

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

**FORM S-3  
REGISTRATION STATEMENT  
UNDER  
THE SECURITIES ACT OF 1933**

**SeaStar Medical Holding Corporation**  
(Exact Name of Registrant as Specified in Its Charter)

**Delaware**  
(State or Other Jurisdiction of  
Incorporation or Organization)

**85-3681132**  
(I.R.S. Employer  
Identification No.)

**3513 Brighton Blvd., Suite 410  
Denver, CO 80216  
(844) 427-8100**  
(Address, Including Zip Code, and Telephone Number, Including Area Code, of Registrant's Principal Executive Offices)

**Eric Schlorff  
Chief Executive Officer  
3513 Brighton Blvd., Suite 410  
Denver, CO 80216  
(844) 427-8100**  
(Name, Address, Including Zip Code, and Telephone Number, Including Area Code, of Agent for Service)

*It is respectfully requested that the Commission also send copies of all notices, orders and communications to:*

**David Marx  
Joshua Erikson  
Dorsey & Whitney LLP  
111 S. Main Street, Suite 2100  
Salt Lake City, Utah 84111  
(801) 933-7360**

Approximate date of commencement of proposed sale to the public: From time to time after the effective date of this registration statement.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, please check the following box.

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box, and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box, and list the Securities Act registration statement number of the earlier effective registration statement for the same offering.

Indicate by check mark whether the registrant is a large, accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large, accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 under the Securities Exchange Act of 1934:

Large, accelerated filer	<input type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input checked="" type="checkbox"/>	Smaller reporting company	<input checked="" type="checkbox"/>
		Emerging growth company	<input checked="" type="checkbox"/>

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act.

**The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the Registration Statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.**

**The information in this preliminary prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This preliminary prospectus is not an offer to sell these securities and is not soliciting an offer to buy these securities in any jurisdiction where the offer or sale is not permitted.**

**SUBJECT TO COMPLETION - DATED APRIL 22, 2025**

**PRELIMINARY PROSPECTUS**



**Up to 3,529,412 Shares of Common Stock**

**Offered by the Selling Securityholder**

This prospectus relates to the offer and resale, from time to time, of up to 3,529,412 shares (the "Shares") of our common stock, \$0.0001 par value per share (the "Common Stock"), by a single institutional investor (the "Selling Securityholder").

The Shares registered for resale under this prospectus underlie common stock purchase warrants (the "Warrants") to purchase an aggregate of up to 3,529,412 shares of our Common Stock, each at an exercise price of \$1.70 per share. The Warrants were issued to the Selling Securityholder in connection with that certain securities purchase agreement dated January 31, 2025, that we entered into with the Selling Securityholder (the "SPA"). The Warrants became exercisable on March 28, 2025, the effective date of the stockholder approval for the issuance of the Shares issuable upon exercise of the Warrants (the "Stockholder Approval Date") and will expire on the date that is the fifth anniversary of the Stockholder Approval Date.

In the event the Selling Securityholder exercises all of the Warrants in cash at an exercise price of \$1.70 per share, we may receive an aggregate of approximately \$6,000,000 of gross proceeds. We will not receive any proceeds from the sale of the Shares by the Selling Securityholder. Any proceeds that we receive from the exercise of such Warrants will be used for working capital and general corporate purposes. See "Use of Proceeds" on page 8.

Our registration of the Shares covered by this prospectus does not mean that the Selling Securityholder will offer or sell any of the Shares. See the section titled "Plan of Distribution" for additional information about how the Selling Securityholder may sell or otherwise dispose of the Shares. See the section titled "Selling Securityholder" for additional information regarding the Selling Securityholder.

Our Common Stock is traded on The Nasdaq Capital Market under the symbol "ICU." Our 10,550,000 listed warrants which do not include the Warrants registered for resale hereunder (the "Listed Warrants") are traded on The Nasdaq Capital Market under the symbol "ICUCW." On April 21, 2025, the last reported sale price on Nasdaq of our Common Stock was \$1.21 per share and the closing price of our Listed Warrants was \$0.0357 per warrant.

On June 7, 2024, we effected a 1-for-25 reverse stock split of the Common Stock (the "Reverse Split") of our issued and outstanding shares of Common Stock, and our shares of Common Stock began trading on a split-adjusted basis on the Nasdaq Capital Market on June 10, 2024 under the same symbol "ICU". All of our stock options and warrants outstanding immediately prior to the Reverse Split were proportionally adjusted except for the Listed Warrants and the private placement warrants that were issued as part of the SPAC transaction, which total 16,788,000 outstanding warrants in the aggregate (the "Unadjusted Warrants"). The Unadjusted Warrants retain an \$11.50 exercise price each and require the exercise of 25 warrants to purchase one share of Common Stock. Unless otherwise indicated, all other share and per share prices in this prospectus have been adjusted to reflect the Reverse Split. However, Common Stock share and per share amounts in certain of the documents incorporated by reference herein have not been adjusted to give effect to the Reverse Split.

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On June 24, 2024, we received a written notification from the Listing Qualifications staff of The Nasdaq Stock Market (“Nasdaq”) that we were not in compliance with the requirement to maintain a minimum market value of listed securities of \$35 million (the “MVLS Requirement”), as set forth in Nasdaq Listing Rule 5550(b)(2) (the “MVLS Rule”), because the market value of our listed securities (the “Securities”) had been below \$35 million for 30 consecutive business days. We had an initial 180 days, or until December 23, 2024, to regain compliance with the MVLS Requirement.

On December 24, 2024, we received written notification (the “Notification”) from Nasdaq stating that we had not regained compliance with the MVLS Requirement. Pursuant to the Notification, the Securities were subject to delisting from Nasdaq on January 3, 2025, unless we requested a hearing before the Nasdaq Hearings Panel (the “Panel”) by December 31, 2024.

On March 11, 2025, we received a decision letter (the “Letter”) from the Panel, granting our request to continue its listing on Nasdaq, subject to certain conditions. The Panel’s decision provides us with an exception until June 22, 2025, to demonstrate compliance with the MVLS Requirement.

We are a “smaller reporting company” and an “emerging growth company” as defined under the federal securities laws and, as such, have elected to comply with certain reduced reporting requirements for this prospectus and may elect to do so in future filings.

*Investing in our securities involves a high degree of risk. You should review carefully the risks and uncertainties described under the heading “Risk Factors” on page 4 of this prospectus as well as those contained in the applicable prospectus supplement and any related free writing prospectus, and under similar headings in the other documents that are incorporated by reference into this prospectus.*

**Neither the Securities 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 date of this prospectus is      , 2025.

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## ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement on Form S-3 (the “Registration Statement”) that we filed with the Securities and Exchange Commission (the “SEC”) using the “shelf” registration process. Under this shelf registration process, the Selling Securityholder may, from time to time, sell the securities offered by it described in this prospectus. We will not receive any proceeds from the sale of the Shares by the Selling Securityholder. In the event the Selling Securityholder exercises all of the Warrants in cash at an exercise price of \$1.70 per share, we may receive an aggregate of approximately \$6,000,000 of gross proceeds. Any proceeds that we receive from the exercise of such Warrants will be used for working capital and general corporate purposes.

We have not, and the Selling Securityholder has not, authorized anyone to provide you with information different than or inconsistent with the information contained in or incorporated by reference in this prospectus, any applicable prospectus supplement or any free writing prospectus that we have authorized for use in connection with this offering. Neither we nor the Selling Securityholder take responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. We are not, and the Selling Securityholder is not, making an offer to sell these securities in any jurisdiction where the offer or sale is not permitted or in which the person making that offer or solicitation is not qualified to do so or to anyone to whom it is unlawful to make an offer or solicitation. You should assume that the information contained in or incorporated by reference in this prospectus, any applicable prospectus supplement or in any free writing prospectus that we have authorized for use in connection with this offering, is accurate only as of the date of those respective documents, regardless of the time of delivery of those respective documents. Our business, financial condition, results of operations and prospects may have changed since those dates. You should read this prospectus, any applicable prospectus supplement, any free writing prospectus that we have authorized for use in connection with this prospectus and the documents incorporated by reference in this prospectus, any applicable prospectus supplement, any free writing prospectus that we have authorized for use in connection with this prospectus, in their entirety before making an investment decision. You should also read and consider the information in the documents to which we have referred you in the sections titled “Where You Can Find More Information” and “Incorporation of Certain Information by Reference.”

The Selling Securityholder is offering to sell, and seeking offers to buy, the securities offered by the Selling Securityholder described in this prospectus only in jurisdictions where offers and sales are permitted. The distribution of this prospectus and this offering of our securities in certain jurisdictions may be restricted by law. Persons outside the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, this offering of our securities and the distribution of this prospectus outside the United States. This prospectus does not constitute, and may not be used in connection with, an offer to sell, or a solicitation of an offer to buy, any securities offered by this prospectus by any person in any jurisdiction in which it is unlawful for such person to make such an offer or solicitation.

Unless otherwise mentioned or unless the context indicates otherwise, all references in this prospectus to the “Company,” “we,” “us” and “our” refer to the business of SeaStar Medical Holding Corporation, a Delaware corporation, and its consolidated subsidiaries following the Business Combination (as defined below). “LMAO” refers to LMF Acquisition Opportunities, Inc. prior to the Business Combination. LMFAO Sponsor, LLC (the “Sponsor”) is LMAO’s sponsor and sole holder of founding shares.

## PROSPECTUS SUMMARY

*The following summary highlights certain information about us, this offering and selected information contained elsewhere in or incorporated by reference into this prospectus. This summary is not complete and does not contain all of the information that you should consider before deciding whether to invest in our securities. For a more complete understanding of our company and this offering, you should read and consider carefully the more detailed information included or incorporated by reference in this prospectus, including the factors described under the heading "Risk Factors."*

### **Business Summary**

#### ***Company Overview***

We are a commercial stage healthcare company focused on transforming treatments for critically ill patients facing organ failure and potential loss of life. Our Selective Cytopheretic Device ("SCD"), is designed as a disease-modifying device that neutralizes over-active immune cells and stops the cytokine storm that yield destructive hyperinflammation and creates a cascade of events that wreak havoc in the patient's body. It has broad potential applications for patients suffering from both acute and chronic kidney disease as well as cardiovascular and other serious inflammatory diseases.

We received Food and Drug Administration ("FDA") approval on February 21, 2024, under a Humanitarian Device Exemption ("HDE") for our pediatric SCD therapy. It is the only FDA approved product for use in pediatric patients with acute kidney injury ("AKI") due to sepsis or a septic condition requiring kidney replacement therapy. We shipped our first commercial pediatric SCD ("QUELIMMUNE") in July 2024. In addition, we are currently conducting a pivotal clinical trial to assess the safety and efficacy of the SCD therapy in critically ill adult patients with AKI requiring continuous renal replacement therapy ("CRRT").

Our SCD therapy has been awarded Breakthrough Device Designation ("BDD") for six therapeutic indications by the FDA, including the use of the SCD therapy for adult patients with AKI, patients with cardiorenal syndrome awaiting left ventricular assist device ("LVAD") implantation, patients with hepatorenal syndrome, patients with end stage renal disease ("ESRD") and adult and pediatric patients undergoing cardiac surgery. The BDD enables the potential for a speedier pathway to approval and the ability to have more frequent and flexible meetings with the FDA.

The inflammatory response is essential to the healing process of critical organs; however, the overactivation of inflammatory cells, which can be triggered by many different bodily insults such as trauma, surgery or infection, can send the body into shock and cause severe damage to a variety of critical organs such as the heart, lungs and kidney. Central to inflammation are the cells within blood and lymph circulatory systems, called white blood cells (primarily neutrophils and monocytes). In a normal inflammatory response, neutrophils are the first immune cells to arrive at the site and are key to the entire immune response that kills pathogens and promotes tissue repair. These inflammatory cells release chemicals (cytokines) that trigger the immune system to eliminate foreign pathogens or damaged tissue, enhancing the immune response.

If the inflammatory response becomes excessive and dysregulated (referred to as proinflammatory), the inflammatory cells will continue to produce cytokines and other damaging molecules, further enhancing the dysregulated immune response, and altering feedback mechanisms that regulate the immune system. This results in damaging hyperinflammation spreading uncontrollably to other parts of the body, often leading to acute chronic solid organ dysfunction or failure, including the heart, lung, kidney, liver, and even death. This hyperinflammatory response is also known as the "cytokine storm," referring to the body's reaction to the category of small-secreted proteins released by hyperinflammatory cells that affect communication between cells.

Currently, there are no therapeutic options that specifically neutralize the white blood cells that are primarily responsible for the destructive hyperinflammatory response. Clinicians typically address hyperinflammation with therapies that are either immunosuppressive or that target one cytokine, both of which are generally suboptimal in the treatment of hyperinflammation. We believe our technology has the potential to overcome limitations in existing anti-inflammatory treatments and address the challenge of selectively targeting activated neutrophils and monocytes.

We are leveraging our patent protected and scalable SCD technology platform to develop proprietary therapies that are organ agnostic and target both acute and chronic indications. Preclinically, our SCD was tested in various animal models, which include acute myocardial infarction, intracranial hemorrhage, chronic heart failure, sepsis, and acute respiratory distress syndrome. The animal models demonstrated the inflammatory response and how it was modified by our SCD. We will continue to explore the application of our SCD technology across a broad range of markets and indications where proinflammatory activated neutrophils and monocytes may contribute to disease progression or severity in both acute and chronic indications

We are using our SCD initially to clinically validate several acute organ injury indications, including kidneys and lungs. Our investigational SCD for adults is an extracorporeal synthetic membrane device that is currently being evaluated in a pivotal clinical trial in the U.S. for premarket clearance by the FDA. The SCD for adults is designed to be easily integrated into existing CRRT systems that are commonly installed in hospitals, including in intensive care units throughout the United States. Similar to our pediatric SCD, once approved and commercialized, our adult SCD is expected to initially target acute kidney injury in adults on CRRT. In addition, we are developing our SCD to address inflammation associated with liver disease, acute respiratory distress syndrome, chronic dialysis and chronic heart failure in adult populations.

There is substantial clinical demand for safe and effective control of hyperinflammation. The use of our SCD to reverse the cytokine storm in pediatric and adult patients with acute kidney injury on CRRT in clinical studies with more than 150 patients reduced mortality rates by 50%, and, of those patients who survive 60 days, none have required dialysis.

On October 28, 2022, we completed a business combination with LMAO, pursuant to that certain Agreement and Plan of Merger, dated as of April 21, 2022 (the “Merger Agreement”), by and among LMAO, LMF Merger Sub, Inc., a Delaware corporation and direct wholly owned subsidiary of LMAO (“Merger Sub”), and SeaStar Medical, Inc., a Delaware corporation (“SeaStar Medical, Inc.”). As contemplated by the Merger Agreement, SeaStar Medical, Inc. merged with and into Merger Sub, with SeaStar Medical, Inc. continuing as the surviving entity in the merger as a wholly owned subsidiary of LMAO (the “Business Combination”). In connection with the closing of the Business Combination, LMAO changed its name to “SeaStar Medical Holding Corporation.”

### ***Corporate Information***

Our principal executive offices are located at 3513 Brighton Boulevard, Suite 410, Denver, Colorado 80216, and our phone number is 844-427-8100.

### ***Implications of Being a Smaller Reporting Company***

We are a “smaller reporting company,” meaning that the market value of our Common Stock held by non-affiliates is less than \$250.0 million measured on the last business day of our most recent second fiscal quarter or our annual revenue was less than \$100.0 million during the most recent completed fiscal year and the market value of our Common Stock held by non-affiliates was less than \$700.0 million measured on the last business day of our most recent second fiscal quarter. Accordingly, we may provide less public disclosure than larger public companies, including the inclusion of only two years of audited financial statements and only two years of management’s discussion and analysis of financial condition and results of operations disclosure. As a result, the information that we provide to our stockholders may be different than you might receive from other public reporting companies in which you hold equity interests.

### ***Recent Developments***

#### ***Nasdaq Listing***

On June 24, 2024, we received a written notification from the Listing Qualifications staff of Nasdaq that we were not in compliance with the requirement to maintain a minimum market value of listed securities of \$35 million, as set forth in the MVLS Rule, because the market value of our listed securities had been below \$35 million for 30 consecutive business days. We had an initial 180 days, or until December 23, 2024, to regain compliance with the MVLS Requirement.

On December 24, 2024, we received the Notification from Nasdaq stating that we had not regained compliance with the MVLS Requirement. Pursuant to the Notification, the Securities were subject to delisting from Nasdaq on January 3, 2025, unless we requested a hearing before the Panel by December 31, 2024.

On March 11, 2025, we received the Letter from the Panel, granting our request to continue its listing on Nasdaq, subject to certain conditions. The Panel’s decision provides us with an exception until June 22, 2025, to demonstrate compliance with the MVLS Requirement.

## THE OFFERING

<b>Securities Offered by the Selling Securityholder</b>	Up to 3,529,412 Shares of Common Stock issuable upon exercise of the Warrants.
<b>Use of Proceeds</b>	We will not receive any proceeds from the sale of the Shares by the Selling Securityholder. In the event the Selling Securityholder exercises all of the Warrants in cash at an exercise price of \$1.70 per share, we may receive an aggregate of \$6,000,000 of gross proceeds. Any proceeds that we receive from the exercise of such Warrants will be used for working capital and general corporate purposes.
<b>Risk Factors</b>	Investing in our securities involves a high degree of risk. See the section titled “Risk Factors” on page 4 of this prospectus and under similar headings in other documents incorporated by reference herein.
<b>Nasdaq Capital Market Symbol</b>	Our Common Stock and Listed Warrants are listed for trading on The Nasdaq Capital Market under the symbols “ICU” and “ICUCW,” respectively.

## RISK FACTORS

*An investment in our securities involves a high degree of risk. You should carefully consider the following risk factors and the risk factors discussed under the section titled "Risk Factors" contained in our most recent Annual Report on Form 10-K and in our subsequent Quarterly Reports on Form 10-Q, as updated by any amendments thereto reflected in subsequent filings, which are incorporated by reference into this prospectus in their entirety, together with all of the other information contained in this prospectus or incorporated by reference into this prospectus, any prospectus supplement and any free writing prospectus that we may authorize. The risks and uncertainties described in these documents are not the only ones we face. Other risks and uncertainties, including those that we do not currently consider material, may impair our business. If any of the risks discussed below or incorporated by reference actually occur, our business, financial condition, operating results or cash flows could be materially adversely affected. This could cause the value of our securities to decline, and you may lose all or part of your investment.*

### **Risks Related to this Offering**

***The sale or availability for sale of shares issuable upon exercise of the Warrants may depress the price of our Common Stock and encourage short sales by third parties, which could further depress the price of our Common Stock.***

To the extent that the Selling Securityholder sells shares of our Common Stock issued upon exercise of the Warrants, the market price of such shares may decrease due to the additional selling pressure in the market. In addition, the dilution from issuances of such shares may cause stockholders to sell their shares of our Common Stock, which could further contribute to any decline in the price of our Common Stock. Any downward pressure on the price of our Common Stock caused by the sale or potential sale of such shares could encourage short sales by third parties. Such sales could place downward pressure on the price of our Common Stock by increasing the number of shares of our Common Stock being sold, which could further contribute to any decline in the market price of our Common Stock.

***Future sales and issuances of our Common Stock or other securities might result in significant dilution and could cause the price of our Common Stock to decline.***

To raise capital, we may sell Common Stock, convertible securities or other equity securities in one or more transactions, at prices and in a manner we determine from time to time. 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 cannot predict what effect, if any, sales of shares of our Common Stock in the public market or the availability of shares for sale will have on the market price of our Common Stock. However, future sales of substantial amounts of our Common Stock in the public market, including shares issued upon exercise of outstanding options, or the perception that such sales may occur, could adversely affect the market price of our Common Stock.

***Management will have broad discretion as to the use of the proceeds from the offering, and uses may not improve our financial condition or market value.***

We will not receive any proceeds from the sale of the Shares by the Selling Securityholder. In the event the Selling Securityholder exercises all of the Warrants in cash at an exercise price of \$1.70 per share, we may receive an aggregate of \$6,000,000 of gross proceeds. Any proceeds that we receive from the exercise of such Warrants will be used for working capital and general corporate purposes.

Because we have not designated the amount of proceeds from the offering to be used for any particular purpose, our management will have broad discretion as to the application of such proceeds and could use them for purposes other than those contemplated hereby. Our management may use the proceeds for corporate purposes that may not improve our financial condition or market value.

## Risks Related to our Company

*Our Common Stock may be delisted from Nasdaq if we do not maintain compliance with Nasdaq's continued listing requirements. If our Common Stock is delisted, it could negatively impact us.*

Continued listing of a security on Nasdaq is conditioned upon compliance with various continued listing standards. There can be no assurance that we will be able to comply with the applicable listing standards. We have in the past received notifications of noncompliance with Nasdaq's continued listing standards and there is no guarantee that we will not receive such notifications in the future.

For example, on June 24, 2024, we received a written notification from the Listing Qualifications staff of Nasdaq that we were not in compliance with the requirement to maintain a minimum market value of listed securities of \$35 million, as set forth in the MVLS Rule, because the market value of our listed securities had been below \$35 million for 30 consecutive business days. We had an initial 180 days, or until December 23, 2024, to regain compliance with the MVLS Requirement.

On December 24, 2024, we received the Notification from Nasdaq stating that we had not regained compliance with the MVLS Requirement. Pursuant to the Notification, the Securities were subject to delisting from Nasdaq on January 3, 2025, unless we requested a hearing before the Panel by December 31, 2024.

On March 11, 2025, we received the Letter from the Panel, granting our request to continue its listing on Nasdaq, subject to certain conditions. The Panel's decision provides us with an exception until June 22, 2025, to demonstrate compliance with the MVLS Requirement.

If our Common Stock ultimately were to be delisted for any reason, it could negatively impact us by (i) reducing the liquidity and market price of our Common Stock; (ii) reducing the number of investors willing to hold or acquire our Common Stock, which could negatively impact our ability to raise equity financing; (iii) limiting our ability to use a registration statement to offer and sell freely tradable securities, thereby preventing us from accessing the public capital markets; and (iv) impairing our ability to provide equity incentives to our employees.

## CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus, including the documents incorporated by reference herein and therein, contain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended (the “Securities Act”) and Section 21E of the Exchange Act of 1934, as amended (the “Exchange Act”). These statements are based on our management’s current beliefs, expectations and assumptions about future events, conditions and results and on information currently available to us. Discussions containing these forward-looking statements may be found, among other places, in the sections titled “Business,” “Risk Factors” and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” incorporated by reference from our most recent Annual Report on Form 10-K and our subsequent Quarterly Reports on Form 10-Q filed with the SEC, as well as any amendments thereto reflected in subsequent filings with the SEC.

Any statements in this prospectus or incorporated by reference herein or therein about our expectations, beliefs, plans, objectives, assumptions or future events or performance are not historical facts and are forward-looking statements. Within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act, these forward-looking statements may include, but are not limited to, statements regarding:

- our future capital requirements and sources and uses of cash;
- our ability to obtain funding or raise capital for our operations and future growth;
- any delays or challenges in obtaining U.S. Food and Drug Administration approval of our SCD product candidates;
- economic downturns and the possibility of rapid change in the highly competitive industry in which we operate;
- the ability to develop and commercialize our products or services following regulatory approval of our product candidates;
- the failure of third-party suppliers and manufacturers to fully and timely meet their obligations;
- product liability or regulatory lawsuits or proceedings relating to our products and services;
- inability to secure or protect our intellectual property;
- dispute or deterioration of relationship with our major partners and collaborators;
- the ability to maintain the listing of our Common Stock on the Nasdaq Capital Market;
- the ability to recognize the anticipated benefits of the Business Combination, which may be affected by, among other things, competition, and the ability of to grow and manage growth profitably; and
- other risks and uncertainties indicated in this prospectus, including those under “Risk Factors” herein, and other filings that have been made or will be made with the SEC.

In some cases, you can identify forward-looking statements by terminology such as “anticipate,” “believe,” “continue,” “could,” “estimate,” “expects,” “intend,” “may,” “might,” “plan,” “potential,” “predict,” “project,” “should,” “will,” “would” or the negative or plural of those terms, and similar expressions intended to identify statements about the future, although not all forward-looking statements contain these words. These statements involve known and unknown risks, uncertainties and other factors that may cause our actual results, levels of activity, performance or achievements to be materially different from the information expressed or implied by these forward-looking statements. In addition, statements that “we believe” and similar statements reflect our beliefs and opinions on the relevant subject. These statements are based upon information available to us as of the date of this prospectus, and while we believe such information forms a reasonable basis for such statements, such information may be limited or incomplete, and our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all potentially available relevant information. These statements are inherently uncertain and investors are cautioned not to unduly rely upon these statements.

You should refer to the risks and uncertainties described in the sections titled “Risk Factors” in this prospectus, and under similar headings in the other documents that are incorporated by reference into this prospectus, for a discussion of important factors that may cause our actual results to differ materially from those expressed or implied by our forward-looking statements. Given these risks, uncertainties and other factors, many of which are beyond our control, we cannot assure you that the forward-looking statements in this prospectus will prove to be accurate, and you should not place undue reliance on these forward-looking statements. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee that the future results, levels of activity, performance or events and circumstances reflected in the forward-looking statements will be achieved or occur. Furthermore, if our forward-looking statements prove to be inaccurate, the inaccuracy may be material. In light of the significant uncertainties in these forward-looking statements, you should not regard these statements as a representation or warranty by us or any other person that we will achieve our objectives and plans in any specified time frame, or at all.

Except as required by law, we assume no obligation to update these forward-looking statements publicly, or to revise any forward-looking statements to reflect events or developments occurring after the date of this prospectus, even if new information becomes available in the future.

## USE OF PROCEEDS

We will not receive any proceeds from the sale of the Shares by the Selling Securityholder. In the event the Selling Securityholder exercises all of the Warrants in cash at an exercise price of \$1.70 per share, we may receive an aggregate of approximately \$6,000,000 of gross proceeds.

## DESCRIPTION OF SECURITIES

*The following summary of the material terms of our securities is not intended to be a complete summary of the rights and preferences of such securities. The descriptions below are qualified by reference to the actual text of the Third Amended and Restated Certificate of Incorporation of SeaStar Medical Holding Corporation, as amended (the "Charter") and our Second Amended and Restated Bylaws (the "Bylaws"). We urge you to read the Charter and the Bylaws in its entirety for a complete description of the rights and preferences of our securities.*

### **Authorized and Outstanding Stock**

The Charter authorizes the issuance of 460,000,000 shares, consisting of (a) 450,000,000 shares of Common Stock and (b) 10,000,000 shares of preferred stock (the "Preferred Stock").

The outstanding shares of Common Stock issued in the Business Combination are duly authorized, validly issued, fully paid and non-assessable. All outstanding shares of LMAO Class B Common Stock following the Business Combination were converted into shares of LMAO Class A Common Stock on a one-to-one basis. Immediately following the conversion of such Class B Common Stock into shares of Class A Common Stock, each share of Class A Common Stock issued and outstanding was reclassified, redesignated and changed into one validly issued, fully paid and non-assessable share of Common Stock.

As of December 31, 2024, there were 5,977,246 shares of Common Stock issued and outstanding and no shares of Preferred Stock issued and outstanding.

### **Common Stock**

The Charter provides the following with respect to the rights, powers, preferences and privileges of the Common Stock:

#### ***Voting Power***

Except as otherwise required by law or as otherwise provided in any certificate of designation for any series of preferred stock, the holders of Common Stock possess all voting power for the election of our directors and all other matters requiring stockholder action. Holders of Common Stock are entitled to one vote per share on matters to be voted on by stockholders. The Charter does not provide for cumulative voting rights.

#### ***Dividends***

Subject to the rights, if any, of the holders of any outstanding shares of Preferred Stock, under the Charter, holders of Common Stock will be entitled to receive such dividends, if any, as may be declared from time to time by our Board of Directors (the "Board") in its discretion out of funds legally available therefor.

#### ***Liquidation, Dissolution and Winding Up***

In the event of our voluntary or involuntary liquidation, dissolution, distribution of assets or winding-up, the holders of the Common Stock will be entitled to receive an equal amount per share of all of our assets of whatever kind available for distribution to stockholders, after the rights of the holders of the Preferred Stock have been satisfied and after payment or provision for payment of our debts.

#### ***Preemptive or Other Rights***

There are no preemptive rights or sinking fund provisions applicable to the shares of our Common Stock.

#### ***Preferred Stock***

The Charter provides that shares of Preferred Stock may be issued from time to time in one or more series. Our Board is authorized to fix the voting rights, if any, designations, powers, preferences, the relative, participating, optional, or other special rights and any qualifications, limitations, and restrictions thereof, applicable to the shares of each series. Our Board will be able to, without stockholder approval, issue Preferred Stock with voting and other rights that could adversely affect the voting power and other rights of the holders of the Common Stock and could have anti-takeover effects. The ability of our Board to issue Preferred Stock without stockholder approval could have the effect of delaying, deferring, or preventing a change of control of us or the removal of existing management. We have no Preferred Stock outstanding at the date hereof. Although we do not currently intend to issue any shares of Preferred Stock, we cannot assure you that we will not do so in the future.

While we have no current plans to issue Preferred Stock, circumstances in which we might issue Preferred Stock in the future could include, among others, offerings of Preferred Stock undertaken for capital raising purposes (whether before or in connection with our initial business combination or thereafter), issuances in connection with acquisitions we might make in the future, or issuances in connection with potential change of control or strategic transactions involving us. Any determination by us to issue shares of Preferred Stock in the future will be dependent on the facts and circumstances at the time.

#### **Anti-Takeover Effects of Provisions of our Charter, our Bylaws and Delaware Law**

Some provisions of Delaware law and our Charter and Bylaws contain provisions that could make the following transactions more difficult: acquisition of us by means of a tender offer; acquisition of us by means of a proxy contest or otherwise; or removal of our incumbent officers and directors. It is possible that these provisions could make it more difficult to accomplish or could deter transactions that stockholders may otherwise consider to be in their best interest or in our best interests, including transactions that might result in a premium over the market price for our shares.

These provisions, summarized below, are expected to discourage coercive takeover practices and inadequate takeover bids. These provisions are also designed to encourage persons seeking to acquire control of us to first negotiate with the Board. We believe that the benefits of increased protection of our potential ability to negotiate with the proponent of an unfriendly or unsolicited proposal to acquire or restructure us outweigh the disadvantages of discouraging these proposals because negotiation of these proposals could result in an improvement of their terms.

#### ***Delaware Anti-takeover Statute***

We are subject to Section 203 of the Delaware General Corporation Law, which prohibits persons deemed “interested stockholders” from engaging in a “business combination” with a publicly held Delaware corporation for three years following the date these persons become interested stockholders unless the business combination is, or the transaction in which the person became an interested stockholder was, approved in a prescribed manner or another prescribed exception applies. Generally, an “interested stockholder” is a person who, together with affiliates and associates, beneficially owns, or within three years prior to the determination of interested stockholder status did own, 15% or more of a corporation’s voting stock. Generally, a “business combination” includes a merger, asset or stock sale, or other transaction resulting in a financial benefit to the interested stockholder. The existence of this provision may have an anti-takeover effect with respect to transactions not approved in advance by Board, such as discouraging takeover attempts that might result in a premium over the market price of our common stock.

#### ***Undesignated Preferred Stock***

The ability to authorize undesignated preferred stock makes it possible for the Board to issue preferred stock with voting or other rights or preferences that could impede the success of any attempt to institute a change of control of our company. These and other provisions may have the effect of deterring hostile takeovers or delaying changes in control or management of our company.

#### ***Special Stockholder Meetings***

Our Bylaws provide that a special meeting of stockholders may only be called by the Board.

### ***Requirements for Advance Notification of Stockholder Nominations and Proposals***

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 the Board or a committee of the Board.

### ***Elimination of Stockholder Action by Written Consent***

Our Charter and our Bylaws eliminate the right of stockholders to take action by written consent any action required to be taken at any annual or special meeting of stockholders.

### ***Classified Board; Election and Removal of Directors; Filling Vacancies***

The Board is divided into three classes. The directors in each class serve for a three-year term, one class being elected each year by our stockholders. Only one class of directors is elected at each annual meeting of our stockholders, with the other classes continuing for the remainder of their respective three-year terms. Because our stockholders do not have cumulative voting rights, our stockholders holding a majority of the shares of common stock outstanding will be able to elect all of our directors. Our Charter provides for the removal of any of our directors only for cause and requires a stockholder vote by the holders of at least a 66-2/3% of the outstanding shares of our capital stock entitled to vote in the election of directors or class of directors, voting together as a single class, at a meeting of the stockholders called for that purpose. Furthermore any new directorships or vacancies in the Board, including new directorships resulting from any increase in the number of directors to serve on the whole board and/or any unfilled vacancies by reason of death, resignation, disqualification, removal for cause, failure to elect or otherwise with respect to any director, may be filled by only the vote of a majority of the remaining directors then in office, although less than a quorum, or by the sole remaining director. This system of electing and removing directors and filling vacancies may tend to discourage a third party from making a tender offer or otherwise attempting to obtain control of us, because it generally makes it more difficult for stockholders to replace a majority of our directors.

### ***Choice of Forum***

Our Charter provides that, unless a majority of the Board, acting on our behalf, consents in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware (or, if the Court of Chancery does not have jurisdiction, another state court located within the State of Delaware or, if no court located within the State of Delaware has jurisdiction, the federal district court for the District of Delaware) shall be the sole and exclusive forum for any derivative action or proceeding brought on our behalf; any action asserting a breach of fiduciary duty; any action asserting a claim against us arising pursuant to the Delaware General Corporation Law, our Charter, our Bylaws or as to which the Delaware General Corporation Law confers jurisdiction to the Court of Chancery of the State of Delaware; or any action asserting a claim against us that is governed by the internal affairs doctrine. Our Charter also provides that the federal district courts of the United States of America are the exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act.

We believe these provisions may benefit us by providing increased consistency in the application of Delaware law and federal securities laws by chancellors and judges, as applicable, particularly experienced in resolving corporate disputes, efficient administration of cases on a more expedited schedule relative to other forums and protection against the burdens of multi-forum litigation. However, these provisions may have the effect of discouraging lawsuits against our directors and officers. The exclusive forum provision would not apply to suits brought to enforce any liability or duty created by the Exchange Act.

Our exclusive forum provision does not relieve us of our duties to comply with the federal securities laws and the rules and regulations thereunder, and our stockholders are not deemed to have waived our compliance with these laws, rules and regulations.

Although our Charter contains the choice of forum provisions described above, it is possible that a court could find that such a provision is inapplicable for a particular claim or action or that such provision is unenforceable.

### ***Amendment of Charter Provisions***

Our Charter grants us the right to amend, alter, change or repeal any provision in our Charter in the manner prescribed by the DGCL (the “Delaware General Corporation Law”). Under Section 242 of the DGCL, our Charter requires a greater vote, a proposed amendment to our Charter must be approved by the affirmative vote of a majority of the voting power of the outstanding stock entitled to vote thereon and a majority of the outstanding stock of each class entitled to vote as a class.

### ***Amendment of Bylaw Provisions***

Our Bylaws grant the Board the authority to amend, alter, repeal, or adopt new Bylaws in accordance with the procedures outlined in the Bylaws themselves. The Board can make such changes by a majority vote of all Board members at any regular or special meeting. Additionally, stockholders have the right to amend, alter, repeal, or adopt new bylaws by an affirmative vote of at least 50% of the outstanding shares of capital stock entitled to vote in the election of directors.

The provisions of the Delaware General Corporation Law, our Charter and our Bylaws could have the effect of discouraging others from attempting hostile takeovers and, as a consequence, they may also inhibit temporary fluctuations in the market price of our common stock that often result from actual or rumored hostile takeover attempts. These provisions may also have the effect of preventing changes in our management. It is possible that these provisions could make it more difficult to accomplish transactions that stockholders may otherwise deem to be in their best interests.

### **Warrants**

#### ***Listed Warrants***

Exercising a total of 25 Listed Warrants entitles the holder thereof to purchase one share of Common Stock at an aggregate price of \$287.50 per share, subject to adjustment as discussed below, at any time after November 27, 2022. The Listed Warrants will expire on October 28, 2027, or earlier upon redemption or liquidation.

We will not be obligated to deliver any shares of Common Stock pursuant to the exercise of a warrant and will have no obligation to settle such warrant exercise unless a registration statement under the Securities Act with respect to the shares of Common Stock underlying the Listed Warrants is then effective and a prospectus relating thereto is current, subject to our satisfying our obligations described below with respect to registration. No warrant will be exercisable and we will not be obligated to issue shares of Common Stock upon exercise of a warrant unless Common Stock issuable upon such warrant exercise has been registered, qualified or deemed to be exempt under the securities laws of the state of residence of the registered holder of the Listed Warrants. In the event that the conditions in the two immediately preceding sentences are not satisfied with respect to a warrant, the holder of such warrant will not be entitled to exercise such warrant and such warrant may have no value and expire worthless. In no event will we be required to net cash settle any Listed Warrant. In the event that a registration statement is not effective for the exercised warrants, the purchaser of a unit containing such warrant will have paid the full purchase price for the unit solely for the share of Common Stock underlying such unit.

We will use our best efforts to maintain a current prospectus relating to those shares of Common Stock until the Listed Warrants expire, as specified in the warrant agreement. Notwithstanding the above, if our Common Stock is at the time of any exercise of a warrant not listed on a national securities exchange such that it satisfies the definition of a “covered security” under Section 18(b)(1) of the Securities Act, we may, at our option, require holders of Listed Warrants who exercise their Listed Warrants to do so on a “cashless basis” in accordance with Section 3(a)(9) of the Securities Act and, in the event we so elect, we will not be required to file or maintain in effect a registration statement, but we will be required to use our reasonable best efforts to register or qualify the shares under applicable blue sky laws to the extent an exemption is not available.

Once the Listed Warrants become exercisable, we may call the Listed Warrants for redemption (other than the Private Placement Warrants, as described below):

- in whole and not in part;
- at a price of \$0.01 per warrant;
- upon not less than 30 days’ prior written notice of redemption (the “30-day redemption period”) to each warrant holder; and
- if, and only if, the reported last sale price of the Common Stock equals or exceeds \$450.00 per share (as adjusted for stock splits, stock dividends, reorganizations, recapitalizations and the like) for any 20 trading days within a 30-trading day period ending 3 business days before we send the notice of redemption to the warrant holders.

If and when the Listed Warrants become redeemable by us, we may exercise our redemption right even if we are unable to register or qualify the underlying securities for sale under all applicable state securities laws.

We have established the last of the redemption criterion discussed above to prevent a redemption call unless there is at the time of the call a significant premium to the warrant exercise price. If the foregoing conditions are satisfied and we issue a notice of redemption of the Listed Warrants, each warrant holder will be entitled to exercise its warrant prior to the scheduled redemption date. However, the price of the Common Stock may fall below the \$450.00 redemption trigger price (as adjusted for stock splits, stock dividends, reorganizations, recapitalizations, and the like) as well as the \$287.50 warrant exercise price after the redemption notice is issued.

If we call the Listed Warrants for redemption as described above, our management will have the option to require any holder that wishes to exercise its warrant to do so on a “cashless basis.” In determining whether to require all holders to exercise their Listed Warrants on a “cashless basis,” our management will consider, among other factors, our cash position, the number of Listed Warrants that are outstanding and the dilutive effect on our stockholders of issuing the maximum number of shares of Common Stock issuable upon the exercise of our Listed Warrants. If our management takes advantage of this option, all holders of Listed Warrants would pay the exercise price by surrendering their Listed Warrants for that number of shares of Common Stock equal to the quotient obtained by dividing: (x) the product of the number of shares of Common Stock underlying the Listed Warrants, multiplied by the difference between the exercise price of the Listed Warrants and the “fair market value” (defined below); by (y) the fair market value. The “fair market value” shall mean the average reported last sale price of the Common Stock for the 10 trading days ending on the third trading day prior to the date on which the notice of redemption is sent to the holders of Listed Warrants. If our management takes advantage of this option, the notice of redemption will contain the information necessary to calculate the number of shares of Common Stock to be received upon exercise of the Listed Warrants, including the “fair market value” in such case. Requiring a cashless exercise in this manner will reduce the number of shares to be issued and thereby lessen the dilutive effect of a warrant redemption. We believe this feature is an attractive option to us if we do not need the cash from the exercise of the Listed Warrants after our initial business combination. If we call our Listed Warrants for redemption and our management does not take advantage of this option, our Sponsor and its permitted transferees would still be entitled to exercise their Private Placement Warrants (as described below) for cash or on a cashless basis using the same formula described above that other warrant holders would have been required to use had all warrant holders been required to exercise their Listed Warrants on a cashless basis, as described in more detail below.

A holder of a warrant may notify us in writing in the event it elects to be subject to a requirement that such holder will not have the right to exercise such warrant, to the extent that after giving effect to such exercise, such person (together with such person’s affiliates), to the warrant agent’s actual knowledge, would beneficially own in excess of 4.9% or 9.8% (or such other amount as a holder may specify) of the shares of Common Stock outstanding immediately after giving effect to such exercise.

If the number of outstanding shares of Common Stock is increased by a stock dividend payable in shares of Common Stock, or by a split-up of shares of Common Stock or other similar event, then, on the effective date of such stock dividend, split-up or similar event, the number of shares of Common Stock issuable on exercise of each warrant will be increased in proportion to such increase in the outstanding shares of Common Stock. A rights offering to holders of Common Stock entitling holders to purchase shares of Common Stock at a price less than the fair market value will be deemed a stock dividend of a number of shares of Common Stock equal to the product of: (i) the number of shares of Common Stock actually sold in such rights offering (or issuable under any other equity securities sold in such rights offering that are convertible into or exercisable for Common Stock); and (ii) one (1) minus the quotient of: (x) the price per share of Common Stock paid in such rights offering, divided by (y) the fair market value. For these purposes: (i) if the rights offering is for securities convertible into or exercisable for Common Stock, in determining the price payable for Common Stock, there will be taken into account any consideration received for such rights, as well as any additional amount payable upon exercise or conversion; and (ii) fair market value means the volume weighted average price of Common Stock as reported during the ten (10) trading day period ending on the trading day prior to the first date on which the shares of Common Stock trade on the applicable exchange or in the applicable market, regular way, without the right to receive such rights.

In addition, if we, at any time while the Listed Warrants are outstanding and unexpired, pay a dividend or make a distribution in cash, securities or other assets to the holders of Common Stock on account of such shares of Common Stock (or other shares of our capital stock into which the Listed Warrants are convertible), other than: (a) as described above; or (b) certain ordinary cash dividends, then the warrant exercise price will be decreased, effective immediately after the effective date of such event, by the amount of cash and/or the fair market value of any securities or other assets paid on each share of Common Stock in respect of such event.

If the number of outstanding shares of our Common Stock is decreased by a consolidation, combination, reverse stock split or reclassification of shares of Common Stock or other similar event, then, on the effective date of such consolidation, combination, reverse stock split, reclassification or similar event, the number of shares of Common Stock issuable on exercise of each warrant will be decreased in proportion to such decrease in outstanding shares of Common Stock.

Whenever the number of shares of Common Stock purchasable upon the exercise of the Listed Warrants is adjusted, as described above, the warrant exercise price will be adjusted (to the nearest cent) by multiplying the warrant exercise price immediately prior to such adjustment by a fraction (x) the numerator of which will be the number of shares of Common Stock purchasable upon the exercise of the Listed Warrants immediately prior to such adjustment, and (y) the denominator of which will be the number of shares of Common Stock so purchasable immediately thereafter.

In case of any reclassification or reorganization of the outstanding shares of Common Stock (other than those described above or that solely affects the par value of such shares of Common Stock), or in the case of any merger or consolidation of us with or into another corporation (other than a consolidation or merger in which we are the continuing corporation and that does not result in any reclassification or reorganization of our outstanding shares of Common Stock), or in the case of any sale or conveyance to another corporation or entity of the assets or other property of us as an entirety or substantially as an entirety in connection with which we are dissolved, the holders of the Listed Warrants will thereafter have the right to purchase and receive, upon the basis and upon the terms and conditions specified in the Listed Warrants and in lieu of the shares of our Common Stock immediately theretofore purchasable and receivable upon the exercise of the rights represented thereby, the kind and amount of shares of stock or other securities or property (including cash) receivable upon such reclassification, reorganization, merger or consolidation, or upon a dissolution following any such sale or transfer, that the holder of the Listed Warrants would have received if such holder had exercised their Listed Warrants immediately prior to such event. If less than 70% of the consideration receivable by the holders of Common Stock in such a transaction is payable in the form of Common Stock in the successor entity that is listed for trading on a national securities exchange or is quoted in an established over-the-counter market, or is to be so listed for trading or quoted immediately following such event, and if the registered holder of the warrant properly exercises the warrant within thirty days following public disclosure of such transaction, the warrant exercise price will be reduced as specified in the warrant agreement based on the Black-Scholes value (as defined in the warrant agreement) of the warrant. The purpose of such exercise price reduction is to provide additional value to holders of the Listed Warrants when an extraordinary transaction occurs during the exercise period of the Listed Warrants pursuant to which the holders of the Listed Warrants otherwise do not receive the full potential value of the Listed Warrants.

The Listed Warrants were issued in registered form under a warrant agreement between Continental, as warrant agent, and us. The description of the Listed Warrants set forth herein is a summary and does not purport to be complete. The warrant agreement provides that the terms of the Listed Warrants may be amended without the consent of any holder to cure any ambiguity or correct any defective provision, but requires the approval by the holders of at least 50% of the then outstanding Listed Warrants to make any change that adversely affects the interests of the registered holders of Listed Warrants.

The Listed Warrants may be exercised upon surrender of the warrant certificate on or prior to the expiration date at the offices of the warrant agent, with the exercise form on the reverse side of the warrant certificate completed and executed as indicated, accompanied by full payment of the exercise price (or on a cashless basis, if applicable), by certified or official bank check payable to us, for the number of Listed Warrants being exercised. The warrant holders do not have the rights or privileges of holders of Common Stock and any voting rights until they exercise their Listed Warrants and receive shares of Common Stock. After the issuance of shares of Common Stock upon exercise of the Listed Warrants, each holder will be entitled to one (1) vote for each share held of record on all matters to be voted on by stockholders.

We have agreed that, subject to applicable law, any action, proceeding or claim against us arising out of or relating in any way to the warrant agreement will be brought and enforced in the courts of the City of New York, County of New York, State of New York or the United States District Court for the Southern District of New York, and we irrevocably submit to such jurisdiction, which jurisdiction will be the exclusive forum for any such action, proceeding or claim. This provision applies to claims under the Securities Act but does not apply to claims under the Exchange Act or any claim for which the federal district courts of the United States of America are the sole and exclusive forum.

#### **Listing**

Our Common Stock and Listed Warrants are traded on the Nasdaq Capital Market under the symbols "ICU" and "ICUCW," respectively.

## MATERIAL U.S. FEDERAL INCOME TAX CONSIDERATIONS

The following is a discussion of material U.S. federal income tax considerations applicable to a Non-U.S. Holder (as defined below) with respect to the ownership and disposition of shares of our Common Stock acquired pursuant to this offering. For purposes of this discussion, the term “Non-U.S. Holder” means a beneficial owner of shares of our Common Stock acquired pursuant to this offering that is treated for U.S. federal income tax purposes as an individual, corporation, estate or trust, other than:

- an individual who is a citizen or resident of the United States, as determined for U.S. federal income tax purposes;
- a corporation, or other entity taxable as a corporation for U.S. federal income tax purposes, created or organized in the United States or under the laws of the United States, any state thereof or the District of Columbia;
- an estate, the income of which is includible in gross income for U.S. federal income tax purposes regardless of its source; or
- a 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 domestic trust.

If a partnership (or an entity treated as a partnership for U.S. federal income tax purposes) holds shares of our Common Stock, the tax treatment of a person treated as a partner of such partnership generally will depend on the status of the partner, the activities of the partnership and certain determinations made at the partner level. Accordingly, partnerships holding shares of our Common Stock and persons that, for U.S. federal income tax purposes, are treated as partners in such partnerships should consult their own tax advisors regarding the U.S. federal income tax consequences to them.

This discussion only addresses beneficial owners that are Non-U.S. Holders of shares of our Common Stock acquired pursuant to this offering that hold such shares of Common Stock as a capital asset within the meaning of Section 1221 of the U.S. Internal Revenue Code of 1986, as amended (the “Code”) (generally, property held for investment). This discussion does not address all aspects of U.S. federal income taxation that may be important to a Non-U.S. Holder in light of such Non-U.S. Holder’s particular circumstances or that may be applicable to Non-U.S. Holders subject to special treatment under U.S. federal income tax law (including, for example, banks, financial institutions, regulated investment companies, mutual funds, real estate investment trusts, dealers in securities, traders in securities that elect mark-to-market treatment, insurance companies, tax-exempt entities, governmental organizations, Non-U.S. Holders who acquire our Common Stock pursuant to the exercise of employee stock options or otherwise as compensation for their services, Non-U.S. Holders liable for the alternative minimum tax, controlled foreign corporations (and shareholders therein), passive foreign investment companies (and shareholders therein), former citizens or former long-term residents of the United States, persons subject to special tax accounting rules as a result of any item of gross income with respect to shares of our Common Stock being taken into account in an applicable financial statement, partnerships or other pass-through entities (and investors therein), corporations organized outside the United States, any state thereof, or the District of Columbia that are nonetheless treated as U.S. persons for U.S. federal income tax purposes, persons deemed to sell our Common Stock under the constructive sale provisions of the Code, and Non-U.S. Holders that hold our Common Stock as part of a hedge, straddle, constructive sale, conversion, or other integrated transaction). In addition, this discussion does not address U.S. federal tax laws other than those pertaining to U.S. federal income tax (such as U.S. federal estate or gift tax, the alternative minimum tax, or the federal net investment income tax), nor does it address any aspects of U.S. state, local or non-U.S. taxes. Non-U.S. Holders are urged to consult with their own tax advisors regarding the possible application of these taxes. Except as discussed below, this summary does not address tax reporting requirements.

The following discussion is based upon current provisions of the Code, U.S. judicial decisions, administrative pronouncements and Treasury regulations, all as in effect and applicable as of the date hereof. All of the preceding authorities are subject to change at any time, possibly with retroactive effect, so as to result in U.S. federal income tax consequences different from those discussed below. We have not requested, and will not request, a legal opinion from legal counsel or a ruling from the IRS with respect to any of the U.S. federal income tax consequences described below, and as a result there can be no assurance that the IRS will not disagree with or challenge any of the conclusions we have reached and describe herein.

Prospective purchasers should consult their own tax advisors as to the particular consequences to them under U.S. federal, state and local, and applicable foreign tax laws of the acquisition, ownership and disposition of our Common Stock.

### **Distributions**

Distributions of cash or property that we pay in respect of our Common Stock 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). Subject to the discussions below under “-U.S. Trade or Business Income,” “-Information Reporting and Backup Withholding” and “-FATCA,” a Non-U.S. Holder generally will be subject to U.S. federal withholding tax at a 30% rate, or at a reduced rate prescribed by an applicable income tax treaty, on any dividends received in respect of our Common Stock. If the amount of the distribution exceeds our current and accumulated earnings and profits, such excess first will be treated as a return of capital to the extent of such holder’s tax basis in our Common Stock, and thereafter will be treated as capital gain. However, we (or the paying agent or other intermediary through which a Non-U.S. Holder holds its Common Stock elects) may be required to withhold on the entire distribution, in which case a Non-U.S. Holder would be entitled to a refund from the IRS for the withholding tax on the portion of the distribution that exceeded our current and accumulated earnings and profits. If we are a USRPHC (as defined below) and we do not qualify for the Regularly Traded Exception (as defined below), distributions which constitute a return of capital will be subject to withholding tax unless an application for a withholding certificate is filed to reduce or eliminate such withholding.

In order to obtain a reduced rate of U.S. federal withholding tax under an applicable income tax treaty, a Non-U.S. Holder will be required to provide a properly executed IRS Form W-8BEN or Form W-8BEN-E (or, in each case, a successor form) certifying such holder’s entitlement to benefits under the treaty. If a Non-U.S. Holder is eligible for a reduced rate of U.S. federal withholding tax under an income tax treaty, such holder may obtain a refund or credit of any excess amounts withheld by filing an appropriate claim for a refund with the IRS. Non-U.S. Holders are urged to consult their own tax advisor regarding possible entitlement to benefits under an applicable income tax treaty.

### **Sale, Exchange or Other Taxable Disposition of Common Stock**

Subject to the discussions below under “-U.S. Trade or Business Income,” “-Information Reporting and Backup Withholding” and “-FATCA,” Non-U.S. Holders generally will not be subject to U.S. federal income or withholding tax in respect of any gain on a sale, exchange or other taxable disposition of our Common Stock unless:

- the gain is U.S. trade or business income, in which case, such gain will be taxed as described in “-U.S. Trade or Business Income” below;
- 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 the disposition and certain other conditions are met, in which case the Non-U.S. Holder will be subject to U.S. federal income tax at a rate of 30% (or a reduced rate under an applicable income tax treaty) on the amount by which certain capital gains allocable to U.S. sources exceed certain capital losses allocable to U.S. sources; or
- we are or have been a “United States real property holding corporation” (a “USRPHC”) under Section 897 of the Code at any time during the shorter of the five-year period ending on the date of the disposition and such Non-U.S. Holder’s holding period for the Common Stock, in which case, subject to the exception set forth in the second sentence of the next paragraph, such gain will be subject to U.S. federal income tax in the same manner as U.S. trade or business income discussed below.

In general, a corporation is a USRPHC if the fair market value of its “United States real property interests” equals or exceeds 50% of the sum of the fair market value of its worldwide real property interests and its other assets used or held for use in a trade or business. In the event that we are determined to be a USRPHC, gain will not be subject to tax as U.S. trade or business income if such Non-U.S. Holder’s holdings (actually and constructively) at all times during the applicable period described in the third bullet point above constituted 5% or less of our Common Stock, provided that our Common Stock was regularly traded on an established securities market during such period as determined under the rules set forth in the Treasury regulations (the “Regularly Traded Exception”). We believe that we are not currently, and we do not anticipate becoming in the future, a USRPHC for U.S. federal income tax purposes.

## **U.S. Trade or Business Income**

For purposes of this discussion, dividend income and gain on the sale, exchange or other taxable disposition of our Common Stock will be considered to be “U.S. trade or business income” if (i) such income or gain is effectively connected with a Non-U.S. Holder’s conduct of a trade or business within the United States and (ii) a Non-U.S. Holder is eligible for the benefits of an income tax treaty with the United States and, if such treaty requires, such gain is attributable to a permanent establishment (or, if a Non-U.S. Holder is an individual, a fixed base) that Non-U.S. Holder maintains in the United States. Generally, U.S. trade or business income is not subject to U.S. federal withholding tax (provided that a Non-U.S. Holder complies with applicable certification and disclosure requirements, including providing a properly executed IRS Form W-8ECI (or successor form)); instead, a Non-U.S. Holder is subject to U.S. federal income tax on a net basis at regular U.S. federal income tax rates (generally in the same manner as a U.S. person) on such Non-U.S. Holder’s U.S. trade or business income. If a Non-U.S. Holder is a corporation, any U.S. trade or business income that a Non-U.S. Holder receives may also be subject to a “branch profits tax” at a 30% rate, or at a lower rate prescribed by an applicable income tax treaty.

## **Information Reporting and Backup Withholding**

We must annually report to the IRS and to each Non-U.S. Holder any dividend income that is subject to U.S. federal withholding tax or that is exempt from such withholding pursuant to an income tax treaty. Copies of these information returns may also be made available under the provisions of a specific treaty or agreement to the tax authorities of the country in which a Non-U.S. Holder resides. Under certain circumstances, the Code imposes a backup withholding obligation on certain reportable payments. Dividends paid to such Non-U.S. Holder will generally be exempt from backup withholding if such Non-U.S. Holder provides a properly executed IRS Form W-8BEN or Form W-8BEN-E (or, in each case, a successor form) or otherwise establish an exemption and we do not have actual knowledge or reason to know that such Non-U.S. Holder is a U.S. person or that the conditions of such other exemption are not, in fact, satisfied.

The payment of the proceeds from the disposition of our Common Stock to or through the U.S. office of any broker (U.S. or non-U.S.) will be subject to information reporting and possible backup withholding unless a Non-U.S. Holder certifies as to its non-U.S. status under penalties of perjury or otherwise establishes an exemption and the broker does not have actual knowledge or reason to know that such holder is a U.S. person or that the conditions of any other exemption are not, in fact, satisfied. The payment of proceeds from the disposition of our Common Stock to or through a non-U.S. office of a non-U.S. broker will not be subject to information reporting or backup withholding unless the non-U.S. broker has certain types of relationships with the United States (a “U.S. related financial intermediary”). In the case of the payment of proceeds from the disposition of our Common Stock to or through a non-U.S. office of a broker that is either a U.S. person or a U.S. related financial intermediary, the Treasury regulations require information reporting (but not backup withholding) on the payment unless the broker has documentary evidence in its files that the owner is not a U.S. person and the broker has no knowledge to the contrary. Non-U.S. Holders are urged to consult their tax advisor on the application of information reporting and backup withholding in light of their particular circumstances.

Backup withholding is not an additional tax. Any amounts withheld under the backup withholding rules from a payment to a Non-U.S. Holder will be refunded or credited against its U.S. federal income tax liability, if any, provided that the required information is timely furnished to the IRS.

## **FATCA**

Pursuant to Section 1471 through 1474 of the Code, commonly referred to as the Foreign Account Tax Compliance Act (“FATCA”), foreign financial institutions (which include most foreign hedge funds, private equity funds, mutual funds, securitization vehicles and any other investment vehicles) and certain other foreign entities that do not otherwise qualify for an exemption must comply with information reporting rules with respect to their U.S. account holders and investors or be subject to a withholding tax on U.S. source payments made to them (whether received as a beneficial owner or as an intermediary for another party).

More specifically, a foreign financial institution or other foreign entity that does not comply with the FATCA reporting requirements or otherwise qualify for an exemption will generally be subject to a 30% withholding tax with respect to any “withholdable payments.” For this purpose, withholdable payments generally include U.S.-source payments otherwise subject to nonresident withholding tax (e.g., U.S.-source dividends). While withholding under FATCA would have also applied to payments of gross proceeds from the sale or other disposition of shares of our Common Stock, proposed Treasury regulations eliminate FATCA withholding on payments of gross proceeds. The preamble to these proposed regulations indicates that taxpayers may rely on them pending their finalization. The FATCA withholding tax will apply to all withholdable payments without regard to whether the beneficial owner of the payment would otherwise be entitled to an exemption from imposition of withholding tax pursuant to an applicable income tax treaty with the United States or U.S. domestic law. We will not pay additional amounts to holders of our Common Stock in respect of amounts withheld. Foreign financial institutions located in jurisdictions that have an intergovernmental agreement with the United States governing FATCA may be subject to different rules.

FATCA currently applies to dividends made in respect of our Common Stock. To avoid withholding on dividends, Non-U.S. Holders may be required to provide us (or our withholding agents) with applicable tax forms or other information. Non-U.S. Holders are urged to consult with their own tax advisors regarding the effect, if any, of the FATCA provisions to them based on their particular circumstances.

## SELLING SECURITYHOLDER

The shares of Common Stock being offered by the Selling Securityholder are those issuable to the Selling Securityholder upon exercise of the Warrants. We are registering the resale of such shares of Common Stock in order to permit the Selling Securityholder to offer the shares for resale from time to time. Except for the ownership of the shares of Common Stock, Warrants and Pre-Funded Warrants issued pursuant to the SPA, as well as the offerings in January 2024 and July 2024, the Selling Securityholder has not had any material relationship with us within the past three years. As used in this prospectus, the term “Selling Securityholder” means the securityholder identified in the table below.

The table below lists the Selling Securityholder and other information regarding the beneficial ownership (as determined under Section 13(d) of the Exchange Act, and the rules and regulations thereunder) of the shares of Common Stock held by the Selling Securityholder. The second column lists the number of shares of Common Stock beneficially owned by the Selling Securityholder, based on its ownership of shares of Common Stock, as of April 9, 2025, assuming exercise of the Warrants held by the Selling Securityholder on that date.

The third column lists the shares of Common Stock being offered by this prospectus by the Selling Securityholder and does not take into account any limitations on exercise of the Warrants set forth therein.

Under the terms of the Warrants, the Selling Securityholder may not exercise the Warrants to the extent (but only to the extent) such Selling Securityholder or any of its affiliates would beneficially own a number of shares of our Common Stock which would exceed 4.99% of our outstanding shares (the “Beneficial Ownership Limitation”). The Beneficial Ownership Limitation may be increased or decreased, provided that in no event shall it exceed 9.99%, upon notice to us, provided that any increase in the beneficial ownership limitation shall not be effective until 61 days following the receipt of such notice by us. The Selling Securityholder may sell all, some or none of their shares in this offering. See “Plan of Distribution” below.

The ownership percentage indicated in the following table is based on 9,766,783 total outstanding shares of our Common Stock as of April 9, 2025.

In computing the number of shares of Common Stock beneficially owned by the Selling Securityholder and the percentage ownership, we included outstanding shares of Common Stock issuable upon exercise of the Warrants that are currently exercisable or exercisable within 60 days of April 9, 2025.

<b>Name</b>	<b>Shares of Common Stock</b>				
	<b>Shares Beneficially Owned Prior to the Offering</b>		<b>Maximum Number of Shares Being Registered for Resale</b>	<b>Shares Beneficially Owned After the Offering</b>	
	<b>Number of Shares</b>	<b>Percentage</b>		<b>Number of Shares (3)</b>	<b>Percentage</b>
Armistice Capital, LLC(1)	2,148,597(2)	18.03%	3,529,412	2,148,597(2)	14.74%

(1) The securities are directly held by Armistice Capital Master Fund Ltd., a Cayman Islands exempted company (the “Master Fund”), and may be deemed to be beneficially owned by: (i) Armistice Capital, LLC (“Armistice Capital”), as the investment manager of the Master Fund; and (ii) Steven Boyd, as the Managing Member of Armistice Capital. The warrants are subject to a beneficial ownership limitation of 4.99%, which such limitation restricts the Selling Stockholder from exercising that portion of the warrants that would result in the Selling Stockholder and its affiliates owning, after exercise, a number of shares of common stock in excess of the beneficial ownership limitation. The address of Armistice Capital Master Fund Ltd. is c/o Armistice Capital, LLC, 510 Madison Avenue, 7th Floor, New York, NY 10022.

(2) Includes 344,000 pre-funded warrants and 934,808 common stock warrants.

(3) Assumes the sale of all shares offered pursuant to this prospectus. In accordance with the terms of the Warrants, in no event are we permitted to issue shares of Common Stock to the Selling Securityholder in excess of the Beneficial Ownership Limitation. Beneficial ownership of the Selling Securityholder included in this Selling Securityholder table reflects the total number of shares potentially issuable upon exercise of the Warrants and does not give effect to the Beneficial Ownership Limitation. Accordingly, actual beneficial ownership, as calculated in accordance with Section 13(d) of the Exchange Act and Rule 13d-3 thereunder, may be lower than as reflected in this table.

## PLAN OF DISTRIBUTION

We are registering the resale of the Shares issuable upon exercise of the Warrants to permit the resale of these Shares by the holder of the Warrants from time to time after the date of this prospectus. We will not receive any of the proceeds from the sale by the Selling Securityholder of the Shares, although we will receive the exercise price of any Warrants not exercised by the Selling Securityholder on a cashless exercise basis. We will bear all fees and expenses incident to our obligation to register the Shares.

The Selling Securityholder may sell all or a portion of the Shares held by it and offered hereby from time to time directly or through one or more underwriters, broker-dealers or agents. If the Shares are sold through underwriters or broker-dealers, the Selling Securityholder will be responsible for underwriting discounts or commissions or agent's commissions. The Shares may be sold in one or more transactions at fixed prices, at prevailing market prices at the time of the sale, at varying prices determined at the time of sale or at negotiated prices. These sales may be effected in transactions, which may involve crosses or block transactions, pursuant to one or more of the following methods:

- on any national securities exchange or quotation service on which the securities may be listed or quoted at the time of sale;
- in the over-the-counter market;
- in transactions otherwise than on these exchanges or systems or in the over-the-counter market;
- through the writing or settlement of options, whether such options are listed on an options exchange or otherwise;
- ordinary brokerage transactions and transactions in which the broker-dealer solicits purchasers;
- block trades in which the broker-dealer will attempt to sell the shares as agent but may position and resell a portion of the block as principal to facilitate the transaction;
- purchases by a broker-dealer as principal and resale by the broker-dealer for its account;
- an exchange distribution in accordance with the rules of the applicable exchange;
- privately negotiated transactions;
- short sales made after the date the Registration Statement is declared effective by the SEC;
- broker-dealers may agree with a selling security holder to sell a specified number of such shares at a stipulated price per share;
- a combination of any such methods of sale; and
- any other method permitted pursuant to applicable law.

The Selling Securityholder may also sell Shares under Rule 144 promulgated under the Securities Act of 1933, as amended, if available, rather than under this prospectus. In addition, the Selling Securityholder may transfer the Shares by other means not described in this prospectus. If the Selling Securityholder effects such transactions by selling Shares to or through underwriters, broker-dealers or agents, such underwriters, broker-dealers or agents may receive commissions in the form of discounts, concessions or commissions from the Selling Securityholder or commissions from purchasers of the Shares for whom they may act as agent or to whom they may sell as principal (which discounts, concessions or commissions as to particular underwriters, broker-dealers or agents may be in excess of those customary in the types of transactions involved). In connection with sales of the Shares or otherwise, the Selling Securityholder may enter into hedging transactions with broker-dealers, which may in turn engage in short sales of the Shares in the course of hedging in positions they assume. The Selling Securityholder may also sell Shares short and deliver Shares covered by this prospectus to close out short positions and to return borrowed shares in connection with such short sales. The Selling Securityholder may also loan or pledge Shares to broker-dealers that in turn may sell such shares.

The Selling Securityholder may pledge or grant a security interest in some or all of the Warrants or Shares owned by them and, if they default in the performance of their secured obligations, the pledgees or secured parties may offer and sell the Shares from time to time pursuant to this prospectus or any amendment to this prospectus under Rule 424(b)(3) or other applicable provision of the Securities Act amending, if necessary, the list of Selling Securityholders to include the pledgee, transferee or other successors in interest as a Selling Securityholder under this prospectus. The Selling Securityholder also may transfer and donate the Shares in other circumstances in which case the transferees, donees, pledgees or other successors in interest will be the selling beneficial owners for purposes of this prospectus.

To the extent required by the Securities Act and the rules and regulations thereunder, the Selling Securityholder and any broker-dealer participating in the distribution of the Shares may be deemed to be “underwriters” within the meaning of the Securities Act, and any commission paid, or any discounts or concessions allowed to, any such broker-dealer may be deemed to be underwriting commissions or discounts under the Securities Act. At the time a particular offering of the Shares is made, a prospectus supplement, if required, will be distributed, which will set forth the aggregate amount of Shares being offered and the terms of the offering, including the name or names of any broker-dealers or agents, any discounts, commissions and other terms constituting compensation from the Selling Securityholder and any discounts, commissions or concessions allowed or re-allowed or paid to broker-dealers.

Brokers, dealers, underwriters or agents participating in the distribution of the shares of our Common Stock offered by this prospectus may receive compensation in the form of commissions, discounts, or concessions from the purchasers, for whom the broker-dealers may act as agent, of the shares sold by the Selling Securityholder through this prospectus. The compensation paid to any such particular broker-dealer by any such purchasers of shares of our Common Stock sold by the Selling Securityholder may be less than or in excess of customary commissions. Neither we nor the Selling Securityholder can presently estimate the amount of compensation that any agent will receive from any purchasers of shares of our Common Stock sold by the Selling Securityholder.

The Selling Securityholder and any other person participating in such distribution will be subject to applicable provisions of the Securities Exchange Act of 1934, as amended, and the rules and regulations thereunder, including, without limitation, to the extent applicable, Regulation M of the Exchange Act, which may limit the timing of purchases and sales of any of the Shares by the Selling Securityholder and any other participating person. To the extent applicable, Regulation M may also restrict the ability of any person engaged in the distribution of the Shares to engage in market-making activities with respect to the Shares. All of the foregoing may affect the marketability of the Shares and the ability of any person or entity to engage in market-making activities with respect to the Shares.

We will pay all expenses of the registration of the Shares, estimated to be \$33,200 in total, including, without limitation, SEC filing fees and expenses of compliance with state securities or “blue sky” laws; provided, however, the Selling Securityholder will pay all underwriting discounts and selling commissions, if any. We will indemnify the Selling Securityholder against liabilities, including some liabilities under the Securities Act in accordance with the registration rights agreements or the Selling Securityholder will be entitled to contribution. We may be indemnified by the Selling Securityholder against civil liabilities, including liabilities under the Securities Act that may arise from any written information furnished to us by the Selling Securityholder specifically for use in this prospectus, in accordance with the related registration rights agreements or we may be entitled to contribution.

Once sold under the registration statement, of which this prospectus forms a part, the Shares will be freely tradable in the hands of persons other than our affiliates.

## **LEGAL MATTERS**

The validity of the Shares have been passed upon by Dorsey & Whitney LLP, Salt Lake City, Utah.

## **EXPERTS**

The consolidated financial statements incorporated in this prospectus by reference to the Annual Report on Form 10-K for the year ended December 31, 2024 have been so incorporated in reliance on the report of WithumSmith+Brown, PC, an independent registered public accounting firm, which report includes an explanatory paragraph about the existence of substantial doubt concerning the Company's ability to continue as a going concern, given on the authority of said firm as experts in auditing and accounting.

## **WHERE YOU CAN FIND MORE INFORMATION**

This prospectus is part of the registration statement on Form S-3 we filed with the SEC under the Securities Act and does not contain all of the information set forth or incorporated by reference in the registration statement and the exhibits to the registration statement. For further information with respect to us and the securities we are offering under this prospectus, we refer you to the registration statement and the exhibits and schedules filed as a part of the registration statement. We file annual, quarterly, and current reports, proxy statements and other information with the SEC. The SEC maintains a website that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC, including SeaStar Medical Holding Corporation. The address of the SEC website is [www.sec.gov](http://www.sec.gov).

We maintain a website at <https://seastarmedical.com/>. Information contained in or accessible through our website does not constitute a part of this prospectus.

## INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to “incorporate by reference” information into this prospectus, which means that we can disclose important information to you by referring you to another document filed separately with the SEC. The SEC file number for the documents incorporated by reference in this prospectus is 001-39927. The documents incorporated by reference into this prospectus contain important information about us that you should read.

The following documents are incorporated by reference into this document:

- our Annual Report on [Form 10-K](#) for the year ended December 31, 2024, filed with the SEC on March 27, 2025;
- our Current Reports on Form 8-K filed with the SEC on [January 13, 2025](#) (with respect to Item 8.01 only), [January 31, 2025](#), [February 3, 2025](#) (with respect to Item 1.01, 3.02 and Exhibits 4.1 4.2, 4.3, 5.1 and 10.1 of Item 9.01(d) only), [March 13, 2025](#) (with respect to Item 8.01 only), [March 21, 2025](#) and [March 28, 2025](#);
- the description of our Common Stock which is registered under Section 12 of the Exchange Act, in our registration statement on [Form 8-A](#), filed on January 22, 2021, as updated by the description of our Common Stock contained in [Exhibit 4.3](#) to our Annual Report on [Form 10-K](#) filed with the SEC on March 27, 2025, including any amendments or reports filed for the purposes of updating this description.

We also incorporate by reference in to this prospectus all documents (other than Current Reports furnished under Item 2.02 or Item 7.01 of Form 8-K and exhibits filed on such form that are related to such items) that are filed by us with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act, including those made after the date of the initial filing of the registration statement of which this prospectus is a part and prior to effectiveness of such registration statement, as well as after the date of this prospectus until we file a post-effective amendment that indicates the termination of the offering of the shares of our Common Stock made by this prospectus and will become a part of this prospectus from the date that such documents are filed with the SEC. These documents include periodic reports, such as Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, and Current Reports on Form 8-K, as well as proxy statements.

We will provide to each person, including any beneficial owner, to whom a prospectus is delivered, without charge upon written or oral request, a copy of any or all of the documents that are incorporated by reference into this prospectus but not delivered with this prospectus, including exhibits which are specifically incorporated by reference into such documents. You should direct any requests for documents to SeaStar Medical Holding Corporation, 3513 Brighton Blvd., Suite 410, Denver, CO 80216; telephone: (844) 427-8100.

Any statement contained herein or in a document incorporated or deemed to be incorporated by reference into this document will be deemed to be modified or superseded for purposes of the document to the extent that a statement contained in this document or any other subsequently filed document that is deemed to be incorporated by reference into this document modifies or supersedes the statement.



Up to 3,529,412 Shares of Common Stock

Offered by the Selling Securityholder

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Prospectus

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, 2025

**You should rely only on the information contained or incorporated by reference in this prospectus. We have not authorized anyone to provide you with different information. You should not assume that the information contained or incorporated by reference in this prospectus is accurate as of any date other than the date of this prospectus. We are not making an offer of these securities in any state where the offer is not permitted.**

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## PART II

### INFORMATION NOT REQUIRED IN PROSPECTUS

#### Item 14. Other Expenses of Issuance and Distribution.

The following table sets forth the estimated costs and expenses payable by us in connection with the offering of the securities being registered. All the amounts shown are estimates, except for the SEC registration fee.

SEC registration fee	\$	700
Accounting fees and expenses	\$	12,500
Legal fees and expenses	\$	20,000
Printing and miscellaneous expenses	\$	—
Total	\$	<u>33,200</u>

#### Item 15. Indemnification of Directors and Officers.

Section 145 of the General Corporation Law of the State of Delaware (the “DGCL”) provides, generally, that a corporation shall have the power to indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of the corporation) by reason of the fact that such person is or was a director, officer, employee or agent of the corporation against all expenses, judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such action, suit or proceeding if such person acted in good faith and in a manner such person reasonably believed to be in or not opposed to the best interests of the corporation and, with respect to any criminal action or proceeding, had no reasonable cause to believe his or her conduct was unlawful. A corporation may similarly indemnify such person for expenses actually and reasonably incurred by such person in connection with the defense or settlement of any action or suit by or in the right of the corporation, provided that such person acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the corporation, and, in the case of claims, issues and matters as to which such person shall have been adjudged liable to the corporation, provided that a court shall have determined, upon application, that, despite the adjudication of liability but in view of all of the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which such court shall deem proper.

In accordance with Section 102(b)(7) of the DGCL, the Charter provides that a director will not be personally liable to us or our stockholders for monetary damages for breach of fiduciary duty as a director, except for liability (i) for any breach of the director’s duty of loyalty to us or our stockholders, (ii) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (iii) under Section 174 of the DGCL, or (iv) for any transaction from which the director derived an improper personal benefit. No such provision shall eliminate or limit the liability of a director for any act or omission occurring prior to the date when such provision became effective. Accordingly, these provisions will have no effect on the availability of equitable remedies such as an injunction or rescission based on a director’s breach of his or her duty of care.

The Charter provides that we will indemnify our present and former directors and officers to the maximum extent permitted by the DGCL and that such indemnification will not be exclusive of any other rights to which those seeking indemnification may be entitled under any bylaw provision, agreement, vote of stockholders or disinterested directors or otherwise.

We entered, and expect to continue to enter into, indemnification agreements with its directors, executive officers, and other employees as determined by the Board. Each indemnification agreement provides for indemnification and advancements by us of certain expenses and costs, if the basis of the indemnitee’s involvement was by reason of the fact that the indemnitee is or was a director, officer, employee, or agent of our or any of our subsidiaries or was serving at our request in an official capacity for another entity, to the fullest extent permitted by the laws of the state of Delaware.

**Item 16. Exhibits.**

<b>Exhibit Number</b>	<b>Description</b>
3.1	<a href="#"><u>Third Amended and Restated Certificate of Incorporation of SeaStar Medical Holding Corporation, filed with the Secretary of State of Delaware on October 28, 2022 (incorporated by reference to Exhibit 3.1 to Form 8-K filed by the registrant on November 4, 2022).</u></a>
3.2	<a href="#"><u>Certificate of Amendment to the Third Amended and Restated Certificate of Incorporation of SeaStar Medical Holding Corporation (incorporated by reference to Exhibit 3.1 to Form 8-K filed by the registrant on September 20, 2023).</u></a>
3.3	<a href="#"><u>Second Certificate of Amendment of Third Amended and Restated Certificate of Incorporation of SeaStar Medical Holding Corporation (incorporated by reference to Exhibit 3.1 to Form 8-K filed by the registrant on June 7, 2024).</u></a>
3.4	<a href="#"><u>Third Certificate of Amendment to the Third Amended and Restated Certificate of Incorporation of SeaStar Medical Holding Corporation (incorporated by reference to Exhibit 3.4 to Form 10-K filed by the registrant on March 27, 2025).</u></a>
3.5	<a href="#"><u>Second Amended and Restated Bylaws of SeaStar Medical Holding Corporation (incorporated by reference to Exhibit 3.1 of Form 8-K filed by the registrant on April 18, 2024).</u></a>
4.1	<a href="#"><u>Specimen Common Stock Certificate (incorporated by reference to Exhibit 4.1 to Form 8-K filed by the registrant on November 4, 2022).</u></a>
4.2	<a href="#"><u>Description of Securities (incorporated by reference to Exhibit 4.3 to Form 10-K filed by the registrant on March 27, 2025).</u></a>
4.3	<a href="#"><u>Form of Pre-Funded Common Stock Purchase Warrant (incorporated by reference to Exhibit 4.1 to Form 8-K filed by the registrant on February 3, 2025).</u></a>
4.4	<a href="#"><u>Form of Common Stock Purchase Warrant (incorporated by reference to Exhibit 4.2 to Form 8-K filed by the registrant on February 3, 2025).</u></a>
5.1*	<a href="#"><u>Opinion of Dorsey &amp; Whitney LLP.</u></a>
10.1	<a href="#"><u>Form of Securities Purchase Agreement by and among the Company and the party thereto (incorporated by reference to Exhibit 10.1 to Form 8-K filed by the registrant on February 3, 2025).</u></a>
23.1*	<a href="#"><u>Consent of WithumSmith+Brown, PC, independent registered public accounting firm.</u></a>
23.2*	<a href="#"><u>Consent of Dorsey &amp; Whitney LLP (included in Exhibit 5.1)</u></a>
24.1*	<a href="#"><u>Power of Attorney (included on the signature page).</u></a>
107 *	<a href="#"><u>Filing Fee Table.</u></a>

\* Filed herewith.

## Item 17. Undertakings.

(a) The undersigned registrant hereby undertakes:

- (1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:
  - (i) To include any prospectus required by Section 10(a)(3) of the Securities Act;
  - (ii) To reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the SEC pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than 20% change in the maximum aggregate offering price set forth in the "Calculation of Filing Fee Tables" or "Calculation of Registration Fee" table, as applicable, in the effective registration statement
  - (iii) To include any material information with respect to the plan of distribution not previously disclosed in the registration statement or any material change to such information in the registration statement;

*provided, however*, that the undertakings set forth in paragraphs (1)(i), (1)(ii) and (1)(iii) of this section do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the SEC by the registrant pursuant to Section 13 or Section 15(d) of the Exchange Act that are incorporated by reference in this registration statement or are contained in a form of prospectus filed pursuant to Rule 424(b) that is part of this registration statement.

- (2) That, for the purpose of determining any liability under the Securities Act, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.
- (3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.
- (4) That, for the purpose of determining liability under the Securities Act to any purchaser:
  - (i) Each prospectus filed by the registrant pursuant to Rule 424(b)(3) shall be deemed to be part of the registration statement as of the date the filed prospectus was deemed part of and included in the registration statement; and
  - (ii) Each prospectus required to be filed pursuant to Rule 424(b)(2), (b)(5), or (b)(7) as part of a registration statement in reliance on Rule 430B relating to an offering made pursuant to Rule 415(a)(1)(i), (vii), or (x) for the purpose of providing the information required by Section 10(a) of the Securities Act shall be deemed to be part of and included in the registration statement as of the earlier of the date such form of prospectus is first used after effectiveness or the date of the first contract of sale of securities in the offering described in the prospectus. As provided in Rule 430B, for liability purposes of the issuer and any person that is at that date an underwriter, such date shall be deemed to be a new effective date of the registration statement relating to the securities in the registration statement to which that prospectus relates, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

Provided, however, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such effective date, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such effective date.

- (5) That, for the purpose of determining liability of the Registrant under the Securities Act to any purchaser in the initial distribution of the securities, the undersigned Registrant undertakes that in a primary offering of securities of the undersigned Registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned Registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser.
- (i) Any preliminary prospectus or prospectus of the undersigned Registrant relating to the offering required to be filed pursuant to Rule 424;
  - (ii) Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned Registrant or used or referred to by the undersigned Registrant;
  - (iii) The portion of any other free writing prospectus relating to the offering containing material information about the undersigned Registrant or its securities provided by or on behalf of the undersigned Registrant; and
  - (iv) Any other communication that is an offer in the offering made by the undersigned Registrant to the purchaser.
- (6) That, for purposes of determining any liability under the Securities Act, each filing of the registrant's annual report pursuant to Section 13(a) or 15(d) of the Exchange Act (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Exchange Act) that is incorporated by reference in the registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.
- (b) Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been advised that in the opinion of the Securities Exchange Commission such indemnification is against public policy as expressed in the Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Act and will be governed by the final adjudication of such issue.

## SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, as amended, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Denver, Colorado, on April 22, 2025.

### SEASTAR MEDICAL HOLDING CORPORATION

By: /s/ Eric Schlorff  
Name: Eric Schlorff  
Title: Chief Executive Officer

## POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Eric Schlorff, as his or her true and lawful attorney-in-fact and agent, with the full power of substitution and resubstitution, for him or her and in his or her name, place or stead, in any and all capacities, to sign any and all amendments (including post-effective amendments, exhibits thereto and other documents in connection therewith) to this Registration Statement, and to sign any registration statement for the same offering covered by this registration statement that is to be effective upon filing pursuant to Rule 462 of the Securities Act of 1933, as amended, and to file the same, with all exhibits thereto and other documents in connection therewith, with the SEC, granting unto said attorney-in-fact and agent, full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming that the attorney-in-fact and agent, or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, as amended, this Registration Statement has been signed by the following persons in the capacity and on the dates indicated.

<u>Name</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Eric Schlorff</u> Eric Schlorff	Chief Executive Officer and Director (Principal Executive Officer)	April 22, 2025
<u>/s/ David Green</u> David Green	Chief Financial Officer (Principal Financial and Accounting Officer)	April 22, 2025
<u>/s/ Rick Barnett</u> Rick Barnett	Chairman of the Board of Directors	April 22, 2025
<u>/s/ Kenneth Van Heel</u> Kenneth Van Heel	Director	April 22, 2025
<u>/s/ Jennifer A. Baird</u> Jennifer A. Baird	Director	April 22, 2025
<u>/s/ John Neuman</u> John Neuman	Director	April 22, 2025
<u>/s/ Bernadette N. Vincent</u> Bernadette N. Vincent	Director	April 22, 2025



April 22, 2025

SeaStar Medical Holding Corporation  
3513 Brighton Blvd, Suite 410  
Denver, Colorado 80216

Re: Registration Statement on Form S-3

We have acted as counsel to SeaStar Medical Holding Corporation, a Delaware corporation (the "Company"), in connection with the filing by the Company with the Securities and Exchange Commission (the "Commission") of a Registration Statement on Form S-3 filed by the Company with the Commission under the Securities Act of 1933, as amended (the "Securities Act"), relating to the resale of up to 3,529,412 shares of common stock, par value \$0.0001 per share (the "Common Stock"), of the Company (the "Warrant Shares"), underlying common warrants (the "Warrants") to purchase an aggregate of up to 3,529,412 shares of Common Stock by the holder of the Warrants (the "Selling Securityholder").

We have examined such documents and have reviewed such questions of law as we have considered necessary or appropriate for the purposes of our opinions set forth below. In rendering our opinions set forth below, we have assumed the authenticity of all documents submitted to us as originals, the genuineness of all signatures and the conformity to authentic originals of all documents submitted to us as copies. We have also assumed the legal capacity for all purposes relevant hereto of all natural persons. As to questions of fact material to our opinions, we have relied upon certificates or comparable documents of officers and other representatives of the Company and of public officials.

Based on the foregoing, we are of the opinion that the Warrant Shares, when issued in accordance with the terms of the Warrants, will be validly issued, fully paid and non-assessable.

Our opinions expressed above are limited to the Delaware General Corporation Law.

We hereby consent to the filing of this opinion as an exhibit to the Registration Statement, and to the reference to our firm under the heading "Legal Matters" in the prospectus constituting part of the Registration Statement. In giving this consent, we do not admit that we are within the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations of the Commission thereunder.

Very truly yours,

/s/ Dorsey & Whitney LLP

JBE/DPL

**CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

We hereby consent to the incorporation by reference in the Prospectus constituting a part of this Registration Statement on Form S-3 of our report dated March 27, 2025, which includes an explanatory paragraph relating to SeaStar Medical Holding Corporation's ability to continue as a going concern, relating to the consolidated financial statements of SeaStar Medical Holding Corporation as of and for the years ended December 31, 2024 and 2023, which appears in SeaStar Medical Holding Corporation's Annual Report on Form 10-K for the year ended December 31, 2024.

We also consent to the reference to us under the caption "Experts" in the Prospectus.

/s/ WithumSmith+Brown, PC

East Brunswick, New Jersey

April 22, 2025

## Calculation of Filing Fee Tables

S-3  
(Form Type)

**SeaStar Medical Holding Corporation**  
(Exact Name of Registrant as Specified in its Charter)

Table 1: Newly Registered and Carry Forward Securities

Security Type	Security Class Title	Fee Calculation or Carry Forward Rule	Amount Registered	Proposed Maximum Offering Price Per Unit	Maximum Aggregate Offering Price	Fee Rate	Amount of Registration Fee	Carry Forward Form Type	Carry Forward File Number	Carry Forward Initial effective date	Filing Fee Previously Paid In Connection with Unsold Securities to be Carried Forward
Newly Registered Securities											
Fees to be Paid	Equity Common Stock, par value \$0.0001 per share	Other	3,529,412(1) \$	1.24(2)	\$4,376,470.88(2)	\$0.00015310	\$ 670.04	—	—	—	—
Total Offering Amounts					\$4,376,470.88(2)	—	\$ 670.04				
Total Fees Previously Paid					—	—	—				
Total Fee Offsets					—	—	—				
Net Fee Due					—	—	\$ 670.04				

(1) Represents 3,529,412 shares of the registrant's common stock, par value \$0.0001 per share (the "Common Stock"), that will be offered for resale by the selling securityholder named in this registration statement pursuant to the prospectus contained in this registration statement. Pursuant to Rule 416 under the Securities Act of 1933, as amended (the "Securities Act"), the shares of Common Stock being registered hereunder include an indeterminable number of additional shares of Common Stock that may be issuable as a result of stock splits, stock dividends or similar transactions.

(2) Estimated solely for the purpose of calculating the amount of the registration fee pursuant to Rule 457(c) of the Securities Act, on the basis of the high and low prices for a share of the registrant's Common Stock reported on April 21, 2025, which date is a date within five business days prior to the filing of this registration statement, and rounded up to the nearest cent.