, could adversely affect our business, operating results and financial condition, as well as adversely affect the value of an investment in our securities. In that event, the trading price of our common stock could decline, and you could lose all or part of your investment.

Risks Relating to our Common Stock and this Offering

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 the price you paid for them.

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 or events, 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;
- regulatory or political developments;
- actual or anticipated fluctuations in our quarterly financial and operating results;
- introduction of new products or services by us or our competitors;
- anticipated and reported clinical trial results;
- issuance of new or changed securities analysts reports or recommendations;
- investor perceptions of us and the specialty pharmaceutical industry;
- sales, or anticipated sales, of large blocks of our stock;

additions or departures of key personnel;

litigation and governmental investigations; 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.

We are subject to certain phase-in provisions of The NASDAQ Global Market and, as a result, we will not immediately be subject to certain corporate governance requirements.

Avista no longer beneficially owns a majority controlling interest in us. As a result, we are not a controlled company within the meaning of the corporate governance standards of The NASDAQ Global Market. However,

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we are entitled to rely on phase-in provisions for the corporate governance requirement that we have a nominating and corporate governance committee that is composed entirely of independent directors. As a result, our nominating and corporate governance committee does not consist entirely of independent directors. Accordingly, you will not have the same protections afforded to stockholders of companies that are subject to all of the corporate governance requirements of NASDAQ for up to the expiration of the phase-in period on September 8, 2017.

Avista will continue to have significant influence over us after this offering and their interest may conflict with yours and ours.

Upon completion of this offering, based on the 37,075,304 shares of our common stock outstanding as of March 10, 2017, Avista will beneficially own approximately 33.2% of our outstanding common stock. For so long as Avista continues to hold a significant portion of our outstanding common stock, Avista may continue to be able to strongly influence or effectively control our decisions.

Anti-takeover provisions in our amended and restated certificate of incorporation and bylaws could prohibit a change of control that our stockholders may favor and could negatively affect our stock price.

Our amended and restated certificate of incorporation and bylaws contain provisions that could make it more difficult and expensive for a third party to acquire control of us, even if a change of control would be beneficial to the interests of our stockholders. These provisions could discourage potential takeover attempts and could adversely affect the market price of our common stock. These provisions may also prevent or frustrate attempts by our stockholders to replace or remove our management. For example, our amended and restated certificate of incorporation and bylaws:

- permit our Board of Directors to issue preferred stock with such terms as they determine, without stockholder approval;
- provide that only one-third of the members of the Board are elected at each stockholders meeting and prohibit removal without cause;
- require advance notice for stockholder proposals and director nominations; and
- contain limitations on convening stockholder meetings and stockholder action by written consent.

These provisions make it more difficult for stockholders or potential acquirers to acquire us without negotiation and could discourage potential takeover attempts and could adversely affect the market price of our common stock. In addition, we have opted out of Section 203 of the Delaware General Corporation Law, or the DGCL. Our amended and restated certificate of incorporation provides that we will not be governed by Section 203 until there occurs a transaction following the consummation of which Avista holds beneficial ownership of less than 5% of the voting power of our then-outstanding shares of common stock.

If a substantial number of shares become available for sale and are sold in a short period of time, the market price of our common stock could decline, which could impede our ability to raise additional capital through the issuance of additional shares of our common stock or other equity securities.

As of March 10, 2017, there were 37,075,304 shares of our common stock outstanding. Of our issued and outstanding shares, all the common stock sold in our initial public offering, our September 2016 public offering, our November 2016 public offering or this offering will be freely transferable, except for any shares held by our affiliates, as that term is defined in Rule 144 under the Securities Act. In addition, our executive officers, certain of our directors and the selling stockholders have entered into a lock-up agreement with the underwriter which regulates their sales of our common stock for a period of 30 days after the date of this prospectus supplement, subject to certain exceptions. After these restrictions have elapsed, additional shares, some of which will be subject to vesting, will be eligible for sale in the public market. If our existing stockholders sell

substantial amounts of our common stock in the public market following this offering, the market price of our common stock could decrease significantly. The perception in the public market that our existing stockholders might sell shares of common stock could also depress the market price of our common stock.

In addition, we have reserved 5,680,992 shares of common stock for issuance under our equity compensation plans. Upon consummation of this offering, we expect to have 1,048,076 shares of common stock issuable upon exercise of outstanding options (754,875 of which will be fully vested). A decline in the price of shares of our common stock caused by the lapse of resale restrictions by our existing stockholders or the sale of common stock issued pursuant to our equity incentive plans might impede our ability to raise capital through the issuance of additional shares of our common stock or other equity securities.

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, then 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 cease coverage of us or fail 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 downgrade our stock, or if our results of operations do not meet their expectations, then our stock price could 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. See Dividend Policy.

You may experience future dilution as a result of future equity offerings.

In order to raise additional capital, we may in the future offer additional shares of our common stock or other securities convertible into or exchangeable for our common stock at prices that may not be the same as the price per share in this offering. We may sell shares or other securities in any other offering at a price per share that is less than the price per share paid by investors in this offering, and investors purchasing shares or other securities in the future could have rights superior to existing stockholders. The price per share at which we sell additional shares of our common stock, or securities convertible or exchangeable into common stock, in future transactions may be higher or lower than the price per share paid by investors in this offering.

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

As of December 31, 2016, we had U.S. federal income tax loss carryforwards of $200.3 million, which will begin to expire in 2030 and will completely expire in 2036. We have had significant financial losses in previous years and as a result we currently maintain a full valuation allowance for our net deferred tax assets including our federal and state tax loss carryforwards. We are limited in our ability to use these tax loss carryforwards and other attributes to reduce our future U.S. federal income tax liabilities, as we have recently experienced an ownership change as specified in Section 382 of the Internal Revenue Code of 1986, as amended, or the Code, in connection with a previous offering.

In addition, we may experience further ownership changes as a result of future changes in our stock ownership, many of which are outside of our control, or if we were to enter into certain strategic transactions. Moreover, our ability to utilize our tax loss carryforwards is conditioned upon our attaining profitability and generating taxable income.

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CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus supplement, the accompanying prospectus and the information incorporated by reference herein and therein include forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, or Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended. We may also make forward-looking statements in other reports filed with the SEC, in materials delivered to stockholders and in press releases. In addition, our representatives may from time to time make oral forward-looking statements. 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 include words such as anticipates, intends, plans, seeks, believes, estimates, expects, should, could, predicts, h expressions. Examples of forward-looking statements include, but are not limited to, statements we make regarding: (i) our outlook and expectations including, without limitation, in connection with continued market expansion and penetration for our commercial products, particularly DEFINITY, in the face of increased competition; (ii) our outlook and expectations in connection with future performance of Xenon in the face of increased competition; (iii) our outlook and expectations related to products manufactured at Jubilant HollisterStier, or JHS and global isotope supply; (iv) our ability to finalize our previously announced collaboration and license transaction with GE Healthcare Ltd., or GE Healthcare, and our outlook and expectations related to the development and commercialization of flurpiridaz F18 through that collaboration; and (v) our liquidity, including our belief that our existing cash, cash equivalents, anticipated revenues and availability under our revolving credit facility, are sufficient to fund our existing operating expenses, capital expenditures and liquidity requirements for at least the next twelve months.

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, they 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. They are neither statements of historical fact nor guarantees or assurances of future performance. The matters referred to in the forward-looking statements contained or incorporated by reference in this prospectus supplement or the accompanying prospectus may not in fact occur. We caution you therefore against relying on any of these forward-looking statements.

Important factors that could cause actual results to differ materially from those in the forward-looking statements include regional, national or global political, economic, business, competitive, market and regulatory conditions and the following:

- our ability to continue to increase segment penetration for DEFINITY in suboptimal echocardiograms and the segment competition from other echocardiography contrast agents, including Optison from GE Healthcare and Lumason from Bracco Diagnostics Inc;

- risks associated with revenues and unit volumes for Xenon in pulmonary studies and the competition in this generic segment from IBA Molecular/Mallinckrodt;

- our dependence on key customers for our medical imaging products, and our ability to maintain and profitably renew our contracts with those key customers, including Cardinal Health, United Pharmacy Partners, GE Healthcare and Triad Isotopes;

our dependence upon third parties for the manufacture and supply of a substantial portion of our products, including DEFINITY at JHS;

risks associated with the technology transfer programs to secure production of our products at alternate contract manufacturer sites, including our next generation DEFINITY product at Samsung BioLogics;

risks associated with the manufacturing and distribution of our products and the regulatory requirements related thereto;

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the instability of the global Moly supply;

the dependence of certain 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. healthcare reform on our business, including related reimbursements for our current and potential future products;

our being subject to extensive government regulation and our potential inability to comply with those regulations;

potential liability associated with our marketing and sales practices;

the occurrence of any side effects with our products;

our exposure to potential product liability claims and environmental liability;

risks associated with our most advanced agent in development, flurpiridaz F 18, including:

- our ability to finalize our previously announced collaboration and license transaction with GE Healthcare;
- the ability to obtain Food and Drug Administration approval; and
- the ability to gain post-approval market acceptance and adequate reimbursement;

the extensive costs, time and uncertainty associated with new product development, including further product development potentially relying on external development partners;

our inability to introduce new products and adapt to an evolving technology and diagnostic landscape;

our inability to identify and in-license or acquire additional products to grow our business;

our inability to protect our intellectual property and the risk of claims that we have infringed on the intellectual property of others;

risks associated with prevailing economic or political conditions and events and financial, business and other factors beyond our control;

risks associated with our international operations;

our inability to adequately protect our facilities, equipment and technology infrastructure;

our inability to hire or retain skilled employees and key personnel;

risks related to our outstanding indebtedness and our ability to satisfy those obligations;

costs and other risks associated with the Sarbanes-Oxley Act and the Dodd-Frank Act; and

risks related to the ownership of our common stock.

Any forward-looking statement made by us in this prospectus supplement, the accompanying prospectus and the information incorporated by reference herein and therein 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.

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USE OF PROCEEDS

The Selling Stockholders will receive all of the proceeds from the sale of shares offered by this prospectus supplement. We will not receive any proceeds from the sale of shares of our common stock by the selling stockholders.

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MARKET PRICE OF OUR COMMON STOCK

Our common stock began trading on The NASDAQ Global Market under the symbol LNTH on June 25, 2015. Prior to that time, there was no public market for our common stock. The following table sets forth the high and low intraday sale prices per share of our common stock, as reported on The NASDAQ Global Market, for the quarterly periods indicated:

	High	Low
Year ended December 31, 2015		
Second Quarter (from June 25, 2015)	$ 7.19	$ 5.97
Third Quarter	$ 8.58	$ 3.82
Fourth Quarter	$ 4.79	$ 2.56
Year ended December 31, 2016		
First Quarter	$ 3.38	$ 1.76
Second Quarter	$ 4.37	$ 1.82
Third Quarter	$ 10.10	$ 3.46
Fourth Quarter	$ 10.70	$ 7.61
Year ended December 31, 2017		
First Quarter (through March 13, 2017)	$ 14.20	$ 7.95

On March 13, 2017, the last reported sale price of our common stock on The NASDAQ Global Market was $14.05 per share. As of the date of this prospectus supplement, we had approximately 35 holders of record of our common stock. The actual number of stockholders is greater than this number of record holders and includes stockholders who are beneficial owners but whose shares are held in street name by brokers and other nominees. This number of holders of record also does not include stockholders whose shares may be held in trust by other entities.

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DIVIDEND POLICY

After this offering, we intend to retain all available funds and any future earnings to reduce debt and for general corporate purposes. However, in the future, subject to the factors described below and our future liquidity and capitalization, we may change this policy and choose to pay dividends. Our business is conducted through our principal operating subsidiary, Lantheus Medical Imaging, Inc., or LMI. Dividends from, and cash generated by, LMI will be our principal source of cash to repay indebtedness, fund operations and pay dividends. Accordingly, our ability to pay dividends to our stockholders is dependent on the earnings and distributions of funds from LMI. LMI s ability to pay dividends to us and, therefore, our ability to pay dividends on our common stock, is currently restricted by the terms of the agreements governing our senior secured credit facilities and may be further restricted by any future indebtedness we incur.

Any future determination to pay dividends will be at the discretion of our board of directors and will take into account:

- restrictions in the agreements governing our senior secured credit facilities and the instruments or agreements governing any future indebtedness we incur;
- general economic, political and business conditions or events;
- our financial condition, results of operations and cash flows;
- our capital requirements;
- the ability of LMI to pay dividends and make distributions to us; and
- those other factors that our board of directors may deem relevant.

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SELLING STOCKHOLDERS

The following table sets forth information with respect to the beneficial ownership of our common stock, as of March 10, 2017, by each of the selling stockholders, determined in accordance with Rule 13d-3 under the Exchange Act. Unless the context otherwise requires, as used in this prospectus, selling stockholders includes the selling stockholders named in the table below and donees, pledgees, transferees or other successors-in-interest selling shares received from the selling stockholders as a gift, pledge, partnership distribution or other transfer after the date of this prospectus, and any such persons will be named in the applicable prospectus supplement.

The column entitled Beneficially Owned upon Completion of this Offering Percentage is based on a total of 37,075,304 shares of our common stock outstanding as of March 10, 2017.

	Common Stock				
	Beneficially Owned as of March 10, 2017		Offered Pursuant to this Prospectus	Beneficially Owned upon Completion of this Offering	
Name of Selling Stockholders	Number	Percentage		Number	Percentage
Avista Capital Partners, L.P. and related funds(1)	15,293,599	41.3%	3,000,000	12,293,599	33.2%

(1) The shares included in the table consist of: 8,713,673 shares held by Avista Capital Partners, L.P., 2,297,718 shares held by Avista Capital Partners (Offshore), L.P. and 4,282,208 shares held by ACP-Lantern Co-Invest, LLC (collectively, the Avista Funds). Avista Capital Partners GP, LLC (ACP GP) serves as the general partner of Avista Capital Partners, L.P. and Avista Capital Partners (Offshore), L.P. and as the managing member of ACP-Lantern Co-Invest, LLC. By virtue of the relationships described above, ACP GP may be deemed to share beneficial ownership of the shares held by the Avista Funds. In this offering Avista Capital Partners, L.P. will sell 1,709,278 shares of common stock, Avista Capital Partners (Offshore), L.P. will sell 450,722 shares of common stock and ACP-Lantern Co-Invest, LLC will sell 840,000 shares of common stock. Voting and disposition decisions at ACP GP with respect to the shares held by the Avista Funds are made by an investment committee, the members of which include David Burgstahler and Sriram Venkataraman, each of whom serves as a director of the Company. Each of the members of the investment committee disclaims beneficial ownership of the shares held by the Avista Funds. The address for each of these entities is c/o Avista Capital Holdings, LP, 65 East 55th Street, 18th Floor, New York, NY 10022.

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MATERIAL U.S. FEDERAL INCOME TAX CONSIDERATIONS TO NON-U.S. HOLDERS

The following is a summary of the material U.S. federal income and estate tax consequences to non-U.S. holders (as defined below) of ownership and disposition of our common stock. This summary does not provide a complete analysis of all potential U.S. federal income tax and estate tax considerations relating thereto. The information provided below is based on the Internal Revenue Code of 1986, as amended, or the Code, and administrative pronouncements, judicial decisions and final, temporary and proposed Treasury regulations as of the date hereof, changes to any of which subsequent to the date of this prospectus may affect the tax consequences described herein. In addition, this summary does not address the Medicare tax on certain investment income or any state, local or foreign taxes or any U.S. federal tax laws other than U.S. federal income tax laws and estate tax laws. Persons considering the purchase, ownership, or disposition of our common stock should consult their tax advisors concerning U.S. federal, state, local, foreign or other tax consequences in light of their particular situations.

As used in this section, a non-U.S. holder is a beneficial owner of our common stock that is not, for U.S. federal income tax purposes:

- any individual who is a citizen or resident of the United States,
- a corporation (or other entity taxable as a corporation) created or organized in or under the laws of the United States, any state thereof or the District of Columbia,
- any estate the income of which is subject to U.S. federal income taxation regardless of its source, or
- any trust if (i) a court within the United States is able to exercise primary supervision over the administration of the trust and one or more U.S. persons have the authority to control all substantial decisions of the trust or (ii) it has a valid election in effect under applicable U.S. Treasury regulations to be treated as a U.S. person.

If you are an individual, you may, in many cases, be deemed to be a resident alien, as opposed to a nonresident alien, by virtue of being present in the United States for at least 31 days in the calendar year and for an aggregate of at least 183 days during a three-year period ending in the current calendar year. For these purposes, all the days of presence in the current year, one-third of the days of presence in the immediately preceding year, and one-sixth of the days of presence in the second preceding year are counted. Resident aliens are subject to U.S. federal income tax as if they were U.S. citizens. Such an individual is urged to consult his or her own tax advisor regarding the U.S. federal income tax consequences of the ownership or disposition of our common stock. If an entity or arrangement treated as a partnership for U.S. federal income tax purposes holds common stock, the tax treatment of a partner or owner of the partnership generally will depend upon the status of such partner or other owner and the activities of the partnership. Accordingly, entities or arrangements that are treated as partnerships for U.S. federal income tax purposes holding shares of our common stock, and any partner or owner of such entity or arrangement, should consult their own tax advisors.

This discussion assumes that a non-U.S. holder will hold our common stock as a capital asset (generally, property held for investment). The summary generally does not address tax considerations that may be relevant to particular

investors because of their specific circumstances, or because they are subject to special rules, including, without limitation if the investor is a controlled foreign corporation, passive foreign investment company or former citizen or long-term resident of the United States. If you fall within any of the foregoing categories, this description does not apply to you, and you should consult with your own tax advisor about the tax consequences of acquiring, owning, and disposing of our common stock.

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INVESTORS CONSIDERING THE PURCHASE OF OUR COMMON STOCK SHOULD CONSULT THEIR OWN TAX ADVISORS REGARDING THE APPLICATION OF THE U.S. FEDERAL INCOME AND ESTATE TAX LAWS TO THEIR PARTICULAR SITUATIONS AND THE CONSEQUENCES OF FOREIGN, STATE OR LOCAL LAWS AND TAX TREATIES.

Distributions on Common Stock

We do not expect to declare or pay any dividends on our common stock in the foreseeable future. If we do pay dividends on shares of our common stock, however, such distributions will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. Distributions in excess of our current and accumulated earnings and profits will constitute a return of capital that is applied against and reduces, but not below zero, a non-U.S. holder s adjusted tax basis in shares of our common stock. Any remaining excess will be treated as gain realized on the sale or other disposition of our common stock. See Dispositions of Common Stock.

Any dividend paid to a non-U.S. holder on our common stock will generally be subject to U.S. federal withholding tax at a 30% rate. The withholding tax might not apply, however, or might apply at a reduced rate, under the terms of an applicable income tax treaty between the United States and the non-U.S. holder s country of residence. You should consult your tax advisors regarding your entitlement to benefits under a relevant income tax treaty. Generally, in order for us or our paying agent to withhold tax at a lower treaty rate, a non-U.S. holder must certify its entitlement to treaty benefits. A non-U.S. holder generally can meet this certification requirement by providing an Internal Revenue Service, or IRS, Form W-8BEN or W-8BEN-E, or other W-8 form, as applicable (or any successor form) or appropriate substitute form to us or our paying agent. If the non-U.S. holder holds the stock through a financial institution or other agent acting on the holder s behalf, the holder will be required to provide appropriate documentation to the agent. The holder s agent will then be required to provide certification to us or our paying agent, either directly or through other intermediaries.

Dividends received by a non-U.S. holder that are effectively connected with a U.S. trade or business conducted by the non-U.S. holder, and, if required by an applicable income tax treaty between the United States and the non-U.S. holder s country of residence, that are also attributable to a permanent establishment (or, in certain cases involving individual holders, a fixed base) maintained by the non-U.S. holder in the United States, are not subject to such withholding tax. To obtain this exemption, a non-U.S. holder must provide us with an IRS Form W-8ECI properly certifying such exemption. Such effectively connected dividends, although not subject to withholding tax, are taxed at the same graduated rates applicable to U.S. persons, net of certain deductions and credits. In addition to the graduated tax described above, such effectively connected dividends received by corporate non-U.S. holders may also be subject to a branch profits tax at a rate of 30% or such lower rate as may be specified by an applicable tax treaty.

Dispositions of Common Stock

Subject to the discussion below on backup withholding and other withholding requirements, gain realized by a non-U.S. holder on a sale, exchange or other disposition of our common stock generally will not be subject to U.S. federal income or withholding tax, unless:

- the gain (1) is effectively connected with the conduct by the non-U.S. holder of a U.S. trade or business and (2) if required by an applicable income tax treaty between the United States and the non-U.S. holder s country of residence, is attributable to a permanent establishment (or, in certain cases involving individual holders, a

fixed base) maintained by the non-U.S. holder in the United States (in which case the special rules described below apply),

the non-U.S. holder is an individual who is present in the United States for 183 or more days in the taxable year of such disposition and certain other conditions are met (in which case the gain would be subject to a flat 30% tax, or such reduced rate as may be specified by an applicable income tax treaty, which may be offset by U.S. source capital losses), or

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we are, or have been, a U.S. real property holding corporation, or a USRPHC, for U.S. federal income tax purposes at any time during the shorter of the five-year period ending on the date of disposition of our common stock and the non-U.S. holder s holding period for our common stock.

Generally, a corporation is a USRPHC if the fair market value of its United States real property interests equals 50% or more of the sum of the fair market value of (a) its worldwide real property interests and (b) its other assets used or held for use in a trade or business. The tax relating to stock in a USRPHC does not apply to a non-U.S. holder whose holdings, actual and constructive, amount to 5% or less of our common stock at all times during the applicable period, provided that our common stock is regularly traded on an established securities market. We believe we have not been and are not currently a USRPHC, and do not anticipate being a USRPHC in the future.

If any gain from the sale, exchange or other disposition of our common stock is (1) effectively connected with a U.S. trade or business conducted by a non-U.S. holder, and (2) if required by an applicable income tax treaty between the United States and the non-U.S. holder s country of residence, attributable to a permanent establishment (or, in certain cases involving individuals, a fixed base) maintained by such non-U.S. holder in the United States, then the gain generally will be subject to U.S. federal income tax at the same graduated rates applicable to U.S. persons, net of certain deductions and credits. If the non-U.S. holder is a corporation, it also may be subject to the branch profits tax at a 30% rate, or such lower rate as may be specified by an applicable income tax treaty.

U.S. Federal Estate Tax

The estates of nonresident alien individuals generally are subject to U.S. federal estate tax on property with a U.S. situs. Because we are a U.S. corporation, our common stock will be U.S. situs property and therefore will be included in the taxable estate of a nonresident alien decedent, unless an applicable estate tax treaty between the United States and the decedent s country of residence provides otherwise.

Backup Withholding and Information Reporting

Any dividends that are paid to a non-U.S. holder must be reported annually to the IRS and to the non-U.S. holder. Copies of these information returns also may be made available to the tax authorities of the country in which the non-U.S. holder resides under the provisions of various treaties or agreements for the exchange of information. Unless the non-U.S. holder is an exempt recipient, dividends paid on our common stock and the gross proceeds from a taxable disposition of our common stock may be subject to additional information reporting and may also be subject to U.S. federal backup withholding (at a rate of 28%) if such non-U.S. holder fails to comply with applicable U.S. information reporting and certification requirements. Provision of any IRS Form W-8 appropriate to the non-U.S. holder s circumstances will generally satisfy the certification requirements necessary to avoid backup withholding.

Backup withholding is not an additional tax. Any amounts so withheld under the backup withholding rules will be refunded by the IRS or credited against the non-U.S. holder s U.S. federal income tax liability, provided that the required information is timely furnished to the IRS.

Other Withholding Requirements

Sections 1471 through 1474 of the Code and related Treasury regulations, together with other Treasury Department or IRS guidance issued thereunder, and intergovernmental agreements, legislation, rules and other official guidance adopted pursuant to such intergovernmental agreements, (commonly referred to as FATCA) generally will impose a 30% U.S. federal withholding tax on payments to certain non-U.S. entities (including certain intermediaries), including dividends on our common stock and, on or after January 1, 2019, gross proceeds from the sale or other disposition of our common stock. Certain non-U.S. holders located in jurisdictions that have

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an intergovernmental agreement with the United States governing FATCA may be subject to different rules. Non-U.S. holders should consult their tax advisors regarding the possible implications of FATCA for their investment in our common stock.

THE PRECEDING DISCUSSION OF U.S. FEDERAL TAX CONSIDERATIONS IS FOR GENERAL INFORMATION ONLY. IT IS NOT TAX ADVICE. EACH PROSPECTIVE INVESTOR SHOULD CONSULT ITS OWN TAX ADVISOR REGARDING THE PARTICULAR U.S. FEDERAL, STATE, LOCAL AND FOREIGN TAX CONSEQUENCES OF PURCHASING, HOLDING AND DISPOSING OF OUR COMMON STOCK, INCLUDING THE CONSEQUENCES OF ANY PROPOSED CHANGE IN APPLICABLE LAWS.

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UNDERWRITING

Credit Suisse Securities (USA) LLC is acting as sole book-running manager of the offering. Subject to the terms and conditions stated in the underwriting agreement dated the date of this prospectus supplement, the underwriter has agreed to purchase, and the selling stockholders have agreed to sell to the underwriter, 3,000,000 shares of our common stock.

The underwriting agreement provides that the obligation of the underwriter to purchase the shares included in this offering is subject to approval of legal matters by counsel and to other conditions. The underwriter is obligated to purchase all the shares if they purchase any of the shares.

We, our officers, certain of our directors and employees and the selling stockholders have agreed that, for a period of 30 days from the date of this prospectus supplement, we and they will not, without the prior written consent of Credit Suisse Securities (USA) LLC, dispose of or hedge any shares or any securities convertible into or exchangeable for our common stock. Credit Suisse Securities (USA) LLC in its sole discretion may release any of the securities subject to these lock-up agreements at any time, which, in the case of officers and directors, shall be without notice.

The shares are listed on the NASDAQ Global Market under the symbol LNTH.

The shares may be offered by the underwriter from time to time to purchasers directly or through agents, or through brokers in brokerage transaction on the NASDAQ Global Market, or to dealers in negotiated transactions or in a combination of such methods of sale, at a fixed price or prices, which may be changed, or at market prices prevailing at the time of sale, at prices related to such prevailing market prices or at negotiated prices. The difference between the price, at which the underwriter purchases shares from us and the selling stockholders and the price at which the underwriter resells such shares may be deemed underwriting compensation.

The expenses of the offering, not including the underwriting discounts, are estimated at $0.2 million and are payable by us. We have agreed to reimburse the underwriter for certain of its expenses, in an amount up to $27,500, as set forth in the underwriting agreement.

In connection with the offering, the underwriter may purchase and sell shares of common stock in the open market. These transactions may include short sales, stabilizing transactions and purchases to cover positions created by short sales. Short sales involve the sale by the underwriter of a greater number of shares than it is required to purchase in the offering, and a short position represents the amount of such sales that have not been covered by subsequent purchases. The underwriter must cover any such short positions by purchasing shares in the open market. Stabilizing transactions consist of various bids for or purchases of common stock made by the underwriter in the open market prior to the completion of the offering.

Purchases to cover short positions and stabilizing purchases, as well as other purchases by the underwriter for its own accounts, may have the effect of preventing or retarding a decline in the market price of the shares. They may also cause the price of the shares to be higher than the price that would otherwise exist in the open market in the absence of these transactions. The underwriter may conduct these transactions on the NASDAQ Global Market in the over-the-counter market or otherwise. If the underwriter commences any of these transactions, they may discontinue them at any time.

The underwriter is a full service financial institutions engaged in various activities, which may include securities trading, commercial and investment banking, financial advisory, investment management, principal investment, hedging, financing and brokerage activities. The underwriter and its respective affiliates have in the past performed

commercial banking, investment banking and advisory services for us from time to time for which it has received customary fees and reimbursement of expenses and may, from time to time, engage in transactions with and perform services for us in the ordinary course of their business for which it may receive

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customary fees and reimbursement of expenses. In the ordinary course of its various business activities, the underwriter and its respective affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities) and financial instruments (which may include bank loans and/or credit default swaps) for their own account and for the accounts of their customers and may at any time hold long and short positions in such securities and instruments. Such investment and securities activities may involve our securities and instruments.

We and the selling stockholders have agreed to indemnify the underwriter against certain liabilities, including liabilities under the Securities Act, or to contribute to payments the underwriter may be required to make because of any of those liabilities.

Notice to Prospective Investors in the European Economic Area

In relation to each member state of the European Economic Area that has implemented the Prospectus Directive (each, a relevant member state), with effect from and including the date on which the Prospectus Directive is implemented in that relevant member state (the relevant implementation date), an offer of shares described in this prospectus may not be made to the public in that relevant member state other than:

to any legal entity which is a qualified investor as defined in the Prospectus Directive;

to fewer than 100 or, if the relevant member state has implemented the relevant provision of the 2010 PD Amending Directive, 150 natural or legal persons (other than qualified investors as defined in the Prospectus Directive), as permitted under the Prospectus Directive, subject to obtaining the prior consent of the relevant Dealer or Dealers nominated by us for any such offer; or

in any other circumstances falling within Article 3(2) of the Prospectus Directive,

provided that no such offer of shares shall require us or any underwriter to publish a prospectus pursuant to Article 3 of the Prospectus Directive.

For purposes of this provision, the expression an offer of securities to the public in any relevant member state means the communication in any form and by any means of sufficient information on the terms of the offer and the shares to be offered so as to enable an investor to decide to purchase or subscribe for the shares, as the expression may be varied in that member state by any measure implementing the Prospectus Directive in that member state, and the expression Prospectus Directive means Directive 2003/71/EC (and amendments thereto, including the 2010 PD Amending Directive, to the extent implemented in the relevant member state) and includes any relevant implementing measure in the relevant member state. The expression 2010 PD Amending Directive means Directive 2010/73/EU.

The sellers of the shares have not authorized and do not authorize the making of any offer of shares through any financial intermediary on their behalf, other than offers made by the underwriter with a view to the final placement of the shares as contemplated in this prospectus. Accordingly, no purchaser of the shares, other than the underwriter, is authorized to make any further offer of the shares on behalf of the sellers or the underwriter.

Notice to Prospective Investors in the United Kingdom

This prospectus is only being distributed to, and is only directed at, persons in the United Kingdom that are qualified investors within the meaning of Article 2(1)(e) of the Prospectus Directive that are also (i) investment professionals falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (the Order) or (ii) high net worth entities, and other persons to whom it may lawfully be communicated, falling within Article 49(2)(a) to (d) of the Order (each such person being referred to as a relevant person). This prospectus and its contents are confidential and should not be distributed, published or reproduced (in whole or in part) or disclosed by recipients to any other persons in the United Kingdom. Any person in the United Kingdom that is not a relevant person should not act or rely on this document or any of its contents.

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Notice to Prospective Investors in France

Neither this prospectus nor any other offering material relating to the shares described in this prospectus has been submitted to the clearance procedures of the *Autorité des Marchés Financiers* or of the competent authority of another member state of the European Economic Area and notified to the *Autorité des Marchés Financiers.* The shares have not been offered or sold and will not be offered or sold, directly or indirectly, to the public in France. Neither this prospectus nor any other offering material relating to the shares has been or will be:

- released, issued, distributed or caused to be released, issued or distributed to the public in France; or
- used in connection with any offer for subscription or sale of the shares to the public in France.

Such offers, sales and distributions will be made in France only:

- to qualified investors (*investisseurs qualifiés*) and/or to a restricted circle of investors (*cercle restreint d investisseurs*), in each case investing for their own account, all as defined in, and in accordance with articles L.411-2, D.411-1, D.411-2, D.734-1, D.744-1, D.754-1 and D.764-1 of the French *Code monétaire et financier*;
- to investment services providers authorized to engage in portfolio management on behalf of third parties; or
- in a transaction that, in accordance with article L.411-2-II-1°-or-2°-or 3° of the French *Code monétaire et financier* and article 211-2 of the General Regulations (*Règlement Général*) of the *Autorité des Marchés Financiers*, does not constitute a public offer (*appel public à l épargne*).

The shares may be resold directly or indirectly, only in compliance with articles L.411-1, L.411-2, L.412-1 and L.621-8 through L.621-8-3 of the French *Code monétaire et financier.*

Notice to Prospective Investors in Hong Kong

The shares may not be offered or sold in Hong Kong by means of any document other than (i) in circumstances which do not constitute an offer to the public within the meaning of the Companies Ordinance (Cap. 32, Laws of Hong Kong), or (ii) to professional investors within the meaning of the Securities and Futures Ordinance (Cap. 571, Laws of Hong Kong) and any rules made thereunder, or (iii) in other circumstances which do not result in the document being a prospectus within the meaning of the Companies Ordinance (Cap. 32, Laws of Hong Kong) and no advertisement, invitation or document relating to the shares may be issued or may be in the possession of any person for the purpose of issue (in each case whether in Hong Kong or elsewhere), which is directed at, or the contents of which are likely to be accessed or read by, the public in Hong Kong (except if permitted to do so under the laws of Hong Kong) other than with respect to shares which are or are intended to be disposed of only to persons outside Hong Kong or only to professional investors within the meaning of the Securities and Futures Ordinance (Cap. 571, Laws of Hong Kong) and any rules made thereunder.

Notice to Prospective Investors in Japan

The shares offered in this prospectus have not been registered under the Securities and Exchange Law of Japan. The shares have not been offered or sold and will not be offered or sold, directly or indirectly, in Japan or to or for the account of any resident of Japan, except (i) pursuant to an exemption from the registration requirements of the Securities and Exchange Law and (ii) in compliance with any other applicable requirements of Japanese law.

Notice to Prospective Investors in Singapore

This prospectus has not been registered as a prospectus with the Monetary Authority of Singapore. Accordingly, this prospectus and any other document or material in connection with the offer or sale, or invitation for subscription

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or purchase, of the shares may not be circulated or distributed, nor may the shares be offered or sold, or be made the subject of an invitation for subscription or purchase, whether directly or indirectly, to persons in Singapore other than (i) to an institutional investor under Section 274 of the Securities and Futures Act, Chapter 289 of Singapore (the SFA), (ii) to a relevant person pursuant to Section 275(1), or any person pursuant to Section 275(1A), and in accordance with the conditions specified in Section 275 of the SFA or (iii) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA, in each case subject to compliance with conditions set forth in the SFA.

Where the shares are subscribed or purchased under Section 275 of the SFA by a relevant person which is:

a corporation (which is not an accredited investor (as defined in Section 4A of the SFA)) the sole business of which is to hold investments and the entire share capital of which is owned by one or more individuals, each of whom is an accredited investor; or

a trust (where the trustee is not an accredited investor) whose sole purpose is to hold investments and each beneficiary of the trust is an individual who is an accredited investor,

shares, debentures and units of shares and debentures of that corporation or the beneficiaries rights and interest (howsoever described) in that trust shall not be transferred within six months after that corporation or that trust has acquired the shares pursuant to an offer made under Section 275 of the SFA except:

to an institutional investor (for corporations, under Section 274 of the SFA) or to a relevant person defined in Section 275(2) of the SFA, or to any person pursuant to an offer that is made on terms that such shares, debentures and units of shares and debentures of that corporation or such rights and interest in that trust are acquired at a consideration of not less than S$200,000 (or its equivalent in a foreign currency) for each transaction, whether such amount is to be paid for in cash or by exchange of securities or other assets, and further for corporations, in accordance with the conditions specified in Section 275 of the SFA;

where no consideration is or will be given for the transfer; or

where the transfer is by operation of law.

Notice to Prospective Investors in Canada

The shares of common stock may be sold only to purchasers purchasing, or deemed to be purchasing, as principal that are accredited investors, as defined in National Instrument 45-106 *Prospectus Exemptions* or subsection 73.3(1) of the *Securities Act* (Ontario), and are permitted clients, as defined in National Instrument 31-103 *Registration Requirements, Exemptions and Ongoing Registrant Obligations*. Any resale of the shares of common stock must be made in accordance with an exemption from, or in a transaction not subject to, the prospectus requirements of applicable securities laws.

Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if this prospectus supplement (including any amendment thereto) contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser s province or territory. The purchaser should refer to any applicable provisions of the securities legislation of the purchaser s province or territory for particulars of these rights or consult with a legal advisor.

Pursuant to section 3A.3 (or, in the case of securities issued or guaranteed by the government of a non-Canadian jurisdiction, section 3A.4) of National Instrument 33-105 *Underwriting Conflicts* (**NI 33-105**), the underwriter is not required to comply with the disclosure requirements of NI 33-105 regarding underwriter conflicts of interest in connection with this offering.

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LEGAL MATTERS

The validity of the shares of common stock offered by this prospectus supplement will be passed upon for us by Ropes & Gray LLP, Boston, Massachusetts. The underwriter is being represented by Latham & Watkins LLP, New York, New York.

WHERE YOU CAN FIND MORE INFORMATION

We have filed with the SEC a registration statement on Form S-3 under the Securities Act with respect to the shares of our common stock being offered by this prospectus supplement and the accompanying prospectus. This prospectus supplement and the accompanying prospectus do not contain all of the information set forth in the registration statement. For further information with respect to us and the shares of our common stock, reference is made to the registration statement and its exhibits. Statements contained in this prospectus supplement or the accompanying prospectus as to the contents of any contract or other document are not necessarily complete. We are required to file annual, quarterly and current reports, proxy statements and other information with the SEC. We make these documents publicly available, free of charge, on our website at www.lantheus.com as soon as reasonably practicable after filing such documents with the SEC. You may also read and copy any document that we file at the Public Reference Room of the SEC located at 100 F Street, N.E., Washington, D.C. 20549. You may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. In addition, the SEC maintains an Internet site at http://www.sec.gov, from which interested persons can electronically access our SEC filings, including the registration statement and the exhibits and schedules thereto.

INCORPORATION OF DOCUMENTS BY REFERENCE

The SEC allows us to incorporate by reference the information we file with it, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is an important part of this prospectus. We incorporate by reference the documents listed below and all documents we file pursuant to Section 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of 1934, as amended, or the Exchange Act, (i) on or after the date of this prospectus supplement and prior to the termination of the offering under this prospectus and any prospectus supplement and (ii) after the date of the filing of this registration statement and prior to its effectiveness (other than, in each case, documents or information deemed to have been furnished and not filed in accordance with SEC rules).

- Annual Report on Form 10-K for the year ended December 31, 2016, which was filed with the SEC on February 23, 2017;

- Definitive Proxy Statement on Schedule 14A for our 2016 Annual Meeting of Stockholders, which was filed with the SEC on March 28, 2016 (but only the information set forth therein that is incorporated by reference into Part III of our Annual Report on Form 10-K for the year ended December 31, 2015);

- Current Reports on Form 8-K which were filed with the SEC on January 26, 2017 and February 21, 2017 (with respect to Item 8.01 only); and

The description of our common stock contained in the registration statement on Form 8-A which was filed with the SEC on July 25, 2014, and any amendment or report we may file with the SEC for the purpose of updating such description.

Any statement in a document incorporated by reference into this prospectus will be deemed to be modified or superseded for purposes of this prospectus to the extent a statement contained in this or any other subsequently filed document that is incorporated by reference into this prospectus modifies or supersedes such statement. Any statement so modified or superseded will be not deemed, except as so modified or superseded, to constitute a part of this prospectus.

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You may request, and we will provide, a copy of these filings at no cost by writing or telephoning us at:

Lantheus Holdings, Inc.

331 Treble Cove Road

North Billerica, Massachusetts 01862

(978) 671-8001

Attn: Investor Relations

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PROSPECTUS

Lantheus Holdings, Inc.

$150,000,000

Common Stock

Preferred Stock

Warrants

Units

Selling Stockholders

15,293,599 Shares of Common Stock

We, Lantheus Holdings, Inc., may from time to time, in one or more offerings, offer and sell (i) common stock, (ii) preferred stock, (iii) warrants and (iv) units or any combination of these securities. Specific terms of these securities will be provided in supplements to this prospectus. The aggregate offering price of all securities sold by Lantheus Holdings, Inc. under this prospectus will not exceed $150,000,000.

In addition, the selling stockholders named in this prospectus may from time to time, in one or more offerings, offer and sell up to 15,293,599 shares of common stock. We will not receive any proceeds from the sale of our common stock by the selling stockholders.

Our common stock is listed on NASDAQ Global Market under the symbol LNTH. On December 9, 2016, the closing price of our common stock was $9.45 per share. We have not yet determined whether the other securities that may be offered by this prospectus will be listed on any exchange, interdealer quotation system or over-the-counter market. If we decide to seek the listing of any such securities upon issuance, the prospectus supplement relating to those securities will disclose the exchange, quotation system or market on which those securities will be listed.

We or the selling stockholders may offer and sell these securities to or through one or more underwriters, dealers and agents, or directly to investors, in amounts, at prices and on terms to be determined by market conditions and other factors at the time of the offering. This prospectus describes only the general terms of these securities and the general manner in which we or the selling stockholders will offer the securities. The specific terms of any securities we or the selling stockholders offer will be included in a supplement to this prospectus. The prospectus supplement will also describe the specific manner in which we or the selling stockholders will offer the securities. Any prospectus supplement may also add, update or change information contained in this prospectus.

You should carefully read this prospectus and any accompanying prospectus supplement, together with the documents we incorporate by reference, before you invest in our securities.

Investing in these securities involves risks that are described in Item 1A. Risk Factors of our Annual Report on Form 10-K for the year ended December 31, 2015 and our Quarterly Reports on Form 10-Q for the quarterly periods ended March 31, 2016, June 30, 2016 and September 30, 2016, which are incorporated by reference herein.

Neither the Securities and Exchange Commission nor any other state securities commission has approved or disapproved of these securities or passed upon the accuracy or adequacy of this prospectus. Any representation to the contrary is a criminal offense.

The date of this prospectus is December 12, 2016

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You should rely only on the information contained in this prospectus or in any free-writing prospectus we may authorize to be delivered or made available to you. Neither we, nor the selling stockholders nor the underwriters (or any of our or their respective affiliates) have authorized anyone to provide any information other than that contained or incorporated by reference in this prospectus or in any free writing prospectus prepared by or on behalf of us or to which we have referred you. Neither we, nor the selling stockholders nor the underwriters (or any of our or their respective affiliates) take any responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. We, the selling stockholders and the underwriters (or any of our or their respective affiliates) are not making an offer to sell these securities in any jurisdiction where the offer or sale is not permitted. The information contained in this prospectus is only accurate as of the date on the front cover page of this prospectus. Our business, financial condition, results of operations and prospectus may have changed since that date.

Unless the context otherwise indicates, the terms Lantheus, the Company, we, us and our used in this prospectus to Lantheus Holdings, Inc. and all of its subsidiaries, and the phrase this prospectus refers to this prospectus and any applicable prospectus supplement(s).

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ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed with the Securities and Exchange Commission (the SEC) utilizing a shelf registration process. Under this shelf registration process, we may, over time, offer and sell up to $150,000,000 in total aggregate offering price of any combination of the securities described in this prospectus, in one or more offerings and at prices and on terms that we determine at the time of the offering. In addition, the selling stockholders may offer and sell, from time to time, in one or more offerings, up to 15,293,599 shares of our common stock. This prospectus provides you with a general description of the securities we or a selling stockholder may offer. Each time we or the selling stockholders offer and sell any of the securities described in this prospectus, we will provide a prospectus supplement along with this prospectus that will contain specific information about the terms of that particular offering by us or the selling stockholders. The accompanying prospectus supplement may also add, update or change information contained in this prospectus. If the information varies between this prospectus and the accompanying prospectus supplement, you should rely on the information in the accompanying prospectus supplement. You should read both this prospectus and the accompanying prospectus supplement together with the additional information described under Where You Can Find More Information. You should also carefully consider, among other things, the matters discussed in the section entitled Risk Factors.

THIS PROSPECTUS MAY NOT BE USED TO SELL ANY SECURITIES

UNLESS ACCOMPANIED BY A PROSPECUS SUPPLEMENT.

FORWARD-LOOKING STATEMENTS

Some of the statements contained in this prospectus are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. We may also make forward-looking statements in other reports filed with the SEC, in materials delivered to stockholders and in press releases. In addition, our representatives may from time to time make oral forward-looking statements. 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 include words such as anticipates, intends, plans, seeks, believes, estimates, expects, sho predicts, targets, hopes and similar expressions. Examples of forward-looking statements include, but are not limited to, statements we make regarding: (i) our outlook and expectations including, without limitation, in connection with continued market expansion and penetration for our commercial products, particularly DEFINITY, in the face of increased competition; (ii) our outlook and expectations in connection with future performance of Xenon in the face of increased competition; (iii) our outlook and expectations related to products manufactured at Jubilant HollisterStier, or JHS, and Pharmalucence and global isotope supply; (iv) our outlook and expectations related to our engagement of strategic partners to assist in developing and potentially commercializing development candidates; and (v) our liquidity, including our belief that our existing cash, cash equivalents, anticipated revenues and availability under our revolving facility, are sufficient to fund our existing operating expenses, capital expenditures and liquidity requirements for at least the next twelve months.

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, they 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. They are neither statements of historical fact nor guarantees or assurances of future performance. The matters referred to in the forward-looking statements contained or incorporated by reference in this prospectus may not in fact occur. We caution you therefore against relying on any of these forward-looking statements.

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Important factors that could cause actual results to differ materially from those in the forward-looking statements include regional, national or global political, economic, business, competitive, market and regulatory conditions and the following:

- our ability to continue to increase segment penetration for DEFINITY in suboptimal echocardiograms and the increased segment competition from other echocardiography contrast agents;
- risks associated with revenues and unit volumes for Xenon in pulmonary studies with increased segment competition resulting from Mallinckrodt s recent re-launch of their Xenon product;
- our dependence on key customers and group purchasing organization arrangements for our medical imaging products, and our ability to maintain and profitably renew our contracts and relationships with those key customers and group purchasing organizations;
- our dependence upon third parties for the manufacture and supply of a substantial portion of our products, including for DEFINITY at JHS;
- risks associated with the technology transfer programs to secure production of our products at alternate contract manufacturer sites, including for DEFINITY at Pharmalucence where activities have been significantly delayed;
- risks associated with the manufacturing and distribution of our products and the regulatory requirements related thereto;
- the instability of the global Molybdenum-99, or Moly, supply;
- the dependence of certain 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. healthcare reform on our business, including related reimbursements for our current and potential future products;
- our being subject to extensive government regulation and our potential inability to comply with those regulations;
- potential liability associated with our marketing and sales practices;

the occurrence of any side effects with our products;

our exposure to potential product liability claims and environmental liability;

risks associated with our most advanced agent in development, flurpiridaz F 18, including our ability to:

- attract strategic partners to successfully complete the Phase 3 clinical program and possibly manufacture and commercialize the agent;
- obtain Food and Drug Administration, or FDA, approval; and
- gain post-approval market acceptance and adequate reimbursement;

risks associated with being able to negotiate in a timely manner relationships with potential strategic partners to advance our other development programs on acceptable terms, or at all;

the extensive costs, time and uncertainty associated with new product development, including further product development relying on external development partners, all against an evolving diagnostic landscape;

our inability to protect our intellectual property and the risk of claims that we have infringed on the intellectual property of others;

risks associated with prevailing economic conditions and financial, business and other factors beyond our control;

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risks associated with our international operations;

our inability to adequately protect our facilities, equipment and technology infrastructure;

our inability to hire or retain skilled employees and key personnel;

risks related to our outstanding indebtedness and our ability to satisfy those obligations;

costs and other risks associated with the Sarbanes-Oxley Act and the Dodd-Frank Act;

our inability to utilize or limitations in our ability to utilize net operating loss carryforwards to reduce our future tax liability; and

risks related to the ownership of our common stock.

Factors that could cause or contribute to such differences include, but are not limited to, those that are discussed in other documents we file with the SEC. Any forward-looking statement made by us in or through incorporation by reference in this prospectus 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.

WHERE YOU CAN FIND MORE INFORMATION

We are required to file annual, quarterly and current reports, proxy statements, and other information with the SEC. We make these documents publicly available, free of charge, on our website at www.lantheus.com as soon as reasonably practicable after filing such documents with the SEC. You may also read and copy any document that we file at the Public Reference Room of the SEC located at 100 F Street, N.E., Washington, D.C. 20549. You may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. In addition, the SEC maintains an Internet site at http://www.sec.gov, from which interested persons can electronically access our SEC filings, including the registration statement and the exhibits and schedules thereto.

The SEC allows us to incorporate by reference the information we file with them, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is an important part of this prospectus. We incorporate by reference the documents listed below and all documents we file pursuant to Section 13(a), 13(c), 14, or 15(d) of the Securities Exchange Act of 1934, as amended (the Exchange Act), (i) on or after the date of this prospectus and prior to the termination of the offering under this prospectus and any prospectus supplement and (ii) after the date of the filing of this registration statement and prior to its effectiveness (other than, in each case, documents or information deemed to have been furnished and not filed in accordance with SEC rules).

Annual Report on Form 10-K for the year ended December 31, 2015, which was filed with the SEC on March 2, 2016;

Definitive Proxy Statement on Schedule 14A for our 2016 Annual Meeting of Stockholders which was filed with the SEC on March 28, 2016 (but only the information set forth therein that is incorporated by reference into Part III of our Annual Report on Form 10-K for the year ended December 31, 2015);

Quarterly Reports on Form 10-Q for the quarterly periods ended March 31, 2016, June 30, 2016 and September 30, 2016 which were filed with the SEC on May 3, 2016, August 4, 2016 and November 1, 2016, respectively;

Current Reports on Form 8-K which were filed with the SEC on January 13, 2016, March 8, 2016, March 28, 2016, April 28, 2016, August 11, 2016, September 2, 2016, September 13, 2016 and November 17, 2016; and

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The description of our common stock contained in the registration statement on Form 8-A which was filed with the SEC on July 25, 2014, and any amendment or report we may file with the SEC for the purpose of updating such description.

Any statement in a document incorporated by reference into this prospectus will be deemed to be modified or superseded for purposes of this prospectus to the extent a statement contained in this or any other subsequently filed document that is incorporated by reference into this prospectus modifies or supersedes such statement. Any statement so modified or superseded will be not deemed, except as so modified or superseded, to constitute a part of this prospectus.

You may request, and we will provide, a copy of these filings at no cost by writing or telephoning us at:

Lantheus Holdings, Inc.

331 Treble Cove Road

North Billerica, Massachusetts 01862

(978) 671-8001

Attn: Investor Relations

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THE COMPANY

We are a global leader in the development, manufacture and commercialization of innovative diagnostic medical imaging agents and products that assist clinicians in the diagnosis and treatment of cardiovascular and other diseases. Our agents are routinely used to diagnose coronary artery disease, congestive heart failure, pulmonary diseases, stroke and other diseases. Clinicians use our imaging agents and products across a range of imaging procedures, including echocardiography and nuclear imaging. We believe that the resulting improved diagnostic information 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 payers and the entire healthcare system.

Our commercial products are used by cardiologists, nuclear physicians, radiologists, internal medicine physicians, sonographers and technologists working in a variety of clinical settings. We sell our products to radiopharmacies, to hospitals, clinics, group practices and integrated delivery networks (including through group purchasing organizations) and to international, third party distributors.

We sell our products globally and have operations in the United States, Puerto Rico and Canada and third-party distribution relationships in Europe, Australia, Asia Pacific and Latin America.

We were founded in 1956 as New England Nuclear Corporation, and our medical imaging business was purchased by E. I. du Pont de Nemours and Company (DuPont) in 1981. Bristol-Myers Squibb Company (BMS) subsequently acquired our medical imaging business from DuPont 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 (collectively, Avista) acquired our medical imaging business from BMS through Lantheus Holdings, Inc. Lantheus Holdings, Inc. is a Delaware corporation, which was incorporated in 2007 for purposes of acquiring our medical imaging business and operating it through its wholly owned subsidiary, Lantheus Medical Imaging, Inc., and is headquartered in North Billerica, Massachusetts. Our principal executive offices are located at 331 Treble Cove Road, North Billerica, Massachusetts 01862, and our telephone number at that address is (978) 671-8001. Our corporate website is www.lantheus.com. The information on our web site is not part of, and is not incorporated by reference into, this prospectus.

RISK FACTORS

Investment in our securities involves a high degree of risk. You should consider carefully the risk factors discussed in the sections entitled Risk Factors contained in our Annual Report on Form 10-K for the year ended December 31, 2015, and in our most recent Quarterly Reports on Form 10-Q filed with the SEC and in any Quarterly Report on Form 10-Q filed subsequent hereto and other filings we make with the SEC from time to time, each of which is incorporated herein by reference in its entirety, as well as other information in or incorporated by reference in this prospectus and the Risk Factors section in the applicable prospectus supplement, before purchasing any of our securities. Each of these risk factors, as well as any additional risks and uncertainties not known to us or currently deemed immaterial, could adversely affect our business, operating results and financial condition, as well as adversely affect the value of an investment in our securities. In that event, the trading price of our common stock could decline, and you could lose all or part of your investment.

USE OF PROCEEDS

Unless otherwise indicated in a prospectus supplement, the net proceeds from the sale of the securities offered by us in this prospectus will be used for general corporate purposes, including working capital, paydown of then-existing debt, acquisitions and other business purposes. We may also invest the proceeds in certificates of deposit, United States

government securities, certain other interest-bearing securities or money market securities. If we decide to use the net proceeds from a particular offering of securities for a specific purpose other than as set forth above, we will describe that in the related prospectus supplement.

We will not receive any proceeds from the sale of our common stock by the selling stockholders.

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RATIO OF COMBINED FIXED CHARGES AND PREFERENCE DIVIDENDS TO EARNINGS

If we offer preferred stock under this prospectus, then we will, at that time, provide a ratio of combined fixed charges and preference dividends to earnings in the applicable prospectus supplement for such offering.

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SELLING STOCKHOLDERS

The selling stockholders indicated below may resell from time to time up to 15,293,599 shares of our common stock (plus an indeterminate number of shares of our common stock that may be issued upon stock splits, stock dividends or similar transactions in accordance with Rule 416 under the Securities Act). Unless the context otherwise requires, as used in this prospectus, selling stockholders includes the selling stockholders named in the table below and donees, pledgees, transferees or other successors-in-interest selling shares received from the selling stockholders as a gift, pledge, partnership distribution or other transfer after the date of this prospectus, and any such persons will be named in the applicable prospectus supplement.

The following table, based upon information currently known by us, sets forth as of November 30, 2016: (i) the number of shares of common stock held of record or beneficially by the selling stockholders as of such date (as determined below) and (ii) the number of shares that may be offered under this prospectus by the selling stockholders. The beneficial ownership of the common stock set forth in the following table is determined in accordance with Rule 13d-3 under the Exchange Act, and the information is not necessarily indicative of beneficial ownership for any other purpose.

	Common Stock			
Name of Selling Stockholders	**Beneficially Owned as of November 30, 2016(1)**	**Offered Pursuant to this Prospectus(1)**	**Beneficially Owned upon Completion of this Offering(1)**	**Percentage Of Common Stock Beneficially Owned upon Completion of this Offering(1)**
Avista Capital Partners, L.P. and related funds(2)	15,293,599	15,293,599		

(1) We do not know when or in what amounts the selling stockholders may offer shares of common stock for sale. The selling stockholders may decide not to sell any or all of the shares offered by this prospectus. Because the selling stockholders may offer all or some of the shares pursuant to this offering, we cannot estimate the number of the shares that will be held by the selling stockholders after completion of the offering. However, for purposes of this table, we have assumed that, after completion of the offering, none of the shares covered by this prospectus will be held by the selling stockholders.

(2) The shares included in the table consist of: 8,713,673 shares held by Avista Capital Partners, L.P., 2,297,718 shares held by Avista Capital Partners (Offshore), L.P., and 4,282,208 shares held by ACP-Lantern Co-Invest, LLC (collectively, the Avista Funds). Avista Capital Partners GP, LLC (ACP GP) serves as the general partner of Avista Capital Partners, L.P. and Avista Capital Partners (Offshore), L.P. and as the managing member of ACP-Lantern Co-Invest, LLC. By virtue of the relationships described above, ACP GP may be deemed to share beneficial ownership of the shares held by the Avista Funds. Voting and disposition decisions at ACP GP with respect to the shares held by the Avista Funds are made by an investment committee, the members of which include David Burgstahler and Sriram Venkataraman, each of whom serves as a director of the Company. Each of the members of the investment committee disclaims beneficial ownership of the shares held by the Avista Funds. The address for each of these entities is c/o Avista Capital Holdings, LP, 65 East 55th Street, 18th Floor, New York, NY 10022.

DESCRIPTION OF CAPITAL STOCK

The following is a description of the material terms of our amended and restated certificate of incorporation, bylaws and other rights of holders of our capital stock, including our Shareholders Agreements (defined herein) as currently in effect. We refer you to our amended and restated certificate of incorporation, bylaws and Shareholders Agreements, copies of which are incorporated by reference herein.

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Authorized Capitalization

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, of which 36,756,106 shares of common stock and no shares of preferred stock are issued and outstanding as of November 30, 2016.

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 will 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

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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.

Registration Rights

Avista and certain of our stockholders have certain registration rights with respect to our common stock pursuant to our Shareholders Agreements, described below.

Shareholders Agreements

In connection with Avista s original acquisition of the Company s business, the Company entered into (i) a Shareholders Agreement with Avista and certain management stockholders, dated January 8, 2008 and subsequently amended and restated on February 26, 2008 and further amended on June 25, 2015 in connection with the consummation of our initial public offering (the Initial Shareholders Agreement), and (ii) an Employee Shareholders Agreement with Avista and certain employee stockholders named therein, dated as of May 30, 2008 and subsequently amended on June 25, 2015 in connection with the consummation of our initial public offering (the Employee Shareholders Agreement, and, collectively with the Initial Shareholders Agreement, the Shareholders Agreements). Certain current directors, including Brian Markison and Samuel Leno, are management stockholder parties to the Initial Shareholders Agreement, and our executive officers are parties to the Employee Shareholders Agreement.

The Shareholders Agreements govern the parties respective rights, duties and obligations with respect to the ownership of Company securities. The Initial Shareholders Agreement currently provides demand registration rights in favor of Avista and piggy-back registration rights in favor of Avista and the management stockholders. Pursuant to certain option award agreements granted prior to the completion of our initial public offering between the Company and its options holders, as a condition to a valid exercise of any such options, the optionee is obligated to join either the Initial Shareholders Agreement or the Employee Shareholders Agreement, as applicable, with respect to the shares of common stock received upon exercise of any such option. The Initial Shareholders Agreement also provides Avista with the right to nominate two directors to the Board of Directors for so long as it beneficially owns 25% or more of our issued and outstanding shares of common stock, and the right to nominate one director for election to our Board of Directors for so long as it beneficially owns 10% or more, but less than 25%, of our issued and outstanding shares of 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. Class I currently consists of three directors, Class II currently consists of three directors, and Class III currently consists of two directors. Our board currently consists of eight directors.

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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.

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Corporate Opportunities

Our amended and restated certificate of incorporation provides that Avista and its affiliates have no obligation to offer us an opportunity to participate in business opportunities presented to Avista or its affiliates even if the opportunity is one that we might reasonably have pursued (and therefore may be free to compete with us in the same business or similar businesses), and that neither Avista nor its affiliates will be liable to us or our stockholders for breach of any duty by reason of any of those activities unless, in the case of any person who is a director or officer of our Company, such business opportunity is expressly offered to such director or officer in writing solely in his or her capacity as an officer or director of our Company.

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.

DESCRIPTION OF WARRANTS

The following description of the warrant agreements summarizes certain general terms that will apply to the warrants that we may issue. The description is not complete, and we refer you to the warrant agreements, which will be filed with the SEC promptly after the offering of any warrants and will be available as described under the heading Where You Can Find More Information in this prospectus.

We may issue warrants to purchase common stock, preferred stock or other securities. We may issue warrants independently or as part of a unit with other securities. Warrants sold with other securities as a unit may be attached to or separate from the other securities. We will issue warrants under one or more warrant agreements between us and a warrant agent that we will name in the applicable prospectus supplement.

The prospectus supplement relating to any warrants we are offering will include specific terms relating to the offering, including a description of any other securities sold together with the warrants. These terms will include some or all of the following:

- the title of warrants;
- the aggregate number of warrants offered;
- the price or prices at which the warrants will be issued;
- the currency or currencies, including composite currencies, in which the prices of the warrants may be payable;

the designation, number and terms of the common stock, preferred stock or other securities or rights, including rights to receive payment in cash or securities based on the value, rate or price of one or more specified commodities, currencies or indices, purchasable upon exercise of the warrants and procedures by which those numbers may be adjusted;

the dates or periods during which the warrants are exercisable;

the designation and terms of any securities with which the warrants are issued as a unit;

if the warrants are issued as a unit with another security, the date on and after which the warrants and the other security will be separately transferable;

if the exercise price is not payable in U.S. dollars, the foreign currency, currency unit or composite currency in which the exercise price is denominated;

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any minimum or maximum amount of warrants that may be exercised at any one time;

any terms relating to the modification of the warrants; and

any other terms of the warrants, including terms, procedures and limitations relating to the transferability, exchange, exercise or redemption of the warrants.

Holders of equity warrants will not be entitled to:

vote, consent or receive dividends;

receive notice as stockholders with respect to any meeting of stockholders for the election of our directors or any other matter; or

exercise any rights as stockholders of Lantheus.

Each warrant will entitle its holder to purchase the principal amount of the number of shares of preferred stock or common stock at the exercise price set forth in, or calculable as set forth in, the applicable prospectus supplement. Unless we otherwise specify in the applicable prospectus supplement, holders of the warrants may exercise the warrants at any time up to the specified time on the expiration date that we set forth in the applicable prospectus supplement. After the close of business on the expiration date, unexercised warrants will become void.

A holder of warrant certificates may exchange them for new warrant certificates of different denominations, present them for registration of transfer and exercise them at the corporate trust office of the warrant agent or any other office indicated in the applicable prospectus supplement. Until any warrants to purchase common stock or preferred stock are exercised, the holders of the warrants will not have any rights of holders of the underlying common stock or preferred stock.

DESCRIPTION OF UNITS

The following description of the units and any applicable underlying security or pledge or depository arrangements summarizes certain general terms that will apply to the applicable agreements. The description is not complete, and we refer you to the applicable agreements, which will be filed with the SEC promptly after the offering of any units and will be available as described under the heading Where You Can Find More Information in this prospectus.

We may issue units comprised of one or more of the other securities described in this prospectus in any combination. Each unit may also include debt obligations of third parties, such as U.S. Treasury securities. Each unit will be issued so that the holder of the unit is also the holder of each security included in the unit. Thus, the holder of a unit will have the rights and obligations of a holder of each included security. The prospectus supplement relating to any units we are offering will include specific terms relating to the offering, including a description of any other securities sold together with the units. These terms will include some or all of the following:

the title of the series of units;

identification and description of the separate constituent securities comprising the units;

the price or prices at which the units will be issued;

the date, if any, on and after which the constituent securities comprising the units will be separately transferable;

a discussion of certain U.S. federal income tax considerations applicable to the units; and

any other terms of the units and their constituent securities.

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PLAN OF DISTRIBUTION

We are registering securities, with an aggregate offering price not to exceed $150.0 million, to be sold by us under a shelf registration process.

In addition, on behalf of the selling stockholders, we are registering 15,293,599 shares of our common stock for resale by the selling stockholders. If we or a selling stockholder offer any securities under this prospectus, we will amend or supplement this prospectus by means of an accompanying prospectus supplement setting forth the specific terms and conditions and other information about that offering as is required or necessary.

We and/or a selling stockholder may sell the securities in any of the following ways (or in any combination) from time to time:

to or through underwriters, brokers or dealers;

directly to one or more purchasers;

through agents; or

any other method permitted pursuant to applicable law and described in an applicable prospectus supplement.

The prospectus supplement will set forth the terms of the offering of such securities, including:

the name or names of any underwriters, dealers or agents and the amounts of securities underwritten or purchased by each of them;

the public offering price of the securities and the proceeds to us and/or to the selling stockholders, as the case may be, and any discounts, commissions or concessions allowed or reallowed or paid to dealers; and

information about the selling stockholders, including the relationship between the selling stockholders and us.

Any public offering price and any discounts or concessions allowed or reallowed or paid to dealers may be changed from time to time.

We and/or the selling stockholders may effect the distribution of the securities from time to time in one or more transactions either:

at a fixed price or prices, which may be changed from time to time;

at market prices prevailing at the time of sale;

at prices relating to the prevailing market prices; or

at negotiated prices.

The selling stockholders may act independently of us in making decisions with respect to the timing, manner and size of each of their sales.

Offers to purchase securities may be solicited directly by us and the sale thereof may be made by us directly to institutional investors or others. In such a case, no underwriters or agents would be involved. We may use electronic media, including the Internet, to sell offered securities directly.

If underwriters are used in the sale of any securities, the securities will be acquired by the underwriters for their own account and may be resold from time to time in one or more transactions, including negotiated

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transactions, at a fixed public offering price or at varying prices determined at the time of sale. The securities may be either offered to the public through underwriting syndicates represented by managing underwriters, or directly by underwriters. Generally, the underwriters obligations to purchase the securities will be subject to certain conditions precedent. Depending on the type of offering, the underwriters may be obligated to purchase all of the securities if they purchase any of the securities (other than any securities purchased upon exercise of any over-allotment option).

We or the selling stockholders may offer the securities covered by this prospectus into an existing trading market on the terms described in the prospectus supplement relating thereto. Underwriters, dealers and agents who participate in any at-the-market offerings will be described in the prospectus supplement relating thereto. To the extent that we make sales through one or more underwriters or agents in at-the-market offerings, we will do so pursuant to the terms of a sales agency financing agreement or other at-the-market offering arrangement between us and the underwriters or agents. If we engage in at-the-market sales pursuant to any such agreement, we will issue and sell our securities through one or more underwriters or agents, which may act on an agency basis or on a principal basis. During the term of any such agreement, we may sell our securities on a daily basis in exchange transactions or otherwise as we agree with the underwriters or agents. The agreement will provide that any common stock sold will be sold at prices related to the then-prevailing market prices for our securities. Therefore, exact figures regarding proceeds that will be raised or commissions to be paid cannot be determined at this time. Pursuant to the terms of the agreement, we also may agree to sell, and the relevant underwriters or agents may agree to solicit offers to purchase, blocks of our securities. The terms of each such agreement will be set forth in more detail in the applicable prospectus supplement.

We or the selling stockholders may sell the securities through agents from time to time. The prospectus supplement will name any agent involved in the offer or sale of the securities and any commissions paid to them. Generally, any agent will be acting on a best efforts basis for the period of its appointment.

If we or the selling stockholders utilize a dealer in the sale of the securities in respect of which this prospectus is delivered, we or the selling stockholders, as applicable, may sell those securities to the dealer, as principal. The dealer may then resell those securities to the public at varying prices to be determined by the dealer at the time of resale.

In effecting sales, broker-dealers or agents engaged by us or the selling stockholders may arrange for other broker-dealers to participate. Broker-dealers or agents may receive commissions, discounts, or concessions from us or the selling stockholders in amounts to be negotiated immediately prior to the sale.

In connection with the sale of the securities or otherwise, we or the selling stockholders may enter into hedging transactions with broker-dealers, which may in turn engage in short sales of the securities covered by this prospectus in the course of hedging the positions they assume. We or the selling stockholders may also sell short the securities covered by this prospectus and deliver the securities to close out short positions, or loan or pledge the securities covered by this prospectus to broker-dealers that in turn may sell these securities.

Any underwriter, broker-dealer, or agent that participates in the distribution of the securities may be deemed to be an underwriter as defined in the Securities Act. Any commissions paid or any discounts or concessions allowed to any such persons, and any profits they receive on resale of the securities, may be deemed to be underwriting discounts and commissions under the Securities Act. We will identify any underwriters or agents and describe their compensation in a prospectus supplement. Any compensation paid to underwriters, dealers or agents in connection with the offering of the securities, and any discounts, concessions or commissions allowed by underwriters to participating dealers will be provided in the applicable prospectus supplement.

The aggregate proceeds to us and the selling stockholders from the sale of the securities will be the purchase price of the securities less discounts and commissions, if any.

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Underwriters or agents may purchase and sell the securities in the open market. These transactions may include over-allotment, stabilizing transactions, syndicate covering transactions and penalty bids. Over-allotment involves sales in excess of the offering size, which creates a short position. Stabilizing transactions consist of bids or purchases for the purpose of preventing or retarding a decline in the market price of the securities and are permitted so long as the stabilizing bids do not exceed a specified maximum. Syndicate covering transactions involve the placing of any bid on behalf of the underwriting syndicate or the effecting of any purchase to reduce a short position created in connection with the offering. The underwriters or agents also may impose a penalty bid, which permits them to reclaim selling concessions allowed to syndicate members or certain dealers if they repurchase the securities in stabilizing or covering transactions. These activities may stabilize, maintain or otherwise affect the market price of the securities, which may be higher than the price that might otherwise prevail in the open market. These activities, if begun, may be discontinued at any time. These transactions may be effected on any exchange on which the securities are traded, in the over-the-counter market or otherwise.

Our common stock is listed on the NASDAQ Global Market under the symbol LNTH.

Agents, broker-dealers and underwriters may be entitled to indemnification by us and, if applicable, the selling stockholders, against certain civil liabilities, including liabilities under the Securities Act, or to contribution with respect to payments which the agents or underwriters may be required to make in respect thereof.

Agents, broker-dealers and underwriters or their affiliates may be customers of, engage in transactions with, or perform services for, us or the selling stockholders (or their affiliates) in the ordinary course of business. We and the selling stockholders may also use underwriters or other third parties with whom we or such selling stockholders have a material relationship. We and the selling stockholders (or their affiliates) will describe the nature of any such relationship in the applicable prospectus supplement.

We and the selling stockholders are subject to the applicable provisions of the Exchange Act and the rules and regulations under the Exchange Act, including Regulation M, which may limit the timing of purchases and sales of any of the securities offered in this prospectus by the selling stockholders and any other person. The anti-manipulation rules under the Exchange Act may apply to sales of securities in the market and to the actions of the Company, the selling stockholders and their respective affiliates.

In order to comply with the securities laws of certain states, if applicable, the securities must be sold in such jurisdictions only through registered or licensed brokers or dealers. In addition, in certain states the securities may not be sold unless they have been registered or qualified for sale in the applicable state or an exemption from the registration or qualification requirement is available and is complied with.

To the extent required, this prospectus may be amended and/or supplemented from time to time to describe a specific plan of distribution. Instead of selling securities under this prospectus, we and/or the selling stockholder may sell the securities offered, including shares of common stock, in compliance with the provisions of Rule 144 or Rule 144A under the Securities Act, if available, or pursuant to other available exemptions from the registration requirements of the Securities Act.

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LEGAL MATTERS

Certain legal matters relating to the issuance and sale of the securities offered hereby will be passed upon for us and the selling stockholders by Ropes & Gray LLP, Boston, Massachusetts. Additional legal matters may be passed upon for us, the selling stockholders or any underwriters, dealers or agents, by counsel that we will name in the applicable prospectus supplement.

Experts

The consolidated financial statements, incorporated in this prospectus by reference from the Company s Annual Report on Form 10-K, have been audited by Deloitte & Touche LLP, an independent registered public accounting firm, as stated in their report, which is incorporated herein by reference. Such consolidated financial statements have been so incorporated in reliance upon the report of such firm given upon their authority as experts in accounting and auditing.

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3,000,000 Shares

Lantheus Holdings, Inc.

Common Stock

PROSPECTUS SUPPLEMENT

March 13, 2017

Credit Suisse