



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

DIVISION OF
CORPORATION FINANCE

Mail Stop 4720

April 1, 2016

Robert W. Overell
President and Chief Executive Officer
PhaseRx, Inc.
410 W. Harrison Street, Suite 300
Seattle, WA 98119

**Re: PhaseRx, Inc.
Amendment No. 1 to Draft Registration Statement on Form S-1
Submitted March 16, 2016
CIK No. 0001429386**

Dear Mr. Overell:

We have reviewed your amended draft registration statement and have the following comments. In some of our comments, we may ask you to provide us with information so we may better understand your disclosure.

Please respond to this letter by providing the requested information and either submitting an amended draft registration statement or publicly filing your registration statement on EDGAR. If you do not believe our comments apply to your facts and circumstances or do not believe an amendment is appropriate, please tell us why in your response.

After reviewing the information you provide in response to these comments and your amended draft registration statement or filed registration statement, we may have additional comments.

Prospectus Summary
Our Competitive Strengths, page 4

1. We refer to your response to comment 5 and the corresponding revised disclosure on page 4 and elsewhere. Please revise to clarify whether, and if so how, the regulatory pathway would differ for future therapeutics targeting single-gene therapeutic liver disorders. For instance, clarify whether any of the steps in the regulatory approval process outlined on page 90 for the conventional drug discovery process would be different. Please make corresponding revisions elsewhere in the prospectus where applicable.

Sale of our Common Stock by Our Stockholders, page 7

2. In the response to comment 13 you provided information regarding the number of shares each existing stockholder is transferring to Titan, after giving effect to the reverse stock split. Please revise your disclosure on page 7 to disclose this aggregate number of shares. Also, disclose your role in requesting the transfers and the reasons for the request.

Management's Discussion and Analysis of Financial Condition and Results of Operations
Critical Accounting Policies and Significant Judgments and Estimates
Stock Based Compensation, page 57

3. Please revise the disclosure you provided in response to prior comment 14 to state whether you use market or income approach based techniques or a combination of the two to fair value your common stock. If more than one method was used, please clarify how the methods were used to determine the fair value.
4. Please revise the disclosure you provided in response to prior comment 14 to clarify how you utilize third party valuation specialists. In this regard, if you determine the fair value of your common stock and considered or relied in part upon the report of third party valuation specialists, please so indicate and remove reference to prices being attributed to these specialists; see for example the first paragraph of your "Valuation of stock Option Grants in 2014 and 2015" disclosure and the statement you make on page 105 indicating that the February 8, 2016 fair market value determination was made by your independent appraiser. Otherwise, please name this specialist in your filing and provide their consent as an expert. Refer to Securities Act Sections Compliance and Disclosure Interpretation Question 141.02.

Business
License Agreements, page 88

5. Please revise your disclosure in this section to provide investors with an understanding of the magnitude and materiality of your royalty obligations under your license agreements.
6. Please disclose in this section the potential aggregate milestone payments to be paid under your UW License Agreement.

Executive Compensation
Director Compensation, page 107

7. We refer to the director compensation table on page 107. Please tell us whether any of the options disclosed in footnotes 2 to 4 were granted during 2015.

Dr. Robert W. Overell
PhaseRx, Inc.
April 1, 2016
Page 3

Principal Stockholders, page 114

8. We refer to your response to comment 13. Please explain in greater detail your basis for not including Titan in the beneficial ownership table based on their holdings as of the most recent practicable date. In this regard, please tell us whether there are material contingencies governing the transfer of shares to Titan.

Notes to Financial Statements

2. Summary of Significant Accounting Policies

Unaudited Pro Forma Balance Sheet Information, page F-8

9. You state in your response to prior comment 32 that you received verbal commitment to exercise the warrants to purchase 2,452,242 shares of preferred stock. Please tell us whether such verbal commitment is enforceable in the event of a dispute and that you will legally deem the warrants to be expired if they are not exercised. Otherwise, explain to us why it is appropriate to include these exercises in your pro forma presentation and reference for us the authoritative literature you rely upon to support your position.

Selling Stockholders, page SS-3

10. Please revise to disclose whether the applicable conversion limit is 4.99% or 9.99% for each selling stockholder. Also, tell us whether the applicable cap can be waived by one or both parties.

You may contact Keira Nakada at 202-551-3659 or Mark Brunhofer at 202-551-3638 if you have questions regarding comments on the financial statements and related matters. Please contact Dorrie Yale at 202-551-8776 or Joseph McCann at 202-551-6262 with any other questions.

Sincerely,

/s/ Joseph McCann for

Suzanne Hayes
Assistant Director
Office of Healthcare and Insurance

cc: Rick A. Werner, Esq. - Haynes and Boone, LLP