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

FORM 10-Q

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

FOR THE QUARTERLY PERIOD ENDED MARCH 31, 2020

or

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

FOR THE TRANSITION PERIOD FROM _ TO _

Commission file number 000-19319

Vertex Pharmaceuticals Incorporated
(Exact name of registrant as specified in its charter)

Massachusetts	**04-3039129**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
50 Northern Avenue, Boston, Massachusetts	**02210**
(Address of principal executive offices)	(Zip Code)

Registrant's telephone number, including area code **(617) 341-6100**

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

Title of each class	Trading Symbol	Name of each exchange on which registered
Common Stock, $0.01 Par Value Per Share	VRTX	The Nasdaq Global Select Market

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

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

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

Large accelerated filer ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐ Emerging growth company ☐

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

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

Indicate the number of shares outstanding of each of the issuer's classes of common stock, as of the latest practicable date.

Common Stock, par value $0.01 per share	259,276,709	Outstanding at April 24, 2020

VERTEX PHARMACEUTICALS INCORPORATED
FORM 10-Q
FOR THE QUARTER ENDED MARCH 31, 2020

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"We," "us," "Vertex" and the "Company" as used in this Quarterly Report on Form 10-Q refer to Vertex Pharmaceuticals Incorporated, a Massachusetts corporation, and its subsidiaries.

"Vertex," "KALYDECO®," "ORKAMBI®," "SYMDEKO®," "SYMKEVI®" and "TRIKAFTA®" are registered trademarks of Vertex. Other brands, names and trademarks contained in this Quarterly Report on Form 10-Q are the property of their respective owners.

We use the brand name for our products when we refer to the product that has been approved and with respect to the indications on the approved label. Otherwise, including in discussions of our cystic fibrosis development programs, we refer to our compounds by their scientific (or generic) name or VX developmental designation.

Part I. Financial Information

Item 1. Financial Statements

VERTEX PHARMACEUTICALS INCORPORATED
Condensed Consolidated Statements of Operations
(unaudited)
(in thousands, except per share amounts)

	Three Months Ended March 31,	
	2020	**2019**
Revenues:		
Product revenues, net	$ 1,515,107	$ 857,253
Collaborative and royalty revenues	—	1,182
Total revenues	1,515,107	858,435
Costs and expenses:		
Cost of sales	162,497	95,092
Research and development expenses	448,528	339,490
Sales, general and administrative expenses	182,258	147,045
Change in fair value of contingent consideration	1,600	—
Total costs and expenses	794,883	581,627
Income from operations	720,224	276,808
Interest income	12,576	15,615
Interest expense	(14,136)	(14,868)
Other (expense) income, net	(61,130)	42,610
Income before provision for income taxes	657,534	320,165
Provision for income taxes	54,781	51,534
Net income	$ 602,753	$ 268,631
Net income per common share:		
Basic	$ 2.32	$ 1.05
Diluted	$ 2.29	$ 1.03
Shares used in per share calculations:		
Basic	259,815	255,695
Diluted	263,515	260,175

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

VERTEX PHARMACEUTICALS INCORPORATED
Condensed Consolidated Statements of Comprehensive Income
(unaudited)
(in thousands)

	Three Months Ended March 31,	
	2020	**2019**
Net income	$ 602,753	$ 268,631
Changes in other comprehensive income:		
Unrealized holding (losses) gains on marketable securities, net	(764)	596
Unrealized gains (losses) on foreign currency forward contracts, net of tax of $(5.0) million and $1.5 million, respectively	18,782	(222)
Foreign currency translation adjustment	(2,662)	4,967
Total changes in other comprehensive income	15,356	5,341
Comprehensive income	$ 618,109	$ 273,972

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

VERTEX PHARMACEUTICALS INCORPORATED
Condensed Consolidated Balance Sheets
(unaudited)
(in thousands, except per share amounts)

	March 31, 2020	December 31, 2019
Assets		
Current assets:		
Cash and cash equivalents	$ 3,593,412	$ 3,109,322
Marketable securities	596,984	698,972
Accounts receivable, net	845,269	633,518
Inventories	187,087	167,502
Prepaid expenses and other current assets	223,648	213,515
Total current assets	5,446,400	4,822,829
Property and equipment, net	736,303	745,080
Goodwill	1,002,158	1,002,158
Intangible assets	400,000	400,000
Deferred tax assets	1,147,705	1,190,815
Other assets	160,635	157,583
Total assets	$ 8,893,201	$ 8,318,465
Liabilities and Shareholders' Equity		
Current liabilities:		
Accounts payable	$ 100,703	$ 87,610
Accrued expenses	1,258,271	1,116,912
Other current liabilities	179,776	130,305
Total current liabilities	1,538,750	1,334,827
Long-term finance lease liabilities	532,952	538,576
Long-term contingent consideration	178,100	176,500
Other long-term liabilities	181,745	183,318
Total liabilities	2,431,547	2,233,221
Commitments and contingencies	—	—
Shareholders' equity:		
Preferred stock, $0.01 par value; 1,000 shares authorized; none issued and outstanding	—	—
Common stock, $0.01 par value; 500,000 shares authorized, 259,079 and 258,993 shares issued and outstanding, respectively	2,591	2,589
Additional paid-in capital	7,695,905	7,937,606
Accumulated other comprehensive income (loss)	13,383	(1,973)
Accumulated deficit	(1,250,225)	(1,852,978)
Total shareholders' equity	6,461,654	6,085,244
Total liabilities and shareholders' equity	$ 8,893,201	$ 8,318,465

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

VERTEX PHARMACEUTICALS INCORPORATED
Condensed Consolidated Statements of Shareholders' Equity
(unaudited)
(in thousands)

	Three Months Ended					
	Common Stock		Additional Paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Shareholders' Equity
	Shares	Amount				
Balance at December 31, 2018	255,172	$ 2,546	$ 7,421,476	$ 659	$ (2,989,478)	$ 4,435,203
Cumulative effect adjustment for adoption of new accounting guidance	—	—	—	—	(40,310)	(40,310)
Other comprehensive income, net of tax	—	—	—	5,341	—	5,341
Net income	—	—	—	—	268,631	268,631
Repurchase of common stock	(537)	(6)	(98,001)	—	—	(98,007)
Common stock withheld for employee tax obligations	(27)	—	(5,832)	—	—	(5,832)
Issuance of common stock under benefit plans	1,743	21	64,023	—	—	64,044
Stock-based compensation expense	—	—	94,243	—	—	94,243
Balance at March 31, 2019	256,351	$ 2,561	$ 7,475,909	$ 6,000	$ (2,761,157)	$ 4,723,313
Balance at December 31, 2019	258,993	$ 2,589	$ 7,937,606	$ (1,973)	$ (1,852,978)	$ 6,085,244
Other comprehensive income, net of tax	—	—	—	15,356	—	15,356
Net income	—	—	—	—	602,753	602,753
Repurchase of common stock	(1,404)	(14)	(300,012)	—	—	(300,026)
Common stock withheld for employee tax obligations	(575)	(6)	(136,161)			(136,167)
Issuance of common stock under benefit plans	2,065	22	77,572	—	—	77,594
Stock-based compensation expense	—	—	116,900	—	—	116,900
Balance at March 31, 2020	259,079	$ 2,591	$ 7,695,905	$ 13,383	$ (1,250,225)	$ 6,461,654

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

VERTEX PHARMACEUTICALS INCORPORATED
Condensed Consolidated Statements of Cash Flows
(unaudited)
(in thousands)

	Three Months Ended March 31,	
	2020	**2019**
Cash flows from operating activities:		
Net income	$ 602,753	$ 268,631
Adjustments to reconcile net income to net cash provided by operating activities:		
Stock-based compensation expense	115,706	93,791
Depreciation expense	26,821	27,140
Increase in fair value of contingent consideration	1,600	—
Deferred income taxes	36,705	43,425
Losses (gains) on equity securities	44,870	(43,551)
Other non-cash items, net	9,668	(2,431)
Changes in operating assets and liabilities:		
Accounts receivable, net	(223,672)	(30,136)
Inventories	(27,450)	(13,139)
Prepaid expenses and other assets	2,790	7,941
Accounts payable	14,285	(24,145)
Accrued expenses	153,814	(27,279)
Other liabilities	57,808	24,537
Net cash provided by operating activities	815,698	324,784
Cash flows from investing activities:		
Purchases of available-for-sale debt securities	(75,265)	(128,215)
Maturities of available-for-sale debt securities	60,145	107,118
Sale of equity securities	72,036	—
Expenditures for property and equipment	(19,450)	(18,041)
Investment in equity securities	(5,800)	—
Net cash provided by (used in) investing activities	31,666	(39,138)
Cash flows from financing activities:		
Issuances of common stock under benefit plans	79,597	63,620
Repurchases of common stock	(300,026)	(94,007)
Payments in connection with common stock withheld for employee tax obligations	(136,167)	(5,832)
Payments on finance leases	(10,287)	(9,385)
Proceeds related to finance leases	5,833	—
Advance from collaborator	2,500	5,000
Repayments of advanced funding	(880)	(1,385)
Net cash used in financing activities	(359,430)	(41,989)
Effect of changes in exchange rates on cash	(6,651)	(378)
Net increase in cash and cash equivalents	481,283	243,279
Cash, cash equivalents and restricted cash—beginning of period	3,120,681	2,658,253
Cash, cash equivalents and restricted cash—end of period	$ 3,601,964	$ 2,901,532
Supplemental disclosure of cash flow information:		
Cash paid for interest	$ 13,771	$ 13,148
Cash paid for income taxes	$ 5,845	$ 1,835
Issuances of common stock from employee benefit plans receivable	$ 817	$ 510
Accrued share repurchase liability	$ —	$ 4,000

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

VERTEX PHARMACEUTICALS INCORPORATED
Notes to Condensed Consolidated Financial Statements
(unaudited)

A. Basis of Presentation and Accounting Policies

Basis of Presentation

The accompanying condensed consolidated financial statements are unaudited and have been prepared by Vertex Pharmaceuticals Incorporated ("Vertex" or the "Company") in accordance with accounting principles generally accepted in the United States of America ("GAAP").

The condensed consolidated financial statements reflect the operations of the Company and its wholly-owned subsidiaries. All material intercompany balances and transactions have been eliminated. The Company operates in one segment, pharmaceuticals. The Company has reclassified certain items from the prior year's condensed consolidated financial statements to conform to the current year's presentation.

Certain information and footnote disclosures normally included in the Company's 2019 Annual Report on Form 10-K have been condensed or omitted. These interim financial statements, in the opinion of management, reflect all normal recurring adjustments necessary for a fair presentation of the financial position and results of operations for the interim periods ended March 31, 2020 and 2019.

The results of operations for the interim periods are not necessarily indicative of the results of operations to be expected for the full fiscal year. These interim financial statements should be read in conjunction with the audited financial statements for the year ended December 31, 2019, which are contained in the Company's 2019 Annual Report on Form 10-K.

Use of Estimates

The preparation of condensed consolidated financial statements in accordance with GAAP requires management to make certain estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the condensed consolidated financial statements, and the amounts of revenues and expenses during the reported periods. Significant estimates in these condensed consolidated financial statements have been made in connection with (i) determining the transaction price of revenues and (ii) accounting for intangible assets and contingent consideration. The Company bases its estimates on historical experience and various other assumptions, including in certain circumstances future projections that management believes to be reasonable under the circumstances. Actual results could differ from those estimates. Changes in estimates are reflected in reported results in the period in which they become known.

Recently Adopted Accounting Standards

Leases

On January 1, 2019, the Company adopted Accounting Standards Codification ("ASC") 842, *Leases* ("ASC 842") using the modified-retrospective method, which amended a number of aspects of lease accounting and required the Company to recognize right-of-use assets and liabilities on the balance sheet. As of January 1, 2019, the Company recorded a cumulative effect adjustment to increase its "Accumulated deficit" by $40.3 million, which related to its leases that were accounted for as build-to-suit leases under the previous accounting guidance.

Internal-Use Software

In 2018, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") 2018-15, *Intangibles—Goodwill and Other—Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract* ("ASU 2018-15"), which clarifies the accounting for implementation costs in cloud computing arrangements. ASU 2018-15 became effective on January 1, 2020. The adoption of ASU 2018-15 resulted in an insignificant amount of additional assets recorded on the Company's condensed consolidated balance sheet.

Fair Value Measurement

In 2018, the FASB issued ASU 2018-13, *Fair Value Measurement (Topic 820): Disclosure Framework-Changes to the Disclosure Requirements for Fair Value Measurement* ("ASU 2018-13"), which modifies the disclosure requirements for fair

value measurements. ASU 2018-13 became effective on January 1, 2020. The adoption of ASU 2018-13 resulted in additional disclosures related to the Company's Level 3 inputs. Please refer to Note E, "Fair Value Measurements," for further information.

Credit Losses

In 2016, the FASB issued ASU 2016-13, *Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments* ("ASU 2016-13"), which requires entities to record expected credit losses for certain financial instruments, including trade receivables, as an allowance that reflects the entity's current estimate of credit losses expected to be incurred. For available-for-sale debt securities in unrealized loss positions, ASU 2016-13 requires allowances to be recorded instead of reducing the amortized cost of the investment. ASU 2016-13 became effective on January 1, 2020. The adoption of ASU 2016-13 did not have a significant impact on its condensed consolidated financial statements.

Recently Issued Accounting Standards

Income Taxes

In 2019, the FASB issued ASU 2019-12, *Income Taxes (Topic 740)* ("ASU 2019-12"), which simplifies the accounting for income taxes. ASU 2019-12 is effective on January 1, 2021. The Company is evaluating the impact the adoption of ASU 2019-12 may have on its condensed consolidated financial statements.

For a discussion of other recent accounting pronouncements please refer to Note A, "Nature of Business and Accounting Policies," in the Company's 2019 Annual Report on Form 10-K.

Summary of Significant Accounting Policies

The Company's significant accounting policies are described in Note A, "Nature of Business and Accounting Policies," in its 2019 Annual Report on Form 10-K.

B. Revenue Recognition

Disaggregation of Revenue

Revenues by Product

Product revenues, net consisted of the following:

	Three Months Ended March 31,	
	2020	2019
	(in thousands)	
TRIKAFTA	$ 895,233	$ —
SYMDEKO/SYMKEVI	173,159	320,275
ORKAMBI	234,138	293,007
KALYDECO	212,577	243,971
Total product revenues, net*	$ 1,515,107	$ 857,253

* The preceding table does not include collaborative and royalty revenues.

VERTEX PHARMACEUTICALS INCORPORATED
Notes to Condensed Consolidated Financial Statements
(unaudited)

Revenues by Geographic Location

Net product revenues are attributed to countries based on the location of the customer. Collaborative and royalty revenues are attributed to countries based on the location of the Company's subsidiary associated with the collaborative arrangement related to such revenues. Total revenues from external customers and collaborators by geographic region consisted of the following:

	Three Months Ended March 31,	
	2020	2019
	(in thousands)	
United States	$ 1,187,588	$ 641,104
Outside of the United States		
Europe	257,391	167,751
Other	70,128	49,580
Total revenues outside of the United States	327,519	217,331
Total revenues	$ 1,515,107	$ 858,435

Contract Liabilities

The Company recorded contract liabilities of $76.3 million and $62.3 million as of March 31, 2020 and December 31, 2019, respectively, related to annual contracts with government-owned and supported customers in international markets that limit the amount of annual reimbursement the Company can receive. Upon exceeding the annual reimbursement amount, products are provided free of charge, which is a material right. These contracts include upfront payments and fees. The Company defers a portion of the consideration received for shipments made up to the annual reimbursement limit as a portion of "Other current liabilities." The deferred amount is recognized as revenue when the free products are shipped. The Company's product revenue contracts include performance obligations that are one year or less.

The Company's contract liabilities at the end of each fiscal year relate to contracts with annual reimbursement limits in international markets in which the annual period associated with the contract is not the same as the Company's fiscal year. In these markets, the Company recognizes revenues related to performance obligations satisfied in previous years; however, these revenues do not relate to any performance obligations that were satisfied more than 12 months prior to the beginning of the current year.

C. Collaborative Arrangements

The Company has entered into numerous agreements pursuant to which it collaborates with third parties on research, development and commercialization programs, including in-license and out-license agreements.

The Company's in-license and out-license agreements that had a significant impact on its financial statements for the three months ended March 31, 2020 and 2019, or were new during the three months ended March 31, 2020, are described below. Additional in-license and out-license agreements were described in Note B, "Collaborative Arrangements," of the Company's 2019 Annual Report on Form 10-K.

In-license Agreements

The Company has entered into a number of license agreements in order to advance and obtain access to technologies and services related to its research and early-development activities. The Company is generally required to make an upfront payment upon execution of the license agreement; development, regulatory and commercialization milestones payments upon the achievement of certain product research, development and commercialization objectives; and royalty payments on future sales, if any, of commercial products resulting from the collaboration.

Pursuant to the terms of its in-license agreements, the Company's collaborators typically lead the discovery efforts and the Company leads all preclinical, development and commercialization activities associated with the advancement of any drug candidates and funds all expenses.

The Company typically can terminate its in-license agreements by providing advance notice to its collaborators; the required length of notice is dependent on whether any product developed under the license agreement has received marketing approval. The Company's license agreements may be terminated by either party for a material breach by the other, subject to notice and cure provisions. Unless earlier terminated, these license agreements generally remain in effect until the date on which the royalty term and all payment obligations with respect to all products in all countries have expired.

CRISPR Therapeutics AG

In 2015, the Company entered into a strategic collaboration, option and license agreement (the "CRISPR Agreement") with CRISPR Therapeutics AG and its affiliates ("CRISPR") to collaborate on the discovery and development of potential new treatments aimed at the underlying genetic causes of human diseases using CRISPR-Cas9 gene-editing technology. The Company had the exclusive right to license certain CRISPR-Cas9-based targets. In the fourth quarter of 2019, the Company elected to exclusively license three CRISPR-Cas9-based targets, including cystic fibrosis, pursuant to the CRISPR Agreement. For each of the three targets that the Company elected to license, CRISPR has the potential to receive up to an additional $410.0 million in development, regulatory and commercial milestones as well as royalties on net product sales.

In 2017, the Company entered into a co-development and co-commercialization agreement with CRISPR pursuant to the terms of the CRISPR Agreement, under which the Company and CRISPR are co-developing and will co-commercialize CTX001 (the "CTX001 Co-Co Agreement") for the treatment of hemoglobinopathies, including treatments for sickle cell disease and beta thalassemia. As part of the collaboration, the Company and CRISPR share equally all development costs and potential worldwide revenues related to potential hemoglobinopathy treatments. The Company concluded that the CTX001 Co-Co Agreement is a cost-sharing arrangement, which results in the net impact of the arrangement being recorded in "Research and development expenses" in its condensed consolidated statements of operations. During the three months ended March 31, 2020 and 2019, the net expense related to the CTX001 Co-Co Agreement was $9.3 million and $7.0 million, respectively.

In July 2019, the Company entered into a separate strategic collaboration and license agreement (the "CRISPR DMD/DM1 Agreement") with CRISPR. Pursuant to this agreement, the Company received an exclusive worldwide license to CRISPR's existing and future intellectual property for duchenne muscular dystrophy ("DMD") and myotonic dystrophy type 1 ("DM1"). In the first quarter of 2020, the Company recorded $25.0 million to "Research and development expenses" related to a pre-clinical milestone earned by CRISPR under the CRISPR DMD/DM1 Agreement. CRISPR has the potential to receive up to an additional $800.0 million in research, development, regulatory and commercial milestones for the DMD and DM1 programs as well as royalties on net product sales. CRISPR has the option to co-develop and co-commercialize all DM1 products globally and forego the milestones and royalties associated with the DM1 program. The Company funds all expenses associated with the collaboration except for research costs for specified guide RNA research conducted by CRISPR, which the Company and CRISPR share equally.

Please refer to Note F, "Marketable Securities and Equity Investments," for further information regarding the Company's investment in CRISPR's common stock.

Out-license Agreements

The Company has entered into licensing agreements pursuant to which it has out-licensed rights to certain drug candidates to third-party collaborators. Pursuant to these out-license agreements, the Company's collaborators become responsible for all costs related to the continued development of such drug candidates and obtain development and commercialization rights to these drug candidates. Depending on the terms of the agreements, the Company's collaborators may be required to make upfront payments, milestone payments upon the achievement of certain product research and development objectives and may also be required to pay royalties on future sales, if any, of commercial products resulting from the collaboration. The termination provisions associated with these collaborations are generally the same as those described above related to the Company's in-license agreements. None of the Company's out-license agreements had a significant impact on the Company's condensed consolidated statement of operations during the three months ended March 31, 2020 and 2019.

VERTEX PHARMACEUTICALS INCORPORATED
Notes to Condensed Consolidated Financial Statements
(unaudited)

Cystic Fibrosis Foundation

The Company has a research, development and commercialization agreement that was originally entered into in 2004 with Cystic Fibrosis Foundation ("CFF"), as successor in interest to the Cystic Fibrosis Foundation Therapeutics, Inc. This agreement was most recently amended in 2016. Pursuant to the agreement, as amended, the Company agreed to pay royalties ranging from low-single digits to mid-single digits on potential sales of certain compounds first synthesized and/or tested between March 1, 2014 and August 31, 2016, including elexacaftor, and tiered royalties ranging from single digits to sub-teens on covered compounds first synthesized and/or tested during a research term on or before February 28, 2014, including KALYDECO (ivacaftor), ORKAMBI (lumacaftor in combination with ivacaftor) and SYMDEKO/SYMKEVI (tezacaftor in combination with ivacaftor). For combination products, such as ORKAMBI, SYMDEKO/SYMKEVI and TRIKAFTA (elexacaftor, tezacaftor, and ivacaftor), sales are allocated equally to each of the active pharmaceutical ingredients in the combination product.

D. Earnings Per Share

Basic net income per common share is based upon the weighted-average number of common shares outstanding. Diluted net income per common share utilizing the treasury method is based upon the weighted-average number of common shares outstanding during the period plus additional weighted-average common equivalent shares outstanding during the period when the effect is dilutive.

The following table sets forth the computation of basic and diluted net income per common share for the periods ended:

	Three Months Ended March 31,	
	2020	2019
	(in thousands, except per share amounts)	
Net income	$ 602,753	$ 268,631
Basic weighted-average common shares outstanding	259,815	255,695
Effect of potentially dilutive securities:		
Stock options	1,868	2,585
Restricted stock and restricted stock units (including PSUs)	1,801	1,870
Employee stock purchase program	31	25
Diluted weighted-average common shares outstanding	263,515	260,175
Basic net income per common share	$ 2.32	$ 1.05
Diluted net income per common share	$ 2.29	$ 1.03

The Company did not include the securities in the following table in the computation of the net income per common share because the effect would have been anti-dilutive during each period:

	Three Months Ended March 31,	
	2020	2019
	(in thousands)	
Stock options	879	2,837
Unvested restricted stock and restricted stock units (including PSUs)	430	6

E. Fair Value Measurements

The fair value of the Company's financial assets and liabilities reflects the Company's estimate of amounts that it would have received in connection with the sale of the assets or paid in connection with the transfer of the liabilities in an orderly transaction between market participants at the measurement date. In connection with measuring the fair value of its assets and liabilities, the Company seeks to maximize the use of observable inputs (market data obtained from sources independent from the Company) and to minimize the use of unobservable inputs (the Company's assumptions about how market

participants would price assets and liabilities). The following fair value hierarchy is used to classify assets and liabilities based on the observable inputs and unobservable inputs used in order to value the assets and liabilities:

Level 1:	Quoted prices in active markets for identical assets or liabilities. An active market for an asset or liability is a market in which transactions for the asset or liability occur with sufficient frequency and volume to provide pricing information on an ongoing basis.
Level 2:	Observable inputs other than Level 1 inputs. Examples of Level 2 inputs include quoted prices in active markets for similar assets or liabilities and quoted prices for identical assets or liabilities in markets that are not active.
Level 3:	Unobservable inputs based on the Company's assessment of the assumptions that market participants would use in pricing the asset or liability.

The Company's investment strategy is focused on capital preservation. The Company invests in instruments that meet the credit quality standards outlined in the Company's investment policy. This policy also limits the amount of credit exposure to any one issue or type of instrument. The Company maintains strategic investments separately from the investment policy that governs its other cash, cash equivalents and marketable securities as described in "Note F, "Marketable Securities and Equity Investments." As of March 31, 2020, the Company's investments were in money market funds, corporate debt securities, commercial paper, government-sponsored enterprise securities and corporate equity securities. Additionally, the Company utilizes foreign currency forward contracts intended to mitigate the effect of changes in foreign exchange rates on its condensed consolidated statement of operations.

As of March 31, 2020, the Company's financial assets and liabilities that were subject to fair value measurements were valued using both observable and unobservable inputs. The Company's financial assets valued based on Level 1 inputs consisted of money market funds, government-sponsored enterprise securities and corporate equity securities. The Company's financial assets and liabilities valued based on Level 2 inputs consisted of certain corporate equity securities as described below, corporate debt securities, commercial paper, which consisted of investments in highly-rated investment-grade corporations, and foreign currency forward contracts with reputable and creditworthy counterparties. As discussed further below, the Company's financial liabilities valued based on Level 3 inputs consisted of acquisition-related contingent milestones. During the three months ended March 31, 2020 and 2019, the Company did not record any other-than-temporary impairment charges related to its financial assets.

VERTEX PHARMACEUTICALS INCORPORATED
Notes to Condensed Consolidated Financial Statements
(unaudited)

The following tables set forth the Company's financial assets and liabilities subject to fair value measurements (and does not include $1.8 billion and $2.3 billion of cash as of March 31, 2020 and December 31, 2019, respectively):

	Fair Value Measurements as of March 31, 2020			
		Fair Value Hierarchy		
	Total	Level 1	Level 2	Level 3
	(in thousands)			
Financial instruments carried at fair value (asset positions):				
Cash equivalents:				
Money market funds	$ 1,736,913	$ 1,736,913	$ —	$ —
Commercial paper	30,700	—	30,700	—
Marketable securities:				
Corporate equity securities	165,178	145,465	19,713	—
Government-sponsored enterprise securities	7,791	7,791	—	—
Corporate debt securities	305,051	—	305,051	—
Commercial paper	118,964	—	118,964	—
Prepaid expenses and other current assets:				
Foreign currency forward contracts	25,434	—	25,434	—
Other assets:				
Foreign currency forward contracts	1,798	—	1,798	—
Total financial assets	$ 2,391,829	$ 1,890,169	$ 501,660	$ —
Financial instruments carried at fair value (liability positions):				
Other current liabilities:				
Foreign currency forward contracts	$ (459)	$ —	$ (459)	$ —
Long-term contingent consideration	(178,100)	—	—	(178,100)
Other long-term liabilities:				
Foreign currency forward contracts	(637)	—	(637)	—
Total financial liabilities	$ (179,196)	$ —	$ (1,096)	$ (178,100)

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	Fair Value Measurements as of December 31, 2019			
		Fair Value Hierarchy		
	Total	Level 1	Level 2	Level 3
	(in thousands)			
Financial instruments carried at fair value (asset positions):				
Cash equivalents:				
Money market funds	$ 791,039	$ 791,039	$ —	$ —
Corporate debt securities	6,070	—	6,070	—
Commercial paper	29,472	—	29,472	—
Marketable securities:				
Corporate equity securities	282,084	261,797	20,287	—
Government-sponsored enterprise securities	12,733	12,733	—	—
Corporate debt securities	301,799	—	301,799	—
Commercial paper	102,356	—	102,356	—
Prepaid expenses and other current assets:				
Foreign currency forward contracts	9,725	—	9,725	—
Total financial assets	$ 1,535,278	$ 1,065,569	$ 469,709	$ —
Financial instruments carried at fair value (liability positions):				
Other current liabilities:				
Foreign currency forward contracts	$ (5,533)	$ —	$ (5,533)	$ —
Long-term contingent consideration	(176,500)	—	—	(176,500)
Other long-term liabilities:				
Foreign currency forward contracts	(1,821)	—	(1,821)	—
Total financial liabilities	$ (183,854)	$ —	$ (7,354)	$ (176,500)

Please refer to Note F, “Marketable Securities and Equity Investments,” for the carrying amount and related unrealized gains (losses) by type of investment.

Fair Value of Corporate Equity Securities

The Company maintains strategic investments in corporate equity securities separately from the investment policy that governs its other cash, cash equivalents and marketable securities. The Company classifies its investments in publicly traded companies as “Marketable securities” on its condensed consolidated balance sheets. Generally, the Company’s investments in the common stock of these publicly traded companies are valued based on Level 1 inputs because they have readily determinable fair values. However, certain of the Company’s investments in publicly traded companies have been or continue to be valued based on Level 2 inputs due to transfer restrictions associated with these investments. Please refer to Note F, “Marketable Securities and Equity Investments,” for further information on these investments.

Fair Value of Contingent Consideration

The Company’s contingent consideration liabilities, which are related to $678.3 million of development and regulatory milestones potentially payable to Exonics’ former equity holders, are classified as Level 3 within the valuation hierarchy. The Company bases its estimates of the probability of achieving the milestones relevant to the fair value of contingent payments on industry data attributable to rare diseases. The discount rates used in the valuation model for contingent payments, which were between 1.8% and 3.1%, represent a measure of credit risk and market risk associated with settling the liabilities. Significant judgment is used in determining the appropriateness of these assumptions at each reporting period. Due to the uncertainties associated with development and commercialization of a drug candidate in the pharmaceutical industry, the Company's estimates regarding the fair value of contingent consideration will change in the future, resulting in adjustments to the fair value of the Company’s contingent consideration liabilities, and the effect of any such adjustments could be material.

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The following table represents a rollforward of the fair value of the Company's contingent consideration liabilities:

	Three Months Ended March 31, 2020
	(in thousands)
Balance at December 31, 2019	$ 176,500
Increase in fair value of contingent payments	1,600
Balance at March 31, 2020	$ 178,100

The "Increase in fair value of contingent payments" in the table above was due to changes in market interest rates and the time value of money.

F. Marketable Securities and Equity Investments

A summary of the Company's cash equivalents and marketable securities, which are recorded at fair value (and do not include $1.8 billion and $2.3 billion of cash as of March 31, 2020 and December 31, 2019, respectively), is shown below:

	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
	(in thousands)			
As of March 31, 2020				
Cash equivalents:				
Money market funds	$ 1,736,913	$ —	$ —	$ 1,736,913
Commercial paper	30,700	4	(4)	30,700
Total cash equivalents	1,767,613	4	(4)	1,767,613
Marketable securities:				
Government-sponsored enterprise securities	7,717	74	—	7,791
Corporate debt securities	305,808	255	(1,012)	305,051
Commercial paper	118,542	426	(4)	118,964
Total marketable debt securities	432,067	755	(1,016)	431,806
Corporate equity securities	87,096	78,082	—	165,178
Total marketable securities	$ 519,163	$ 78,837	$ (1,016)	$ 596,984
As of December 31, 2019				
Cash equivalents:				
Money market funds	$ 791,039	$ —	$ —	$ 791,039
Corporate debt securities	6,070	—	—	6,070
Commercial paper	29,470	3	(1)	29,472
Total cash equivalents	826,579	3	(1)	826,581
Marketable securities:				
Government-sponsored enterprise securities	12,689	44	—	12,733
Corporate debt securities	301,458	391	(50)	301,799
Commercial paper	102,240	121	(5)	102,356
Total marketable debt securities	416,387	556	(55)	416,888
Corporate equity securities	113,829	168,255	—	282,084
Total marketable securities	$ 530,216	$ 168,811	$ (55)	$ 698,972

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Available-for-sale debt securities were classified on the Company's condensed consolidated balance sheets at fair value as follows:

	As of March 31, 2020	As of December 31, 2019
	(in thousands)	
Cash and cash equivalents	$ 1,767,613	$ 826,581
Marketable securities	431,806	416,888
Total	$ 2,199,419	$ 1,243,469

Available-for-sale debt securities by contractual maturity were as follows:

	As of March 31, 2020	As of December 31, 2019
	(in thousands)	
Matures within one year	$ 2,157,586	$ 1,137,942
Matures after one year through five years	41,833	105,527
Total	$ 2,199,419	$ 1,243,469

The Company has a limited number of available-for-sale debt securities in insignificant loss positions as of March 31, 2020, which it does not intend to sell and has concluded it will not be required to sell before recovery of the amortized costs for the investments at maturity. The Company did not record any charges for other-than-temporary declines in the fair value of available-for-sale debt securities or gross realized gains or losses in the three months ended March 31, 2020 and 2019.

As of March 31, 2020 and December 31, 2019, the total fair value of the Company’s strategic investments in the common stock of publicly traded companies, which was primarily related to its investment in CRISPR, was $165.2 million and $282.1 million, respectively, and was classified as “Marketable securities” on its condensed consolidated balance sheets.

The Company records changes in the fair value of its investments in corporate equity securities, which are primarily attributable to its investment in CRISPR, to “Other (expense) income, net” on its condensed consolidated statements of operations. During the three months ended March 31, 2020 and 2019, the Company recorded a net unrealized loss of $39.4 million and a net unrealized gain of $43.6 million, respectively, on corporate equity securities held at the conclusion of each period. During the three months ended March 31, 2020, the Company received proceeds of $72.0 million related to sales of CRISPR’s common stock, which had an original weighted-average cost basis of $26.7 million. There were no sales of CRISPR’s common stock during the three months ended March 31, 2019.

As of March 31, 2020, the carrying value of the Company’s equity investments without readily determinable fair values, which are recorded in “Other assets” on its condensed consolidated balance sheets, was $46.6 million.

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G. Accumulated Other Comprehensive Income (Loss)

The following table summarizes the changes in accumulated other comprehensive income (loss) by component:

	Foreign Currency Translation Adjustment	Unrealized Holding Gains (Losses), Net of Tax		Total
		On Available-For-Sale Debt Securities	On Foreign Currency Forward Contracts	
	(in thousands)			
Balance at December 31, 2019	$ (895)	$ 503	$ (1,581)	$ (1,973)
Other comprehensive (loss) income before reclassifications	(2,662)	(764)	25,772	22,346
Amounts reclassified from accumulated other comprehensive income (loss)	—	—	(6,990)	(6,990)
Net current period other comprehensive (loss) income	(2,662)	(764)	18,782	15,356
Balance at March 31, 2020	$ (3,557)	$ (261)	$ 17,201	$ 13,383
Balance at December 31, 2018	$ (11,227)	$ (536)	$ 12,422	$ 659
Other comprehensive income before reclassifications	4,967	596	5,126	10,689
Amounts reclassified from accumulated other comprehensive income	—	—	(5,348)	(5,348)
Net current period other comprehensive income (loss)	4,967	596	(222)	5,341
Balance at March 31, 2019	$ (6,260)	$ 60	$ 12,200	$ 6,000

H. Hedging

Foreign currency forward contracts - Designated as hedging instruments

The Company maintains a hedging program intended to mitigate the effect of changes in foreign exchange rates for a portion of the Company's forecasted product revenues denominated in certain foreign currencies. The program includes foreign currency forward contracts that are designated as cash flow hedges under GAAP having contractual durations from one to eighteen months. The Company recognizes realized gains and losses for the effective portion of such contracts in "Product revenues, net" in its condensed consolidated statements of operations in the same period that it recognizes the product revenues that were impacted by the hedged foreign exchange rate changes.

The Company formally documents the relationship between foreign currency forward contracts (hedging instruments) and forecasted product revenues (hedged items), as well as the Company's risk management objective and strategy for undertaking various hedging activities, which includes matching all foreign currency forward contracts that are designated as cash flow hedges to forecasted transactions. The Company also formally assesses, both at the hedge's inception and on an ongoing basis, whether the foreign currency forward contracts are highly effective in offsetting changes in cash flows of hedged items on a prospective and retrospective basis. If the Company were to determine that a (i) foreign currency forward contract is not highly effective as a cash flow hedge, (ii) foreign currency forward contract has ceased to be a highly effective hedge or (iii) forecasted transaction is no longer probable of occurring, the Company would discontinue hedge accounting treatment prospectively. The Company measures effectiveness based on the change in fair value of the forward contracts and the fair value of the hypothetical foreign currency forward contracts with terms that match the critical terms of the risk being hedged. As of March 31, 2020, all hedges were determined to be highly effective.

The Company considers the impact of its counterparties' credit risk on the fair value of the foreign currency forward contracts. As of March 31, 2020 and December 31, 2019, credit risk did not change the fair value of the Company's foreign currency forward contracts.

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The following table summarizes the notional amount of the Company's outstanding foreign currency forward contracts designated as cash flow hedges under GAAP:

	As of March 31, 2020	As of December 31, 2019
Foreign Currency	**(in thousands)**	
Euro	$ 581,764	$ 501,197
British pound sterling	124,160	87,032
Australian dollar	74,643	89,705
Canadian dollar	46,390	50,452
Total foreign currency forward contracts	$ 826,957	$ 728,386

Foreign currency forward contracts - Not designated as hedging instruments

The Company also enters into foreign currency forward contracts with contractual maturities of less than one month, that are designed to mitigate the effect of changes in foreign exchange rates on monetary assets and liabilities, including intercompany balances. These contracts are not designated as hedging instruments under GAAP. The Company recognizes realized gains and losses for such contracts in "Other (expense) income, net" in its condensed consolidated statements of operations each period. As of March 31, 2020, the notional amount of the Company's outstanding foreign currency forward contracts where hedge accounting under GAAP is not applied was $522.2 million.

During the three months ended March 31, 2020 and 2019, the Company recognized the following related to foreign currency forward contacts in its condensed consolidated statements of operations:

	Three Months Ended March 31,	
	2020	2019
	(in thousands)	
Designated as hedging instruments - Reclassified from AOCI		
Product revenues, net	$ 8,922	$ 6,839
Not designated as hedging instruments		
Other (expense) income, net	$ 16,229	$ 3,151
Total reported in the Condensed Consolidated Statement of Operations		
Product revenues, net	$ 1,515,107	$ 857,253
Other (expense) income, net	$ (61,130)	$ 42,610

The following table summarizes the fair value of the Company's outstanding foreign currency forward contracts designated as cash flow hedges under GAAP included on its condensed consolidated balance sheets:

As of March 31, 2020			
Assets		**Liabilities**	
Classification	**Fair Value**	**Classification**	**Fair Value**
	(in thousands)		
Prepaid expenses and other current assets	$ 25,434	Other current liabilities	$ (459)
Other assets	1,798	Other long-term liabilities	(637)
Total assets	$ 27,232	Total liabilities	$ (1,096)

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As of December 31, 2019			
Assets		**Liabilities**	
Classification	**Fair Value**	**Classification**	**Fair Value**
	(in thousands)		
Prepaid expenses and other current assets	$ 9,725	Other current liabilities	$ (5,533)
Other assets	—	Other long-term liabilities	(1,821)
Total assets	$ 9,725	Total liabilities	$ (7,354)

As of March 31, 2020, the Company expects the amounts that are related to foreign exchange forward contracts designated as cash flow hedges under GAAP recorded in “Prepaid expenses and other current assets” and “Other current liabilities” to be reclassified to earnings within twelve months.

The following table summarizes the potential effect of offsetting derivatives by type of financial instrument designated as cash flow hedges under GAAP on the Company’s condensed consolidated balance sheets:

	As of March 31, 2020				
	Gross Amounts Recognized	**Gross Amounts Offset**	**Gross Amounts Presented**	**Gross Amounts Not Offset**	**Legal Offset**
Foreign currency forward contracts			**(in thousands)**		
Total assets	$ 27,232	$ —	$ 27,232	$ (1,096)	$ 26,136
Total liabilities	(1,096)	—	(1,096)	1,096	—

	As of December 31, 2019				
	Gross Amounts Recognized	**Gross Amounts Offset**	**Gross Amounts Presented**	**Gross Amounts Not Offset**	**Legal Offset**
Foreign currency forward contracts			**(in thousands)**		
Total assets	$ 9,725	$ —	$ 9,725	$ (7,354)	$ 2,371
Total liabilities	(7,354)	—	(7,354)	7,354	—

I. Inventories

Inventories consisted of the following:

	As of March 31, 2020	**As of December 31, 2019**
	(in thousands)	
Raw materials	$ 24,835	$ 26,247
Work-in-process	117,427	107,021
Finished goods	44,825	34,234
Total	$ 187,087	$ 167,502

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J. Stock-based Compensation Expense and Share Repurchase Programs

Stock-based compensation expense

During the three months ended March 31, 2020 and 2019, the Company recognized the following stock-based compensation expense:

	Three Months Ended March 31,	
	2020	2019
	(in thousands)	
Stock-based compensation expense by type of award:		
Restricted stock and restricted stock units (including PSUs)	$ 97,149	$ 63,510
Stock options	17,266	28,156
ESPP share issuances	2,485	2,577
Stock-based compensation expense related to inventories	(1,194)	(452)
Total stock-based compensation expense included in costs and expenses	$ 115,706	$ 93,791
Stock-based compensation expense by line item:		
Cost of sales	$ 1,361	$ 1,338
Research and development expenses	72,687	59,715
Sales, general and administrative expenses	41,658	32,738
Total stock-based compensation expense included in costs and expenses	115,706	93,791
Income tax effect	(64,246)	(39,524)
Total stock-based compensation expense, net of tax	$ 51,460	$ 54,267

The following table sets forth the Company's unrecognized stock-based compensation expense as of March 31, 2020, by type of award and the weighted-average period over which that expense is expected to be recognized:

	As of March 31, 2020	
	Unrecognized Expense	Weighted-average Recognition Period
	(in thousands)	(in years)
Type of award:		
Restricted stock and restricted stock units (including PSUs)	$ 550,095	2.27
Stock options	$ 109,086	2.33
ESPP share issuances	$ 2,238	0.40

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The following table summarizes information about stock options outstanding and exercisable as of March 31, 2020:

	Options Outstanding			Options Exercisable	
Range of Exercise Prices	**Number Outstanding**	**Weighted-average Remaining Contractual Life**	**Weighted-average Exercise Price**	**Number Exercisable**	**Weighted-average Exercise Price**
	(in thousands)	**(in years)**	**(per share)**	**(in thousands)**	**(per share)**
$29.07–$40.00	81	1.47	$ 37.70	81	$ 37.70
$40.01–$60.00	224	2.41	$ 49.15	224	$ 49.15
$60.01–$80.00	116	4.03	$ 74.89	112	$ 74.89
$80.01–$100.00	1,393	5.99	$ 89.44	1,085	$ 90.01
$100.01–$120.00	182	4.88	$ 109.25	180	$ 109.18
$120.01–$140.00	402	5.44	$ 129.59	400	$ 129.61
$140.01–$160.00	954	7.86	$ 155.50	436	$ 155.41
$160.01–$180.00	669	8.24	$ 168.21	245	$ 165.11
$180.01–$189.38	1,498	8.65	$ 185.44	440	$ 185.31
Total	5,519	6.98	$ 137.34	3,203	$ 119.05

Share repurchase programs

During 2018, the Company's Board of Directors approved a share repurchase program (the "2018 Share Repurchase Program"), pursuant to which the Company repurchased $500.0 million of its common stock in 2018 and 2019. During the three months ended March 31, 2019, the Company repurchased 537,018 of its common stock under the share repurchase program for an aggregate of $98.0 million including commissions and fees. As of June 30, 2019, the Company had repurchased the entire $500.0 million it was authorized to repurchase of its common stock under the 2018 Share Repurchase Program.

During 2019, the Company's Board of Directors approved a new share repurchase program (the "2019 Share Repurchase Program"), pursuant to which the Company is authorized to repurchase up to $500.0 million of its common stock between August 1, 2019 and December 31, 2020. The Company expects to fund further repurchases of its common stock through a combination of cash on hand and cash generated by operations. During the three months ended March 31, 2020, the Company repurchased 1,403,868 shares of its common stock under the 2019 Share Repurchase Program for an aggregate of $300.0 million including commissions and fees. As of March 31, 2020, there was a total of $164.0 million remaining for repurchases under the 2019 Share Repurchase Program.

Under the 2019 Share Repurchase Programs, the Company is authorized to purchase shares from time to time through open market or privately negotiated transactions. Such purchases are made pursuant to Rule 10b5-1 plans or other means as determined by the Company's management and in accordance with the requirements of the SEC.

K. Income Taxes

The Company is subject to U.S. federal, state, and foreign income taxes. For the three months ended March 31, 2020 and 2019, the Company recorded provisions for income taxes of $54.8 million and $51.5 million, respectively. The Company's effective tax rate for the three months ended March 31, 2020 was lower than the U.S. statutory rate primarily due to a discrete benefit related to the write-off of a long-term intercompany receivable and excess tax benefits related to stock-based compensation. The Company's effective tax rate for the three months ended March 31, 2019 was lower than the U.S. statutory rate primarily due to excess tax benefits related to stock-based compensation.

The Company released its valuation allowance on the majority of its net operating losses and other deferred tax assets as of December 31, 2018. Starting in 2019, the Company began recording a provision for income taxes on its pre-tax income using an effective tax rate approximating statutory rates. Due to the Company's ability to offset its pre-tax income against

previously benefited net operating losses, it expects a portion of its tax provision to represent a non-cash expense until its net operating losses have been fully utilized.

The Company maintained a valuation allowance of $205.2 million related primarily to U.S. state and foreign tax attributes as of December 31, 2019. On a periodic basis, the Company reassesses any valuation allowances that it maintains on its deferred tax assets, weighing positive and negative evidence to assess the recoverability of the deferred tax assets.

In March 2020, the Coronavirus Aid, Relief and Economic Security Act ("the CARES Act") was signed into law. The CARES Act includes provisions relating to several aspects of corporate income taxes. The Company does not currently expect the CARES Act to have a significant impact on its provision for income taxes; however, it will continue to monitor the provisions of the CARES Act in relation to its operations.

The Company has reviewed the tax positions taken, or to be taken, in its tax returns for all tax years currently open to examination by a taxing authority. Unrecognized tax benefits represent the aggregate tax effect of differences between tax return positions and the benefits recognized in the financial statements. As of March 31, 2020 and December 31, 2019, the Company had $43.0 million and $33.9 million, respectively, of gross unrecognized tax benefits, which would affect the Company's tax rate if recognized. The Company does not expect that its unrecognized tax benefits will materially increase within the next twelve months. The Company accrues interest and penalties related to unrecognized tax benefits as a component of its provision for income taxes. As of March 31, 2020, no significant interest or penalties were accrued. The Company did not recognize any material interest or penalties related to uncertain tax positions during the three months ended March 31, 2020 and 2019.

As of March 31, 2020, foreign earnings, which were not significant, have been retained by foreign subsidiaries for indefinite reinvestment. Upon repatriation of those earnings, in the form of dividends or otherwise, the Company could be subject to withholding taxes payable to the various foreign countries.

The Company files U.S. federal income tax returns and income tax returns in various state, local and foreign jurisdictions. The Company is no longer subject to any tax assessment from an income tax examination in the United States or any other major taxing jurisdiction for years before 2011, except where the Company has net operating losses or tax credit carryforwards that originate before 2011. The Company has various income tax audits ongoing at any time throughout the world. No significant adjustments have been reported for any jurisdiction under audit.

L. Commitments and Contingencies

Revolving Credit Facility

In September 2019, the Company and certain of its subsidiaries entered into a Credit Agreement (the "2019 Credit Agreement") with Bank of America, N.A., as administrative agent and the lenders referred to therein. The 2019 Credit Agreement provides for a $500.0 million unsecured revolving facility, which was not drawn upon at closing. Amounts drawn pursuant to the 2019 Credit Agreement, if any, may be used to finance the Company's working capital needs, and for general corporate or other lawful purposes. The Company had no borrowings outstanding under the 2019 Credit Agreement as of March 31, 2020 and December 31, 2019. The 2019 Credit Agreement also provides that, subject to satisfaction of certain conditions, the Company may request that the borrowing capacity under the 2019 Credit Agreement be increased by an additional $500.0 million. The 2019 Credit Agreement, which matures on September 17, 2024, supersedes the Company's credit agreement entered into in 2016 with Bank of America, N.A serving in the same capacity. Additionally, the 2019 Credit Agreement provides a sublimit of $50.0 million for letters of credit.

Direct costs related to the 2019 Credit Agreement, which were not material to the Company's financial statements, were deferred and will be recorded over the term of the 2019 Credit Agreement.

Any amounts borrowed under the 2019 Credit Agreement will bear interest, at the Company's option, at either a base rate or a Eurocurrency rate, in each case plus an applicable margin. Under the 2019 Credit Agreement, the applicable margins on base rate loans range from 0.125% to 0.50% and the applicable margins on Eurocurrency loans range from 1.125% to 1.50%, in each case based on the Company's consolidated leverage ratio (the ratio of the Company's total consolidated funded indebtedness to the Company's consolidated EBITDA for the most recently completed four fiscal quarter period).

Any amounts borrowed pursuant to the 2019 Credit Agreement are guaranteed by certain of the Company's existing and future domestic subsidiaries, subject to certain exceptions.

The 2019 Credit Agreement contains customary representations and warranties and affirmative and negative covenants, including financial covenants to maintain (i) subject to certain limited exceptions, a consolidated leverage ratio of 3.50 to 1.00, subject to an increase to 4.00 to 1.00 following a material acquisition and (ii) a consolidated interest coverage ratio (the ratio of the Company's consolidated EBITDA to its consolidated interest expenses for the most recently completed four fiscal quarter period) of 2.50 to 1.00, in each case measured on a quarterly basis. The 2019 Credit Agreement also contains customary events of default. In the case of a continuing event of default, the administrative agent would be entitled to exercise various remedies, including the acceleration of amounts due under outstanding loans. As of March 31, 2020, the Company was in compliance with the covenants described above.

Guaranties and Indemnifications

As permitted under Massachusetts law, the Company's Articles of Organization and By-laws provide that the Company will indemnify certain of its officers and directors for certain claims asserted against them in connection with their service as an officer or director. The maximum potential amount of future payments that the Company could be required to make under these indemnification provisions is unlimited. However, the Company has purchased directors' and officers' liability insurance policies that could reduce its monetary exposure and enable it to recover a portion of any future amounts paid. No indemnification claims currently are outstanding, and the Company believes the estimated fair value of these indemnification arrangements is minimal.

The Company customarily agrees in the ordinary course of its business to indemnification provisions in agreements with clinical trial investigators and sites in its drug development programs, sponsored research agreements with academic and not-for-profit institutions, various comparable agreements involving parties performing services for the Company and its real estate leases. The Company also customarily agrees to certain indemnification provisions in its drug discovery, development and commercialization collaboration agreements. With respect to the Company's clinical trials and sponsored research agreements, these indemnification provisions typically apply to any claim asserted against the investigator or the investigator's institution relating to personal injury or property damage, violations of law or certain breaches of the Company's contractual obligations arising out of the research or clinical testing of the Company's compounds or drug candidates. With respect to lease agreements, the indemnification provisions typically apply to claims asserted against the landlord relating to personal injury or property damage caused by the Company, to violations of law by the Company or to certain breaches of the Company's contractual obligations. The indemnification provisions appearing in the Company's collaboration agreements are similar to those for the other agreements discussed above, but in addition provide some limited indemnification for its collaborator in the event of third-party claims alleging infringement of intellectual property rights. In each of the cases above, the indemnification obligation generally survives the termination of the agreement for some extended period, although the Company believes the obligation typically has the most relevance during the contract term and for a short period of time thereafter. The maximum potential amount of future payments that the Company could be required to make under these provisions is generally unlimited. The Company has purchased insurance policies covering personal injury, property damage and general liability that reduce its exposure for indemnification and would enable it in many cases to recover all or a portion of any future amounts paid. The Company has never paid any material amounts to defend lawsuits or settle claims related to these indemnification provisions. Accordingly, the Company believes the estimated fair value of these indemnification arrangements is minimal.

Other Contingencies

The Company has certain contingent liabilities that arise in the ordinary course of its business activities. The Company accrues a reserve for contingent liabilities when it is probable that future expenditures will be made, and such expenditures can be reasonably estimated. There were no material contingent liabilities accrued as of March 31, 2020 or December 31, 2019.

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M. Additional Cash Flow Information

The cash, cash equivalents and restricted cash at the beginning and ending of each period presented in the Company's condensed consolidated statements of cash flows consisted of the following:

	Three Months Ended March 31,			
	2020		2019	
	Beginning of period	End of period	Beginning of period	End of period
	(in thousands)			
Cash and cash equivalents	$ 3,109,322	$ 3,593,412	$ 2,650,134	$ 2,893,885
Prepaid expenses and other current assets	8,004	8,552	4,910	6,250
Other assets	3,355	—	3,209	1,397
Cash, cash equivalents and restricted cash per statement of cash flows	$ 3,120,681	$ 3,601,964	$ 2,658,253	$ 2,901,532

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations

OVERVIEW

We invest in scientific innovation to create transformative medicines for people with serious diseases with a focus on specialty markets. We continue to focus on developing and commercializing therapies for the treatment of cystic fibrosis, or CF. In 2019, we obtained approval in the United States, or U.S., for and launched TRIKAFTA (elexacaftor/tezacaftor/ivacaftor and ivacaftor). We are broadening our pipeline through internal research efforts and accessing external innovation through business development transactions.

We have four approved medicines that treat the underlying cause of CF, which is a life-threatening genetic disease. In October 2019, TRIKAFTA, our triple-combination regimen, was approved by the United States Food and Drug Administration, or FDA, for the treatment of patients with CF 12 years of age or older who have at least one *F508del* mutation in the cystic fibrosis transmembrane conductance regulator, or CFTR, gene. This approval increased the number of patients eligible for our medicines in the U.S. by approximately 6,000 and provided an additional treatment option for many patients who are also eligible for one of our previously approved products. We have submitted a Marketing Authorization Application, or MAA, to the European Medicines Agency, or EMA, for this triple combination regimen. Our four medicines are collectively approved to treat approximately 60% of the 75,000 CF patients in North America, Europe and Australia. We are focused on obtaining approval for the triple combination in ex-U.S. markets for patients 12 years of age and older and evaluating our triple combination in younger patients with the goal of having treatments for up to 90% of patients with CF. We are also pursuing genetic therapies to address the remaining 10% of CF patients.

Our small molecule programs include programs focused on developing treatments for alpha-1 antitrypsin, or AAT, deficiency, APOL1-mediated kidney diseases and pain. We are evaluating CTX001, a genetic therapy as a potential treatment for sickle cell disease and beta thalassemia, in Phase 1/2 clinical trials in collaboration with CRISPR Therapeutics AG, or CRISPR. In 2019, through a series of strategic transactions, we acquired preclinical genetic therapy programs for Duchenne muscular dystrophy, or DMD, and myotonic dystrophy type 1, or DM1, and preclinical programs to develop cell-based therapies for type 1 diabetes, or T1D.

We are monitoring the potential impacts of the recent spread of the novel strain of the coronavirus ("COVID-19") on our business. COVID-19 has not affected our supply chain or the demand for our medicines and we believe that we will be able to continue to supply all of our approved medicines to our patients globally. We have adjusted our business operations in response to COVID-19, with a majority of our employees working remotely, and COVID-19 has resulted in delays in certain research and development activities.

Financial Highlights

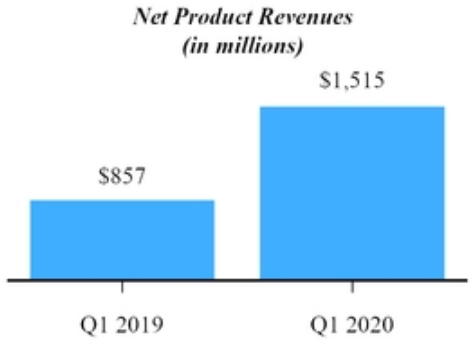
Revenues

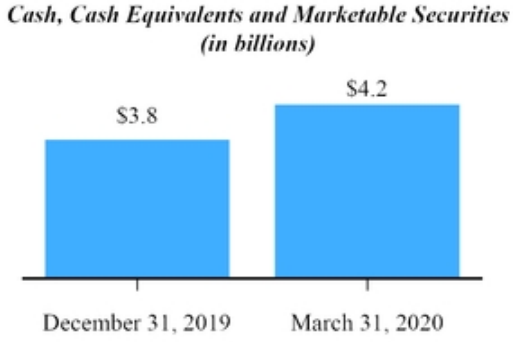
In the first quarter of 2020, our net product revenues continued to increase due to the approval of TRIKAFTA in late 2019 and uptake of our medicines medicines in ex-U.S. markets following completion of reimbursement agreements in 2019.

Expenses

Our combined R&D and SG&A expenses increased to $630.8 million in the first quarter of 2020 from $486.5 million in the first quarter of 2019. In the first quarter of 2020, cost of sales was 11% of our net product revenues.

Balance Sheet





Business Updates

COVID-19 has not affected our supply chain and we believe that we will be able to continue to supply all of our approved medicines to our patients globally.

TRIKAFTA (elexacaftor/tezacaftor/ivacaftor and ivacaftor)

- The majority of the approximately 18,000 eligible patients in the United States have now initiated treatment with TRIKAFTA following its approval in October 2019.
- The MAA for the elexacaftor, tezacaftor and ivacaftor triple combination in patients 12 years of age and older with at least one *F508del* mutation that we submitted in 2019 is being reviewed by the EMA.
- We recently submitted our applications for approval of the elexacaftor, tezacaftor and ivacaftor triple combination for patients 12 years of age and older with at least one *F508del* mutation in Australia and Switzerland.
- We recently completed enrollment for a Phase 3 clinical trial evaluating the use of the elexacaftor, tezacaftor and ivacaftor triple combination in children 6 to 11 years of age with CF who have two copies of the *F508del* mutation or who have one *F508del* mutation and one minimal function mutation. If the data from this clinical trial is positive, we plan to submit a supplemental New Drug Application, or sNDA, to the FDA in the second half of 2020 for children 6 to 11 years of age with at least one *F508del* mutation, followed by regulatory submissions in other countries.

KALYDECO (ivacaftor)

- We recently completed the submission of an sNDA to the FDA and Type 2 variation to the EMA for the use of KALYDECO in patients four to less than six months of age.

Pipeline

Depending on the disease, stage of development and type of clinical trial, and to ensure patient safety and reduce the burden on the healthcare system at a time of critical need, we have temporarily paused or delayed enrollment in certain clinical trials.

- *AAT Deficiency:* We temporarily paused screening and enrollment in the Phase 2 proof-of-concept clinical trial for VX-814, our first investigational oral small molecule corrector for the treatment of alpha-1 antitrypsin, or AAT, deficiency, in patients with AAT deficiency who have two copies of the Z mutation. The Phase 2 clinical trial remains active and we continue to initiate new trial sites to enable future patient enrollment.
- *Focal Segmental Glomerulosclerosis:* We recently initiated a Phase 2 proof-of-concept clinical trial designed to evaluate the reduction in proteinuria in patients with APOL1-mediated focal segmental glomerulosclerosis, or FSGS, receiving treatment with VX-147.
- *Beta Thalassemia and Sickle Cell Disease:* We and our collaborator, CRISPR, expect to provide additional data from the two ongoing Phase 1/2 clinical trials of the investigational CRISPR/Cas9 gene-editing therapy CTX001, in patients with transfusion-dependent beta thalassemia and in patients with severe sickle cell disease in 2020.
- *T1D*: We continue to advance our cell therapy program for the treatment of T1D and expect to initiate clinical development in patients in late 2020 or early 2021.

External Innovation

- *Affinia Therapeutics:* In April 2020, we entered into a collaboration with Affinia Therapeutics Inc. to gain access to a novel library of AAV capsids to support our ongoing research and development efforts in genetic therapies. The goal of the collaboration will be to develop gene therapies for people affected by DMD, DM1 and CF.
- *Moderna:* Based on preclinical data generated to date, we recently extended our collaboration with Moderna, aimed at the discovery and development of messenger ribonucleic acid, or mRNA, therapeutics for the treatment of CF.

Research

We are continuing to invest in our research programs and fostering scientific innovation in order to identify and develop transformative medicines. Our strategy is to combine transformative advances in the understanding of human disease and the science of therapeutics in order to identify and develop new medicines. We believe that pursuing research in diverse areas allows us to balance the risks inherent in drug development and may provide drug candidates that will form our pipeline in future years. To supplement our internal research programs, we acquire technologies and programs and collaborate with biopharmaceutical and technology companies, leading academic research institutions, government laboratories, foundations and other organizations, as needed, to advance research in our areas of therapeutic interest and to access technologies needed to execute on our strategy.

Drug Discovery and Development

Discovery and development of a new pharmaceutical product is a difficult and lengthy process that requires significant financial resources along with extensive technical and regulatory expertise. Potential drug candidates are subjected to rigorous evaluations, driven in part by stringent regulatory considerations, designed to generate information concerning efficacy, side effects, proper dosage levels and a variety of other physical and chemical characteristics that are important in determining whether a drug candidate should be approved for marketing as a pharmaceutical product. Most chemical compounds that are investigated as potential drug candidates never progress into development, and most drug candidates that do advance into development never receive marketing approval. Because our investments in drug candidates are subject to considerable risks, we closely monitor the results of our discovery, research, clinical trials and nonclinical studies and frequently evaluate our drug development programs in light of new data and scientific, business and commercial insights, with the objective of balancing risk and potential. This process can result in abrupt changes in focus and priorities as new information becomes available and as we gain additional understanding of our ongoing programs and potential new programs, as well as those of our competitors.

If we believe that data from a completed registration program support approval of a drug candidate, we submit an NDA to the FDA requesting approval to market the drug candidate in the United States and seek analogous approvals from comparable regulatory authorities in jurisdictions outside the United States. To obtain approval, we must, among other things, demonstrate with evidence gathered in nonclinical studies and well-controlled clinical trials that the drug candidate is safe and effective for the disease it is intended to treat and that the manufacturing facilities, processes and controls for the manufacture of the drug candidate are adequate. The FDA and ex-U.S. regulatory authorities have substantial discretion in deciding whether or not a drug candidate should be granted approval based on the benefits and risks of the drug candidate in the treatment of a particular disease, and could delay, limit or deny regulatory approval. If regulatory delays are significant or regulatory approval is limited or denied altogether, our financial results and the commercial prospects for the drug candidate involved will be harmed.

Regulatory Compliance

Our marketing of pharmaceutical products is subject to extensive and complex laws and regulations. We have a corporate compliance program designed to actively identify, prevent and mitigate risk through the implementation of compliance policies and systems and through the promotion of a culture of compliance. Among other laws, regulations and standards, we are subject to various U.S. federal and state laws, and comparable laws in other jurisdictions, pertaining to health care fraud and abuse, including anti-kickback and false claims laws, and laws prohibiting the promotion of drugs for unapproved or off-label uses. Anti-kickback laws generally make it illegal for a prescription drug manufacturer to knowingly and willfully solicit, offer, receive or pay any remuneration in return for or to induce the referral of business, including the purchase or prescription of a particular drug that is reimbursed by a state or federal health care program. False claims laws prohibit anyone from knowingly or willfully presenting for payment to third-party payors, including Medicare and Medicaid, claims for reimbursed drugs or services that are false or fraudulent, claims for items or services not provided as claimed, or claims for medically unnecessary items or services. We are subject to laws and regulations that regulate the sales and marketing practices of pharmaceutical manufacturers, as well as laws such as the U.S. Foreign Corrupt Practices Act, which govern our international business practices with respect to payments to government officials. In addition, we are subject to various data protection and privacy laws and regulations in the U.S., E.U., Canada, Australia and other jurisdictions. We expect to continue to devote substantial resources to maintain, administer and expand these compliance programs globally.

Reimbursement

Sales of our products depend, to a large degree, on the extent to which our products are reimbursed by third-party payors, such as government health programs, commercial insurance and managed health care organizations. We dedicate substantial management and other resources in order to obtain and maintain appropriate levels of reimbursement for our products from third-party payors, including governmental organizations in the United States and ex-U.S. markets.

In the United States, we have worked successfully with third party payors in order to promptly obtain appropriate levels of reimbursement for our first three CF medicines and are working with these stakeholders to obtain reimbursement for TRIKAFTA. We plan to continue to engage in discussions with numerous commercial insurers and managed health care organizations, along with government health programs that are typically managed by authorities in the individual states, to ensure that payors recognize the significant benefits that our medicines provide by treating the underlying cause of cystic fibrosis and continue to provide access to our medicines.

In Europe and other ex-U.S. markets, we seek government reimbursement for our medicines on a country-by-country basis. This is necessary for each new medicine, as well as, label expansions for our current medicines in most countries. We successfully obtained reimbursement for KALYDECO in each significant ex-U.S. market within two years of approval. We experienced significant challenges in obtaining reimbursement for ORKAMBI in certain ex-U.S. markets, however, we now have obtained reimbursement for ORKAMBI or SYMKEVI in most of our significant ex-U.S. markets. In some ex-U.S. markets, including Ireland, Denmark and Australia, our reimbursement agreements include innovative arrangements that provide a pathway to access and rapid reimbursement for certain future CF medicines. We filed a MAA with the EMA for the triple combination regimen of elexacaftor, tezacaftor and ivacaftor and, if approved, we would need to seek government reimbursement on a country-by-country basis, in most European markets. In December 2019, we reached an agreement with the government in Ireland to expand the existing reimbursement agreement to include the triple combination regimen pending approval by the EMA. We continue to seek government reimbursement and label expansions for our medicines in the applicable jurisdictions.

Strategic Transactions

Acquisitions

As part of our business strategy, we seek to acquire drugs, drug candidates and other technologies and businesses that have the potential to complement our ongoing research and development efforts. In 2019, we invested significantly in business development transactions designed to augment our pipeline, including the acquisition of Exonics, a privately-held company focused on creating transformative gene-editing therapies to repair mutations that cause DMD and other severe neuromuscular diseases, including DM1, and Semma, a privately-held company focused on the use of stem cell-derived human islets as a potentially curative treatment for T1D. In the Exonics acquisition, we paid approximately $245.0 million upfront to Exonics equity holders and agreed to additional payments based upon successful achievement of specified development and regulatory milestones. In the Semma acquisition, we paid approximately $950.0 million in cash to Semma equity holders. We expect to continue to identify and evaluate potential acquisitions that may be similar to or different from the transactions that we have engaged in previously.

Both of our 2019 acquisitions were accounted for as business combinations. As of the acquisition date for each transaction, the cash payments, as well as the fair value of contingent consideration for Exonics, were allocated primarily to goodwill and the fair value of several in-process research and development assets that we acquired. The fair value of contingent consideration related to Exonics was recorded as a liability and will be adjusted on a quarterly basis in the future. As a result, these acquisitions are primarily reflected in additional assets and liabilities on our condensed consolidated balance sheet. Please refer to Note C, “Acquisitions,” and our critical accounting policies, “Acquisitions,” in our 2019 Annual Report on Form 10-K for further information regarding the significant judgments and estimates related to our 2019 acquisitions.

Collaboration and Licensing Arrangements

We enter into arrangements with third parties, including collaboration and licensing arrangements, for the development, manufacture and commercialization of drugs, drug candidates and other technologies that have the potential to complement our ongoing research and development efforts. We expect to continue to identify and evaluate collaboration and licensing opportunities that may be similar to or different from the collaborations and licenses that we have engaged in previously.

In-License Agreements

We have entered into collaborations with biotechnology and pharmaceutical companies in order to acquire rights or to license drug candidates or technologies that enhance our pipeline and/or our research capabilities. Over the last several years, we entered into collaboration agreements with a number of companies, including Arbor Biotechnologies, Inc., CRISPR, Kymera Therapeutics, Inc. and Molecular Templates, Inc. Generally, when we in-license a technology or drug candidate, we make upfront payments to the collaborator, assume the costs of the program and/or agree to make contingent payments, which could consist of milestone, royalty and option payments. Most of these collaboration payments are expensed as research and development expenses; however, depending on many factors, including the structure of the collaboration, the significance of the drug candidate that we license to the collaborator’s operations and the other activities in which our collaborators are engaged, the accounting for these transactions can vary significantly. In the first quarter of 2020 and the first quarter of 2019,

our research and development expenses included $36.3 million and $5.3 million, respectively, related to upfront and milestones payments pursuant to our collaboration agreements.

Out-License Agreements

We also have out-licensed internally developed programs to collaborators who are leading the development of these programs. These out-license arrangements include our agreements with Janssen Pharmaceuticals, Inc., or Janssen, which is evaluating pimodivir in Phase 3 clinical trials for the treatment of influenza; and Merck KGaA, Darmstadt, Germany, which licensed oncology research and development programs from us in early 2017. Pursuant to these out-licensing arrangements, our collaborators are responsible for the research, development and commercialization costs associated with these programs, and we are entitled to receive contingent milestone and/or royalty payments. As a result, we do not expect to incur significant expenses in connection with these programs and have the potential for future collaborative and royalty revenues resulting from these programs.

Please refer to Note C, “Collaborative Arrangements,” for further information regarding our in-license agreements and out-license agreements.

Strategic Investments

In connection with our business development activities, we have periodically made equity investments in our collaborators. As of March 31, 2020, we held strategic equity investments in several public companies, including CRISPR, and certain private companies, and we plan to make additional strategic equity investments in the future. While we invest the majority of our cash, cash equivalents and marketable securities in instruments that meet specific credit quality standards and limit our exposure to any one issue or type of instrument, our strategic investments are maintained and managed separately from our other cash, cash equivalents and marketable securities. Any changes in the fair value of equity investments with readily determinable fair values (including publicly traded securities such as CRISPR) are recorded to other income (expense), net in our condensed consolidated statement of operations. For equity investments without readily determinable fair values including equity investments in private companies, each reporting period we are required to re-evaluate the carrying value of the investment, which may result in other income (expense).

In the first quarter of 2020 and the first quarter of 2019, we recorded within other income (expense), a net loss of $44.9 million and a net gain of $43.6 million, respectively, related to changes in the fair value of our strategic investments, and from sales of certain equity investments. To the extent that we continue to hold strategic investments, particularly strategic investments in publicly traded companies, we will record other income (expense) related to these strategic investments on a quarterly basis. Due to the high volatility of stocks in the biotechnology industry, we expect the value of these strategic investments to fluctuate and that the increases or decreases in the fair value of these strategic investments will continue to have material impacts on our net income (expense) and our profitability on a quarterly and/or annual basis.

RESULTS OF OPERATIONS

	Three Months Ended March 31,		Increase/(Decrease)	
	2020	2019	$	%
	(in thousands)			
Revenues	$ 1,515,107	$ 858,435	$ 656,672	76%
Operating costs and expenses	794,883	581,627	213,256	37%
Income from operations	720,224	276,808	443,416	160%
Other non-operating (expense) income, net	(62,690)	43,357	**	**
Provision for income taxes	54,781	51,534	3,247	6%
Net income	$ 602,753	$ 268,631	$ 334,122	124%
Net income per diluted common share	$ 2.29	$ 1.03		
Diluted shares used in per share calculations	263,515	260,175		

** Not meaningful

Net Income

Our net income increased in the first quarter of 2020 as compared to the first quarter of 2019 due to significant increases in our revenues partially offset by increases in our operating expenses, non-operating expense and provision for income taxes. The increase in revenues was primarily due to the U.S. approval of TRIKAFTA in the fourth quarter of 2019. Increases in operating expenses were the result of increased cost of sales consistent with increased product revenues, increased investment in research and development and increased sales, general and administrative expenses to support our business. The change in non-operating (expense) income, net was primarily related to changes in the value of our strategic investments.

Earnings Per Share

Diluted net income per common share was $2.29 in the first quarter of 2020 as compared to diluted net income per common share of $1.03 in the first quarter of 2019.

Revenues

	Three Months Ended March 31,		Increase/(Decrease)	
	2020	2019	$	%
	(in thousands)			
Product revenues, net	$ 1,515,107	$ 857,253	$ 657,854	77%
Collaborative and royalty revenues	—	1,182	(1,182)	**
Total revenues	$ 1,515,107	$ 858,435	$ 656,672	76%

** Not meaningful

Product Revenues, Net

	Three Months Ended March 31,		Increase/(Decrease)	
	2020	2019	$	%
	(in thousands)			
TRIKAFTA	$ 895,233	$ —	$ 895,233	**
SYMDEKO/SYMKEVI	173,159	320,275	(147,116)	(46)%
ORKAMBI	234,138	293,007	(58,869)	(20)%
KALYDECO	212,577	243,971	(31,394)	(13)%
Total product revenues, net	$ 1,515,107	$ 857,253	$ 657,854	77 %

** Not meaningful

In the first quarter of 2020, our net product revenues increased by $657.9 million as compared to the first quarter of 2019. The increase in total net product revenues in the first quarter of 2020 was primarily due to the launch of TRIKAFTA, which was approved in the United States in the fourth quarter of 2019. Decreases in revenues for our other products were the result of patients in the United States switching from these medicines to TRIKAFTA partially offset by label expansions and expanded access to our medicines in ex-U.S markets. In the first quarter of 2020 and 2019, our net product revenues included

product revenues of $327.5 million and $217.4 million, respectively, from ex-U.S. markets. Net product revenues in the first quarter of 2020 were also positively impacted by factors that may not be repeated in future periods, including early prescription refills, advance purchasing of medicines and initial compliance and persistence rates of patients who recently initiated treatment with TRIKAFTA.

Collaborative and Royalty Revenues

We did not record any collaborative and royalty revenues in the first quarter of 2020. Our collaborative and royalty revenues were $1.2 million in the first quarter of 2019. Our collaborative revenues have historically fluctuated significantly from one period to another and may continue to fluctuate in the future. Our future royalty revenues will be dependent on if, and when, our collaborators, including Janssen and Merck KGaA, Darmstadt, Germany are able to successfully develop drug candidates that we have out-licensed to them.

Operating Costs and Expenses

	Three Months Ended March 31,		Increase/(Decrease)	
	2020	2019	$	%
	(in thousands)			
Cost of sales	$ 162,497	$ 95,092	$ 67,405	71%
Research and development expenses	448,528	339,490	109,038	32%
Sales, general and administrative expenses	182,258	147,045	35,213	24%
Change in fair value of contingent consideration	1,600	—	1,600	**
Total costs and expenses	$ 794,883	$ 581,627	$ 213,256	37%

** Not Meaningful

Cost of Sales

Our cost of sales primarily consists of the cost of producing inventories that corresponded to product revenues for the reporting period, plus the third-party royalties payable on our net sales of our products. Pursuant to our agreement with the CFF, our tiered third-party royalties on sales of TRIKAFTA, SYMDEKO/SYMKEVI, KALYDECO and ORKAMBI, calculated as a percentage of net sales, range from the single digits to the sub-teens. Over the last several years, our cost of sales has been increasing due to increased net product revenues. Our cost of sales as a percentage of our net product revenues was approximately 11% in each of the first quarter of 2019 and 2020.

Research and Development Expenses

	Three Months Ended March 31,		Increase/(Decrease)	
	2020	2019	$	%
	(in thousands)			
Research expenses	$ 157,270	$ 90,463	$ 66,807	74%
Development expenses	291,258	249,027	42,231	17%
Total research and development expenses	$ 448,528	$ 339,490	$ 109,038	32%

Our research and development expenses include internal and external costs incurred for research and development of our drugs and drug candidates and expenses related to certain technology that we acquire or license through business development transactions. We do not assign our internal costs, such as salary and benefits, stock-based compensation expense, laboratory supplies and other direct expenses and infrastructure costs, to individual drugs or drug candidates, because the employees within our research and development groups typically are deployed across multiple research and development programs. These internal costs are significantly greater than our external costs, such as the costs of services provided to us by clinical research organizations and other outsourced research, which we allocate by individual program. All research and development costs for our drugs and drug candidates are expensed as incurred.

Since January 2018, we have incurred approximately $3.6 billion in research and development expenses associated with drug discovery and development. The successful development of our drug candidates is highly uncertain and subject to a number of risks. In addition, the duration of clinical trials may vary substantially according to the type, complexity and novelty of the drug candidate and the disease indication being targeted. The FDA and comparable agencies in foreign countries impose substantial requirements on the introduction of therapeutic pharmaceutical products, typically requiring lengthy and detailed laboratory and clinical testing procedures, sampling activities and other costly and time-consuming procedures. Data obtained from nonclinical and clinical activities at any step in the testing process may be adverse and lead to

discontinuation or redirection of development activities. Data obtained from these activities also are susceptible to varying interpretations, which could delay, limit or prevent regulatory approval. The duration and cost of discovery, nonclinical studies and clinical trials may vary significantly over the life of a project and are difficult to predict. Therefore, accurate and meaningful estimates of the ultimate costs to bring our drug candidates to market are not available.

In 2019 and the first quarter of 2020, costs related to our CF programs represented the largest portion of our development costs. Any estimates regarding development and regulatory timelines for our drug candidates are highly subjective and subject to change. Until we have data from Phase 3 clinical trials, we cannot make a meaningful estimate regarding when, or if, a clinical development program will generate revenues and cash flows.

Research Expenses

	Three Months Ended March 31,		Increase/(Decrease)	
	2020	2019	$	%
	(in thousands)			
Research Expenses:				
Salary and benefits	$ 34,269	$ 24,379	$ 9,890	41%
Stock-based compensation expense	26,409	17,535	8,874	51%
Outsourced services and other direct expenses	30,853	23,364	7,489	32%
Collaboration and asset acquisition payments	36,250	—	36,250	**
Infrastructure costs	29,489	25,185	4,304	17%
Total research expenses	$ 157,270	$ 90,463	$ 66,807	74%

** Not meaningful

We expect to continue to invest in our research programs with a focus on identifying drug candidates with the goal of creating transformative medicines for serious diseases. Our research expenses increased by 74% in the first quarter of 2020 compared to the first quarter of 2019 primarily as a result of collaboration and asset acquisition payments for which there were no similar expenses in the first quarter of 2019 as well as increased expenses to support our cell and genetic therapy programs.

Development Expenses

	Three Months Ended March 31,		Increase/(Decrease)	
	2020	2019	$	%
	(in thousands)			
Development Expenses:				
Salary and benefits	$ 79,598	$ 60,507	$ 19,091	32%
Stock-based compensation expense	46,278	42,180	4,098	10%
Outsourced services and other direct expenses	116,433	97,768	18,665	19%
Collaboration and asset acquisition payments	—	5,250	(5,250)	**
Infrastructure costs	48,949	43,322	5,627	13%
Total development expenses	$ 291,258	$ 249,027	$ 42,231	17%

** Not meaningful

Our development expenses increased by 17% in the first quarter of 2020 as compared to the first quarter of 2019, primarily due to increased expenses related to our advancing pipeline including clinical trials, headcount and infrastructure costs.

Sales, General and Administrative Expenses

	Three Months Ended March 31,		Increase/(Decrease)	
	2020	2019	$	%
	(in thousands)			
Sales, general and administrative expenses	$ 182,258	$ 147,045	$ 35,213	24%

Sales, general and administrative expenses increased by 24% in the first quarter of 2020 as compared to the first quarter of 2019, primarily due to increased global support for our medicines and incremental investment to support the launch of our triple combination regimen.

Contingent Consideration

In the first quarter of 2020, the increase in the fair value of contingent consideration potentially payable to Exonics' former equity holders was $1.6 million. There were no similar amounts for the first quarter of 2019.

Other Non-Operating Income (Expense), Net

Interest Income

Interest income decreased from $15.6 million in the first quarter of 2019 to $12.6 million in the first quarter of 2020 primarily due to prevailing market interest rates. Our future interest income will be dependent on the amount of, and prevailing market interest rates on, our outstanding cash equivalents and marketable securities.

Interest Expense

Interest expense was $14.1 million in the first quarter of 2020 as compared to $14.9 million in the first quarter of 2019. The majority of our interest expense in these periods was related to imputed interest expense associated with our leased corporate headquarters in Boston. Our future interest expense will be dependent on whether, and to what extent, we borrow amounts under our credit facility.

Other Income (Expense), Net

Other income (expense), net was an expense of $61.1 million in the first quarter of 2020 as compared to income of $42.6 million in the first quarter of 2019. Our other income (expense), net in these periods is primarily related to changes in the fair value of our strategic investments, as well as realized gains from sales of certain investments. We expect that due to the volatility of the stock price of biotechnology companies, our other income (expense), net will fluctuate in future periods based on increases or decreases in the fair value of our strategic investments.

Income Taxes

Our provision for income taxes in the first quarter of 2020 was $54.8 million as compared to $51.5 million in the first quarter of 2019. Our effective tax rate for the first quarter of 2020 was lower than the U.S. statutory rate primarily due to a discrete benefit related to the write off of a long-term intercompany receivable and excess tax benefits related to stock-based compensation. Our effective tax rate for the first quarter of 2019 was lower than the U.S. statutory rate primarily due to excess tax benefits related to stock-based compensation. We released our valuation allowance on the majority of our net operating losses and other deferred tax assets in the fourth quarter of 2018. Starting in 2019, we began recording a provision for income taxes on our pre-tax income using an effective tax rate approximating statutory rates. Due to our ability to offset our pre-tax income against previously benefited net operating losses, we expect a portion of our tax provision to represent a non-cash expense until our net operating losses have been fully utilized.

LIQUIDITY AND CAPITAL RESOURCES

The following table summarizes the components of our financial condition as of March 31, 2020 and December 31, 2019:

	March 31, 2020	December 31, 2019	Increase/(Decrease) $	Increase/(Decrease) %
	(in thousands)			
Cash, cash equivalents and marketable securities	$ 4,190,396	$ 3,808,294	$ 382,102	10%
Working Capital				
Total current assets	5,446,400	4,822,829	623,571	13%
Total current liabilities	(1,538,750)	(1,334,827)	203,923	15%
Total working capital	$ 3,907,650	$ 3,488,002	$ 419,648	12%

As of March 31, 2020, total working capital was $3.9 billion, which represented an increase of $420 million from $3.5 billion as of December 31, 2019. The increase in total working capital in the first quarter of 2020 was primarily related to $815.7 million of cash provided by operations partially offset by $300.0 million of cash used to repurchase our common stock pursuant to our share repurchase program that we announced in July 2019.

Sources of Liquidity

As of March 31, 2020, we had cash, cash equivalents and marketable securities of $4.2 billion, which represented an increase of $382 million from $3.8 billion as of December 31, 2019. We intend to rely on our existing cash, cash equivalents and marketable securities together with cash flows from product sales as our primary source of liquidity.

We may borrow up to $500.0 million pursuant to our revolving credit facility that we entered into in 2019. We may repay and reborrow amounts under the revolving credit agreement without penalty. Subject to certain conditions, we may request that the borrowing capacity under this credit agreement be increased by an additional $500.0 million, up to a total of $1.0 billion.

Other possible sources of future liquidity include commercial debt, public and private offerings of our equity and debt securities, strategic sales of assets or businesses and financial transactions. Negative covenants in our credit agreement may prohibit or limit our ability to access these sources of liquidity.

Future Capital Requirements

We have significant future capital requirements, including:

- significant expected operating expenses to conduct research and development activities and to operate our organization; and
- substantial facility and capital lease obligations, including leases for two buildings in Boston, Massachusetts that continue through 2028.

In addition:

- We have entered into certain collaboration agreements with third parties that include the funding of certain research, development and

commercialization efforts with the potential for future milestone and royalty payments by us upon the achievement of pre-established developmental and regulatory targets and/or commercial targets, and we may enter into additional business development transactions, including acquisitions, collaborations and equity investments, that require additional capital.

- We have reached an agreement with the French government and will repay a portion of the amounts we have collected under the ORKAMBI early access programs in France to the French government in 2020 based on the difference between the invoiced amount and the final amount for ORKAMBI distributed through these programs as reflected in the structure of the agreement with the French government.
- To the extent we borrow amounts under the credit agreement we entered into in 2019, we would be required to repay any outstanding principal amounts in 2024.
- As of March 31, 2020, $164.0 million remained available to fund repurchases under our share repurchase program.

We expect that cash flows from our products together with our current cash, cash equivalents and marketable securities will be sufficient to fund our operations for at least the next twelve months and do not expect COVID-19 to have an adverse affect on our liquidity. The adequacy of our available funds to meet our future operating and capital requirements will depend on many factors, including the amounts of future revenues generated by our products, and the potential introduction of one or more of our other drug candidates to the market, the level of our business development activities and the number, breadth, cost and prospects of our research and development programs.

Financing Strategy

We may raise additional capital by borrowing under credit agreements, through public offerings or private placements of our securities or securing new collaborative agreements or other methods of financing. We will continue to manage our capital structure and will consider all financing opportunities, whenever they may occur, that could strengthen our long-term liquidity profile. There can be no assurance that any such financing opportunities will be available on acceptable terms, if at all.

CONTRACTUAL COMMITMENTS AND OBLIGATIONS

Our commitments and obligations were reported in our Annual Report on Form 10-K for the year ended December 31, 2019, which was filed with the Securities and Exchange Commission, or SEC, on February 13, 2020. There have been no material changes from the contractual commitments and obligations previously disclosed in that Annual Report on Form 10-K.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

Our discussion and analysis of our financial condition and results of operations are based upon our condensed consolidated financial statements prepared in accordance with generally accepted accounting principles in the United States. The preparation of these financial statements requires us to make certain estimates and assumptions that affect the reported amounts of assets and liabilities, the disclosure of contingent assets and liabilities at the date of the condensed consolidated financial statements and the reported amounts of revenues and expenses during the reported periods. These items are monitored and analyzed by management for changes in facts and circumstances, and material changes in these estimates could occur in the future. Changes in estimates are reflected in reported results for the period in which the change occurs. We base our estimates on historical experience and various other assumptions that we believe to be reasonable under the circumstances. Actual results may differ from our estimates if past experience or other assumptions do not turn out to be substantially accurate. During the three months ended March 31, 2020, there were no material changes to our critical accounting policies as reported in our Annual Report on Form 10-K for the year ended December 31, 2019, which was filed with the SEC on February 13, 2020.

RECENT ACCOUNTING PRONOUNCEMENTS

For a discussion of recent accounting pronouncements, please refer to Note A, “Basis of Presentation and Accounting Policies.”

Item 3. Quantitative and Qualitative Disclosures About Market Risk

As part of our investment portfolio, we own financial instruments that are sensitive to market risks. The investment portfolio is used to preserve our capital until it is required to fund operations, including our research and development activities. None of these market risk-sensitive instruments are held for trading purposes. We do not have derivative financial instruments in our investment portfolio.

Interest Rate Risk

We invest our cash in a variety of financial instruments, principally securities issued by the U.S. government and its agencies, investment-grade corporate bonds and commercial paper, and money market funds. These investments are denominated in U.S. Dollars. All of our interest-bearing securities are subject to interest rate risk and could decline in value if interest rates fluctuate. Substantially all of our investment portfolio consists of marketable securities with active secondary or resale markets to help ensure portfolio liquidity, and we have implemented guidelines limiting the term-to-maturity of our investment instruments. Due to the conservative nature of these instruments, we do not believe that we have a material exposure to interest rate risk. If interest rates were to increase or decrease by 1%, the fair value of our investment portfolio would increase or decrease by an immaterial amount.

In 2019, we entered into a credit agreement. Loans under the credit agreement bear interest, at our option, at either a base rate or a Eurocurrency rate, in each case plus an applicable margin. The applicable margin on base rate loans ranges from 0.125% to 0.50% and the applicable margin on Eurocurrency loans ranges from 1.125% to 1.50%, in each case, based on our consolidated leverage ratio (the ratio of our total consolidated funded indebtedness to our consolidated EBITDA for the most recently completed four fiscal quarter period). We do not believe that changes in interest rates related to the credit agreement would have a material effect on our financial statements. As of March 31, 2020, we had no principal or interest outstanding. A portion of our “Interest expense” in 2020 will be dependent on whether, and to what extent, we borrow amounts under the existing facility.

Foreign Exchange Market Risk

As a result of our foreign operations, we face exposure to movements in foreign currency exchange rates, primarily the Euro and British Pound against the U.S. Dollar. The current exposures arise primarily from cash, accounts receivable,

intercompany receivables and payables, payables and accruals and inventories. Both positive and negative effects to our net revenues from international product sales from movements in exchange rates are partially mitigated by the natural, opposite effect that exchange rates have on our international operating costs and expenses.

We have a foreign currency management program with the objective of reducing the effect of exchange rate fluctuations on our operating results and forecasted revenues and expenses denominated in foreign currencies. We currently have cash flow hedges for the Euro, British Pound, Canadian Dollar and Australian Dollar related to a portion of our forecasted product revenues that qualify for hedge accounting treatment under U.S. GAAP. We do not seek hedge accounting treatment for our foreign currency forward contracts related to monetary assets and liabilities that impact our operating results. As of March 31, 2020, we held foreign exchange forward contracts that were designated as cash flow hedges with notional amounts totaling $827.0 million and had a net fair value of $26.1 million recorded on our condensed consolidated balance sheet.

Although not predictive in nature, we believe a hypothetical 10% threshold reflects a reasonably possible near-term change in exchange rates. Assuming that the March 31, 2020 exchange rates were to change by a hypothetical 10%, the fair value recorded on our condensed consolidated balance sheet related to our foreign exchange forward contracts that were designated as cash flow hedges as of March 31, 2020 would change by approximately $82.7 million. However, since these contracts hedge a specific portion of our forecasted product revenues denominated in certain foreign currencies, any change in the fair value of these contracts is recorded in “Accumulated other comprehensive income (loss) ” on our condensed consolidated balance sheet and is reclassified to earnings in the same periods during which the underlying product revenues affect earnings. Therefore, any change in the fair value of these contracts that would result from a hypothetical 10% change in exchange rates would be entirely offset by the change in value associated with the underlying hedged product revenues resulting in no impact on our future anticipated earnings and cash flows with respect to the hedged portion of our forecasted product revenues.

Item 4. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

Our management (under the supervision and with the participation of our chief executive officer and chief financial officer), after evaluating the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended) as of the end of the period covered by this Quarterly Report on Form 10-Q, has concluded that, based on such evaluation, as of March 31, 2020 our disclosure controls and procedures were effective and designed to provide reasonable assurance that the information required to be disclosed is recorded, processed, summarized and reported within the time periods specified in the SEC’s rules and forms. In designing and evaluating our disclosure controls and procedures, our management recognized that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives, and our management necessarily was required to apply its judgment in evaluating the cost-benefit relationship of possible controls and procedures.

Changes in Internal Controls Over Financial Reporting

No change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Securities Exchange Act of 1934, as amended) occurred during the three months ended March 31, 2020 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

PART II. Other Information

Item 1. Legal Proceedings

We are not currently subject to any material legal proceedings.

Item 1A. Risk Factors

Information regarding risk factors appears in Item 1A of our Annual Report on Form 10-K for the year ended December 31, 2019, which was filed with the SEC on February 13, 2020. There have been no material changes from the risk factors previously disclosed in the Annual Report on Form 10-K, except as noted below.

We are subject to risks associated with the spread of the novel strain of coronavirus, or COVID-19.

Our operations expose us to risks associated with the spread of COVID-19, which has affected the regions in which we conduct our operations and distribute medicines to patients. COVID-19 has broadly affected the global economy, resulted in significant travel and work restrictions in many regions and has put a significant strain on healthcare resources. COVID-19 is having, and we expect it will continue to have, an impact on our operations and an impact on the operations of our collaborators, third-party contractors and other entities, including governments, governmental agencies and payors, with which we interact. To date, the most significant effects on our business have been delays in certain research and development activities and the requirement that a majority of our employees work remotely. In the future, the economic impacts of the COVID-19 outbreak could affect our business directly or indirectly, including potentially affecting the net prices for our products through changes in our payor mix as a result of increased unemployment in the United States or increased pressure on healthcare costs. The effects on our research, development, manufacturing and commercialization activities, will be dependent on, among other things, the severity and duration of the COVID-19 outbreak as well as the impact of the outbreak on our third-party manufacturers, suppliers, distributors, subcontractors and customers. While the ultimate impact of COVID-19 on our business is highly uncertain, any negative impacts that materialize could materially adversely affect our operations, financial performance and stock price. Any negative impacts of COVID-19, alone or in combination with others, could exacerbate risk factors discussed in Part I, "Item 1A. Risk Factors" in our Annual Report on Form 10-K for the year ended December 31, 2019. The full extent to which the COVID-19 outbreak will negatively affect our operations, financial performance and stock price will depend on future developments that are highly uncertain and cannot be predicted, including the scope and duration of the outbreak and actions taken by governmental authorities and other third parties in response to the outbreak.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Quarterly Report on Form 10-Q and, in particular, our Management's Discussion and Analysis of Financial Condition and Results of Operations set forth in Part I-Item 2, contain or incorporate a number of forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, including statements regarding:

- our expectations regarding the amount of, timing of and trends with respect to our revenues, costs and expenses and other gains and losses, including those related to net product revenues;
- our expectations regarding the effect of COVID-19 on, among other things, our financial performance, business and operations;
- our expectations regarding clinical trials, development timelines and regulatory authority filings and submissions for ivacaftor, lumacaftor, tezacaftor, elexacaftor, and the timelines for regulatory filings for our triple combination regimen;
- our ability to obtain reimbursement for our medicines in ex-U.S. markets and our ability to otherwise successfully market our medicines or any of our other drug candidates for which we obtain regulatory approval;
- our expectations regarding the timing and structure of clinical trials of our drugs and drug candidates and the expected timing of our receipt of data from our ongoing and planned clinical trials;
- the data that will be generated by ongoing and planned clinical trials and the ability to use that data to advance compounds, continue development or support regulatory filings;
- our beliefs regarding the support provided by clinical trials and preclinical and nonclinical studies of our drug candidates for further investigation, clinical trials or potential use as a treatment;
- our plan to continue investing in our research and development programs and our strategy to develop our drug candidates, alone or with third party-collaborators;
- the potential future benefits of our acquisitions and collaborations;
- the establishment, development and maintenance of collaborative relationships;
- potential business development activities;

- potential fluctuations in foreign currency exchange rates;
- our ability to use our research programs to identify and develop new drug candidates to address serious diseases and significant unmet medical needs; and
- our liquidity and our expectations regarding the possibility of raising additional capital.

Any or all of our forward-looking statements in this Quarterly Report on Form 10-Q may turn out to be wrong. They can be affected by inaccurate assumptions or by known or unknown risks and uncertainties. Many factors mentioned in this Quarterly Report on Form 10-Q will be important in determining future results. Consequently, no forward-looking statement can be guaranteed. Actual future results may vary materially from expected results. We also provide a cautionary discussion of risks and uncertainties under "Risk Factors" in Item 1A of our Annual Report on Form 10-K for the year ended December 31, 2019, which was filed with the SEC on February 13, 2020. These are factors and uncertainties that we think could cause our actual results to differ materially from expected results. Other factors and uncertainties besides those listed there could also adversely affect us.

Without limiting the foregoing, the words "believes," "anticipates," "plans," "intends," "expects" and similar expressions are intended to identify forward-looking statements. There are a number of factors and uncertainties that could cause actual events or results to differ materially from those indicated by such forward-looking statements, many of which are beyond our control. In addition, the forward-looking statements contained herein represent our estimate only as of the date of this filing and should not be relied upon as representing our estimate as of any subsequent date. While we may elect to update these forward-looking statements at some point in the future, we specifically disclaim any obligation to do so to reflect actual results, changes in assumptions or changes in other factors affecting such forward-looking statements.

Item 2. Unregistered Sales of Equity Securities and Use of Proceeds

Issuer Repurchases of Equity Securities

In July 2019, we approved a share repurchase program (the "2019 Share Repurchase Program"), pursuant to which we are authorized to repurchase up to $500.0 million of our common stock between August 1, 2019 and December 31, 2020. The table set forth below shows repurchases of securities by us during the three months ended March 31, 2020, including shares repurchased under our 2019 Share Repurchase Program.

Period	Total Number of Shares Purchased	Average Price Paid per Share	Total Number of Shares Purchased as Part of Publicly Announced Plans or Programs (1)	Approximate Dollar Value of Shares that May Yet be Purchased Under the Plans or Programs (1)
January 1, 2020 to January 31, 2020	—	$—	—	$464,000
February 1, 2020 to February 29, 2020	54,579	$219.86	54,579	$452,001
March 1, 2020 to March 31, 2020	1,349,289	$213.44	1,349,289	$164,002
Total	1,403,868	$213.69	1,403,868	$164,002

(1) Under our 2019 Share Repurchase Program, we are authorized to purchase shares from time to time through open market or privately negotiated transactions. Such purchases may be made pursuant to Rule 10b5-1 plans or other means as determined by our management and in accordance with the requirements of the Securities and Exchange Commission.

Item 5. Other Information

On April 28, 2020, our board of directors amended and restated our by-laws to permit the holding of virtual meetings of shareholders on an online platform. The foregoing description is qualified by reference to our amended and restated by-laws, which are filed as Exhibit 3.2 to this Quarterly Report on Form 10-Q.

On April 28, 2020, Paul Silva, our Senior Vice President and Corporate Controller and our Principal Accounting Officer, informed us he plans to retire on April 30, 2021.

Item 6. Exhibits

Exhibit Number	Exhibit Description
3.2	Amended and Restated By-Laws of Vertex Pharmaceuticals Incorporated.
10.1	Employment Agreement, dated as of April 1, 2020, between Vertex Pharmaceuticals Incorporated and Dr. Jeffrey M. Leiden (incorporated by reference to Exhibit 10.1 to our Current Report on Form 8-K filed on April 1, 2020).*
31.1	Certification of the Chief Executive Officer under Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of the Chief Financial Officer under Section 302 of the Sarbanes-Oxley Act of 2002.
32.1	Certification of the Chief Executive Officer and the Chief Financial Officer under Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS	XBRL Instance
101.SCH	XBRL Taxonomy Extension Schema
101.CAL	XBRL Taxonomy Extension Calculation
101.LAB	XBRL Taxonomy Extension Labels
101.PRE	XBRL Taxonomy Extension Presentation
101.DEF	XBRL Taxonomy Extension Definition

* Management contract, compensatory plan or agreement.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

Vertex Pharmaceuticals Incorporated

May 1, 2020 By: /s/ Charles F. Wagner, Jr.

Charles F. Wagner, Jr.

Executive Vice President, Chief Financial Officer
(principal financial officer and
duly authorized officer)

AMENDED AND RESTATED

BY-LAWS

of

VERTEX PHARMACEUTICALS INCORPORATED

ARTICLE I

STOCKHOLDERS

Section 1. Annual Meeting. The annual meeting of the stockholders shall be held on the second Monday of May in each year, or on such other date within six months after the end of the fiscal year of the Corporation as the Board of Directors shall fix, at such time as shall be fixed by the Board of Directors in the call of the meeting. Purposes for which an annual meeting is to be held, in addition to those prescribed by law, by the Articles of Organization, or by these By-Laws, may be specified by the Board of Directors in the notice of the meeting.

Section 2. Special Meeting in Lieu of Annual Meeting. If no annual meeting has been held in accordance with the foregoing provisions, a special meeting of the stockholders may be held in lieu thereof. Any action taken at such special meeting shall have the same force and effect as if taken at the annual meeting, and in such case all references in these By-Laws to the annual meeting of the stockholders shall be deemed to refer to such special meeting. Any such special meeting shall be called as provided in Section 3 of this Article 1.

Section 3. Special Meetings. A special meeting of the stockholders may be called at any time by the Chairman of the Board, the President, or by the Board of Directors. A special meeting of the stockholders shall also be called by the Clerk (or, in the case of the death, absence, incapacity, or refusal of the Clerk, by any other officer) upon written application of one or more stockholders who hold at least forty percent in interest of the capital stock entitled to vote at the meeting. Each call of a meeting shall state the place, date, hour, and purposes of the meeting.

Section 4. Place of the Meetings. All meetings of the stockholders shall be held at such place, either within or without The Commonwealth of Massachusetts, within the United States as shall be fixed by the Board of Directors in the notice of the meeting; provided that the meeting may be held without a physical place to the extent permitted by law. Any adjourned session of any meeting of the stockholders shall be held as designated in the vote of adjournment.

Section 5. Notice of Meeting. A written notice of each meeting of stockholders, stating the place, date, hour and purposes of the meeting, shall be given at least seven days before the meeting to each stockholder entitled to vote thereat and to each stockholder who, by law, by the Articles of Organization, or by these By-Laws, is entitled to notice.

Such notice shall be given by the Clerk or an Assistant Clerk or by an officer designated by the Board of Directors. Whenever notice of a meeting is required to be given to a stockholder under any provision of the Business Corporation Law of the Commonwealth of Massachusetts or of the Articles of Organization or these By-Laws, a written waiver thereof, executed before or after the meeting by such stockholder or his attorney thereunto authorized and filed with the records of the meeting, shall be deemed equivalent to such notice.

Section 6. Quorum of Stockholders. At any meeting of the stockholders, a quorum shall consist of a majority in interest of all stock issued and outstanding and entitled to vote at the meeting, except when a larger quorum is required by law, by the Articles of Organization, or by these By-Laws. Stock owned directly or indirectly by the Corporation, if any, shall not be deemed outstanding for this purpose.

Section 7. Adjournment of Meetings. Any meeting of the stockholders may be adjourned (a) prior to the time the meeting has been convened, by the Board of Directors, or (b) after the meeting has been convened, by a majority of the votes properly cast upon the question, whether or not a quorum is present at the meeting, and the meeting may be held as adjourned without further notice.

Section 8. Action by Vote. When a quorum is present at any meeting, (a) upon any question other than an election of a director, a majority of the votes properly cast shall decide the question, except when a larger vote is required by law, by the Articles of Organization, or by these By-Laws, (b) in an uncontested election, votes properly cast in favor of election of a director exceeding the votes properly withheld in such election shall effect the election of a director, and (c) in a contested election, a plurality of the votes properly cast for election shall effect the election of a director. An election of directors shall be considered contested if, as of the record date for the applicable meeting, there are more nominees for election than positions on the board of directors to be filled by election at the meeting. All other elections of directors shall be considered uncontested.

Section 9. Voting. Stockholders entitled to vote shall have one vote for each share of stock held by them of record according to the records of the Corporation, unless otherwise provided by the Articles of Organization. No ballot shall be required for any vote for election to any office unless requested by a stockholder present or represented at the meeting and entitled to vote in such election. The Corporation shall not, directly or indirectly, vote any share of its own stock.

Section 10. Proxies. To the extent permitted by law, stockholders entitled to vote may vote either in person or by written proxy. Unless otherwise specified or limited by their terms, such proxies shall entitle the holders thereof to vote at any adjournment of such meeting but shall not be valid after the final adjournment of such meeting.

Section 11. Action by Consent. Any action required or permitted to be taken at any meeting of the stockholders may be taken without a meeting, but only if all stockholders entitled to vote on the matter consent to the action in

writing and the written consents are filed with the records of meetings of stockholders. Such consents shall be treated for all purposes as a vote taken at a meeting.

ARTICLE II

BOARD OF DIRECTORS

Section 1. Number and Elections. Subject to the rights of the holders of Preferred Stock to elect one or more additional directors under specified circumstances as provided in Article 4 of the Articles of Organization, the Board of Directors shall consist of not less than three nor more than eleven persons, the exact number to be fixed from time to time by the Board of Directors pursuant to a resolution adopted by a majority vote of the directors then in office. The directors shall be elected in the manner provided in the Articles of Organization, by such stockholders as have the right to vote thereon.

Section 2. Nominations. Nominations for the election of directors may be made by the Board of Directors or a committee appointed by the Board of Directors or by any stockholder entitled to vote in the election of directors generally. However, any stockholder entitled to vote in the election of directors generally may nominate one of more persons for election as directors at a meeting only if written notice of such stockholder's intent to make such nomination or nominations has been given, either by personal delivery or by mailing it, postage prepaid, to the Clerk of the Corporation not later than (a) with respect to an election to be held at an annual meeting of stockholders, ninety (90) days prior to the anniversary date of the immediately preceding annual meeting, and (b) with respect to an election to be held at a special meeting of stockholders for the election of directors, the close of business on the tenth day following the date on which notice of such meeting is first given to stockholders. Each such notice shall set forth (i) the name and address of the stockholder who intends to make the nomination and of the person or persons to be nominated; (ii) a representation that the stockholder is a holder of record of stock of the Corporation entitled to vote at such meeting and intends to appear in person or by proxy at the meeting to nominate the person or persons specified in the notice; (iii) a description of all arrangements or understandings between the stockholder and each nominee and any other person or persons (naming such person or persons) pursuant to which the nomination or nominations are to be made by the stockholder; (iv) such other information regarding each nominee proposed by such stockholder as would be required to be included in a proxy statement filed pursuant to the proxy rules of the Securities and Exchange Commission; and (v) the consent of each nominee to serve as a director of the Corporation if so elected. The presiding officer of the meeting may refuse to acknowledge the nomination of any person not made in compliance with the foregoing procedure.

Section 3. Newly Created Directorships and Vacancies. Newly created directorships and vacancies on the Board of Directors shall be filled as provided in the Articles of Organization.

Section 4. Removal of Directors. Directors may be removed from office only as provided in the Articles of Organization.

Section 5. Directors Elected by Holders of Preferred Stock. Whenever the holders of any class or series or Preferred Stock or of any other class or series of shares issued by the Corporation shall have the right, voting separately as a class or series, to elect one or more directors under specified circumstances, the election, term of office, filling of vacancies, and other features of such directorships shall be governed by the terms of the Articles of Organization applicable thereto, and none of the provisions of Sections 1 to 4 of this Article II shall apply with respect to directors so elected.

Section 6. Resignations. Any director, member of a committee, or officer may resign at any time by delivering his resignation in writing to the Chairman of the Board, the President, the Clerk, or to a meeting of the Board of Directors. Such resignation shall be effective upon receipt unless specified to be effective at some other time.

Section 7. Powers. Except as reserved to the stockholders by law, by the Articles of Organization, or by these By-Laws, the business of the Corporation shall be managed by the Board of Directors who shall have and may exercise all the powers of the Corporation.

Section 8. Proxy Access for Director Nominations.

(a) Information to be Included in the Corporation's Proxy Materials. Whenever the Board of Directors solicits proxies with respect to the election of directors at an annual meeting of stockholders (following the 2016 annual meeting of stockholders), subject to the provisions of this Section 8, the Corporation shall include in its proxy statement for such annual meeting, in addition to any persons nominated for election by the Board of Directors or a committee appointed by the Board of Directors, the name, together with the Required Information (as defined below), of any person to be nominated for election to the Board of Directors by a stockholder pursuant to Section 2 of this Article II (a "Stockholder Nominee") if (i) the stockholder of record who intends to make the nomination qualifies as, or is acting on behalf of, an Eligible Stockholder (as defined in Section 8(c) of this Article II), (ii) the Eligible Stockholder expressly elects, in a written statement accompanying the notice required by Section 2 of this Article II (a "Nomination Notice"), to have its Stockholder Nominee included in the Corporation's proxy materials pursuant to this Section 8 and (iii) all of the other requirements set forth in this Section 8 and in Section 2 of this Article II are satisfied. For purposes of this Section 8, the "Required Information" that the Corporation will include in its proxy statement is (A) the information provided to the Clerk of the Corporation concerning the Stockholder Nominee and the Eligible Stockholder that is required to be disclosed in the Corporation's proxy statement pursuant to Section 14 of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and the rules and regulations promulgated thereunder, and (B) if the Eligible Stockholder so elects, a Supporting Statement (as defined in Section 8(g) of this Article II). For the avoidance of doubt, nothing in this Section 8 shall limit the Corporation's ability to solicit against any Stockholder Nominee or include in

its proxy materials the Corporation's own statements or other information relating to any Eligible Stockholder or Stockholder Nominee, including any information provided to the Corporation pursuant to this Section 8. Subject to the provisions of this Section 8, the name of any Stockholder Nominee included in the Corporation's proxy statement for an annual meeting of stockholders shall also be set forth on the form of proxy distributed by the Corporation in connection with such annual meeting.

(b) Permitted Number of Stockholder Nominees. The maximum number of Stockholder Nominees that will be included in the Corporation's proxy materials with respect to an annual meeting of stockholders shall not exceed the greater of (i) two or (ii) 20% of the number of directors in office as of the last day on which a Nomination Notice may be delivered pursuant to Section 2 of this Article II (the "Final Proxy Access Date") or, if such amount is not a whole number, the closest whole number below 20% (such greater number, as it may be adjusted pursuant to this Section 8(b)), the "Permitted Number"). In the event that one or more vacancies for any reason occurs on the Board of Directors after the Final Proxy Access Date but before the date of the annual meeting and the Board of Directors resolves to reduce the size of the Board of Directors in connection therewith, the Permitted Number shall be calculated based on the number of directors in office as so reduced. In addition, the Permitted Number shall be reduced by (i) the number of individuals who will be included in the Corporation's proxy materials as nominees recommended by the Board of Directors pursuant to an agreement, arrangement or other understanding with a stockholder or group of stockholders (other than any such agreement, arrangement or understanding entered into in connection with an acquisition of stock from the Corporation by such stockholder or group of stockholders), together with the number of directors in office as of the Final Proxy Access Date who were either elected by the Board of Directors to fill a vacancy pursuant to such an agreement, arrangement or other understanding, or included in the Corporation's proxy materials as nominees recommended by the Board of Directors pursuant to such an agreement, arrangement or other understanding for any of the two preceding annual meetings of stockholders, and whose remaining terms extend beyond the upcoming annual meeting, and (ii) the number of directors in office as of the Final Proxy Access Date who were included in the Corporation's proxy materials as Stockholder Nominees for any of the two preceding annual meetings of stockholders (including any persons counted as Stockholder Nominees pursuant to the immediately succeeding sentence) and whose remaining terms extend beyond the upcoming annual meeting. For purposes of determining when the Permitted Number has been reached, any individual requested by an Eligible Stockholder to be included in the Corporation's proxy materials pursuant to this Section 8 whose nomination is subsequently withdrawn or whom the Board of Directors decides to nominate for election to the Board of Directors shall be counted as one of the Stockholder Nominees. Any Eligible Stockholder requesting that more than one Stockholder Nominee be included in the Corporation's proxy materials pursuant to this Section 8 shall rank such Stockholder Nominees based on the order in which the Eligible Stockholder desires such Stockholder Nominees to be selected for inclusion in the Corporation's proxy materials in the event that the total number of Stockholder Nominees requested by Eligible Stockholders to be included in the Corporation's proxy materials pursuant to this Section 8 exceeds the Permitted Number. In the event that the number of Stockholder Nominees requested by Eligible Stockholders to be included in the Corporation's proxy materials pursuant to this Section 8 exceeds the Permitted Number, the highest ranking Stockholder Nominee who meets the

requirements of this Section 8 from each Eligible Stockholder will be selected for inclusion in the Corporation's proxy materials until the Permitted Number is reached, going in order of the amount (largest to smallest) of shares of stock of the Corporation each Eligible Stockholder disclosed as owned in its Nomination Notice. If the Permitted Number is not reached after the highest ranking Stockholder Nominee who meets the requirements of this Section 8 from each Eligible Stockholder has been selected, then the next highest ranking Stockholder Nominee who meets the requirements of this Section 8 from each Eligible Stockholder will be selected for inclusion in the Corporation's proxy materials, and this process will continue as many times as necessary, following the same order each time, until the Permitted Number is reached. Notwithstanding anything to the contrary contained in this Section 8, the Corporation shall not be required to include any Stockholder Nominees in its proxy materials pursuant to this Section 8 for any meeting of stockholders for which the Corporation receives a Nomination Notice (whether or not subsequently withdrawn) and the stockholder by whom or on whose behalf the nomination is to be made does not expressly elect, in a written statement accompanying the Nomination Notice, to have its Stockholder Nominee included in the Corporation's proxy materials pursuant to this Section 8.

(c) Eligible Stockholder. An "Eligible Stockholder" is a stockholder or a group of no more than 20 stockholders (counting as one stockholder, for this purpose, any two or more funds that are part of the same Qualifying Fund Group (as defined below)) that (i) has Owned (as defined in Section 8(d) of this Article II) continuously for at least three years (the "Minimum Holding Period") a number of shares of stock of the Corporation that represents at least three percent of the voting power of the outstanding shares of stock as of the date the Nomination Notice is delivered to or mailed and received by the Clerk of the Corporation in accordance with Section 2 of this Article II (the "Required Shares") and (ii) continues to Own the Required Shares through the date of the annual meeting. A "Qualifying Fund Group" is any two or more funds that are (A) under common management and investment control, (B) under common management and funded primarily by the same employer or (C) a "group of investment companies" as such term is defined in Section 12(d)(1)(G)(ii) of the Investment Company Act of 1940, as amended. Whenever the Eligible Stockholder consists of a group of stockholders (including a group of funds that are part of the same Qualifying Fund Group), (1) each provision in this Section 8 that requires the Eligible Stockholder to provide any written statements, representations, undertakings, agreements or other instruments or to meet any other conditions shall be deemed to require each stockholder (including each individual fund within a Qualifying Fund Group) that is a member of such group to provide such statements, representations, undertakings, agreements or other instruments and to meet such other conditions (except that the members of such group may aggregate the shares that each member has Owned continuously for the Minimum Holding Period in order to meet the three percent Ownership requirement of the "Required Shares" definition) and (2) a breach of any obligation, agreement or representation under this Section 8 by any member of such group shall be deemed a breach by the Eligible Stockholder. No person may be a member of more than one group of stockholders constituting an Eligible Stockholder with respect to any annual meeting.

(d) Definition of Ownership. For purposes of this Section 8, a stockholder shall be deemed to "Own" only those outstanding shares of stock of the Corporation as to which the stockholder possesses both (i) the full voting and investment rights pertaining to the shares and (ii) the full economic interest in (including the opportunity for profit

from and risk of loss on) such shares; provided that the number of shares calculated in accordance with clauses (i) and (ii) shall not include any shares (A) sold by such stockholder or any of its affiliates in any transaction that has not been settled or closed, (B) borrowed by such stockholder or any of its affiliates for any purposes or purchased by such stockholder or any of its affiliates pursuant to an agreement to resell, or (C) subject to any option, warrant, forward contract, swap, contract of sale, or other derivative or similar instrument or agreement entered into by such stockholder or any of its affiliates, whether any such instrument or agreement is to be settled with shares or with cash based on the notional amount or value of shares of outstanding capital stock of the Corporation, in any such case which instrument or agreement has, or is intended to have, the purpose or effect of (1) reducing in any manner, to any extent or at any time in the future, such stockholder's or its affiliates' full right to vote or direct the voting of any such shares or (2) hedging, offsetting or altering to any degree any gain or loss realized or realizable from maintaining the full economic ownership of such shares by such stockholder or affiliate. For purposes of this Section 8, a beneficial owner shall be considered a "stockholder" and shall "Own" shares held in the name of a nominee or other intermediary so long as such person retains the right to instruct how the shares are voted with respect to the election of directors and possesses the full economic interest in the shares. A stockholder's Ownership of shares shall be deemed to continue during any period in which (i) the stockholder has loaned such shares, provided that the stockholder has the power to recall such loaned shares on five business days' notice and includes with its Nomination Notice an agreement that it (A) will promptly recall such loaned shares upon being notified that any of its Stockholder Nominees will be included in the Corporation's proxy materials and (B) will continue to hold such shares through the date of the annual meeting, or (ii) the stockholder has delegated any voting power by means of a proxy, power of attorney or other instrument or arrangement that is revocable at any time by the stockholder. The terms "Owned," "Owning" and other variations of the word "Own" shall have correlative meanings. Whether outstanding shares of stock of the Corporation are "Owned" for these purposes shall be determined by the Board of Directors. For purposes of this Section 8, the term "affiliate" or "affiliates" shall have the meaning ascribed thereto under the General Rules and Regulations under the Exchange Act.

(e) Information to be Included with a Nomination Notice. In addition to containing the information, representations and other documents required to be set forth in a Nomination Notice pursuant to Section 2 of this Article II, in order for a Stockholder Nominee to be eligible for inclusion in the Corporation's proxy materials pursuant to this Section 8, the Nomination Notice must also set forth or be accompanied by the following:

(i) A written statement by the Eligible Stockholder setting forth and certifying as to the number of shares of stock it Owns and has Owned continuously for the Minimum Holding Period;

(ii) one or more written statements from the record holder of the Required Shares (and from each intermediary through which the Required Shares are or have been held during the Minimum Holding Period) verifying that, as of a date within seven calendar days prior to the date the Nomination Notice is delivered to or mailed and received by the Clerk of the Corporation in accordance with Section 2 of this Article II, the Eligible Stockholder Owns, and has Owned continuously for the Minimum Holding Period, the Required Shares, and the Eligible

Stockholder's agreement to provide, within five business days following the later of the record date for the determination of stockholders certified to vote at the annual meeting and the date notice of the record date is first publicly disclosed, one or more written statements from the record holder and such intermediaries verifying the Eligible Stockholder's continuous Ownership of the Required Shares through the record date;

(iii) a copy of the Schedule 14N that has been or is concurrently being filed with the Securities and Exchange Commission as required by Rule 14a-18 under the Exchange Act;

(iv) a representation and agreement that the Eligible Stockholder (A) will continue to hold the Required Shares through the date of the annual meeting, (B) acquired the Required Shares in the ordinary course of business and not with the intent to change or influence control of the Corporation, and does not presently have such intent, (C) has not nominated and will not nominate for election to the Board of Directors at the annual meeting any person whom it has not requested be included in the Corporation's proxy materials pursuant to this Section 8, (D) has not engaged and will not engage in, and has not and will not be a "participant" in another person's, "solicitation" within the meaning of Rule 14a-1(l) under the Exchange Act in support of the election of any individual as a director at the annual meeting other than its Stockholder Nominee(s) or a nominee of the Board of Directors, (E) has not distributed and will not distribute to any stockholder of the Corporation any form of proxy for the annual meeting other than the form distributed by the Corporation, (F) has complied and will comply with all laws and regulations applicable to solicitations and the use, if any, of soliciting material in connection with the annual meeting and (G) has provided and will provide facts, statements and other information in all communications with the Corporation and its stockholders that are or will be true and correct in all material respects and do not and will not omit to state a material fact necessary in order to make the statements made, in light of the circumstances under which they were made, not misleading;

(v) an undertaking that the Eligible Stockholder agrees to (A) assume all liability stemming from any legal or regulatory violation arising out of the Eligible Stockholder's communications with the stockholders of the Corporation or out of the information provided to the Corporation by or on behalf of the Eligible Stockholder, (B) indemnify and hold harmless the Corporation and each of its directors, officers and employees individually against any liability, loss or damages in connection with any threatened or pending action, suit or proceeding, whether legal, administrative or investigative, against the Corporation or any of its directors, officers or employees arising out of any nomination of any person for election to the Board of Directors submitted by or on behalf of the Eligible Stockholder or any solicitation or other activity in connection therewith, and (C) file with the Securities and Exchange Commission any solicitation or other communication with the stockholders of the Corporation relating to the meeting at which its Stockholder Nominee(s) will be nominated, regardless of whether any such filing is required under Regulation 14A of the Exchange Act or whether any exemption from filing is available for such solicitation or other communication under Regulation 14A of the Exchange Act;

(vi) a written representation and agreement from each Stockholder Nominee that such Stockholder Nominee (A) is not and will not become a party to (1) any agreement, arrangement or understanding with, and has not given any commitment or assurance to, any person or entity as to how such Stockholder Nominee, if elected

as a director of the Corporation, will act or vote on any issue or question (a "Voting Commitment") that has not been disclosed to the Corporation in such representation and agreement or (2) any Voting Commitment that could limit or interfere with such person's ability to comply, if elected as a director of the Corporation, with such person's fiduciary duties under applicable law, (B) is not and will not become a party to any agreement, arrangement or understanding with any person or entity other than the Corporation with respect to any direct or indirect compensation, reimbursement or indemnification in connection with such person's nomination or service or action as a director that has not been disclosed to the Corporation in such representation and agreement, (C) would be in compliance, if elected as a director of the Corporation, and will comply with the Corporation's code of business conduct and ethics, corporate governance guidelines, stock ownership and trading policies and guidelines and any other policies or guidelines of the Corporation applicable to directors and (D) will make such other acknowledgments, enter into such agreements and provide such information as the Board of Directors requires of all directors, including promptly submitting all completed and signed questionnaires required of the Corporation's directors;

(vii) if the Eligible Stockholder consists of a group of stockholders, the designation by all group members of one member of the group that is authorized to receive communications, notices and inquiries from the Corporation and to act on behalf of all members of the group with respect to all matters relating to the request under this Section 8 (including withdrawal of the nomination); and

(viii) if two or more funds that are part of the same Qualifying Fund Group are intended to be counted as one stockholder for purposes of qualifying as an Eligible Stockholder, documentation reasonably satisfactory to the Corporation that demonstrates that the funds are part of the same Qualifying Fund Group.

(f) Additional Required Information. In addition to the information required pursuant to Section 8(e) of this Article II or any other provision of these By-Laws, the Corporation may require (i) any proposed Stockholder Nominee requested to be included in the Corporation's proxy materials to furnish any other information (A) that may reasonably be requested by the Corporation to determine whether the Stockholder Nominee would be independent under the Independence Standards (as defined in Section 8(i) of this Article II), (B) that could be material to a reasonable stockholder's understanding of the independence, or lack thereof, of such Stockholder Nominee or (C) that may reasonably be requested by the Corporation to determine the eligibility of such Stockholder Nominee to be included in the Corporation's proxy materials pursuant to this Section 8 or to serve as a director of the Corporation, and (ii) any Eligible Stockholder to furnish any other information that may reasonably be requested by the Corporation to verify the Eligible Stockholder's continuous ownership of the Required Shares for the Minimum Holding Period and through the date of the annual meeting.

(g) Supporting Statement. The Eligible Stockholder may, at its option, provide to the Clerk of the Corporation, at the time the Nomination Notice is provided, a written statement, not to exceed 500 words, in support of its Stockholder Nominee(s)' candidacy (a "Supporting Statement"). Only one Supporting Statement may be submitted by an Eligible Stockholder (including any group of stockholders together constituting an Eligible Stockholder) in support of its Stockholder Nominee(s). Notwithstanding anything to the contrary contained in this

Section 8, the Corporation may omit from its proxy materials any information or Supporting Statement (or portion thereof) that it, in good faith, believes would violate any applicable law, rule or regulation.

(h) Correction of Defects; Updates and Supplements. In the event that any information or communications provided by or on behalf of an Eligible Stockholder or a Stockholder Nominee to the Corporation or its stockholders ceases to be true and correct in all material respects or omits to state a material fact necessary to make the statements made, in light of the circumstances under which they were made, not misleading, such Eligible Stockholder or Stockholder Nominee, as the case may be, shall promptly notify the Clerk of the Corporation of any such defect and of the information that is required to correct any such defect. Without limiting the forgoing, an Eligible Stockholder must provide immediate notice to the Corporation if the Eligible Stockholder ceases to Own any of the Required Shares prior to the date of the annual meeting. For the avoidance of doubt, no notification, update or supplement provided pursuant to this Section 8(h) shall be deemed to cure any defect in any previously provided information or communications or limit the remedies available to the Corporation relating to any such defect (including the right to omit a Stockholder Nominee from its proxy materials pursuant to this Section 8).

(i) Stockholder Nominee Eligibility. Notwithstanding anything to the contrary contained in this Section 8, the Corporation shall not be required to include in its proxy materials, pursuant to this Section 8, a Stockholder Nominee (i) who would not be an independent director under the rules and listing standards of the United States securities exchanges upon which the capital stock of the Corporation is listed or traded, any applicable rules of the Securities and Exchange Commission, or any publicly disclosed standards used by the Board of Directors in determining and disclosing the independence of the Corporation's directors (collectively, the "Independence Standards"), (ii) whose election as a member of the Board of Directors would cause the Corporation to be in violation of these By-Laws, the Articles of Organization, the rules and listing standards of the United States securities exchanges upon which the capital stock of the Corporation is listed or traded, or any applicable law, rule or regulation, (iii) who is or has been, within the past three years, an officer or director of a competitor, as defined in Section 8 of the Clayton Antitrust Act of 1914, (iv) who is a named subject of a pending criminal proceeding (excluding traffic violations and other minor offenses) or has been convicted in such a criminal proceeding within the past 10 years, (v) who is subject to any order of the type specified in Rule 506(d) of Regulation D promulgated under the Securities Act of 1933, as amended, or (vi) who shall have provided any information to the Corporation or its stockholders that was untrue in any material respect or that omitted to state a material fact necessary to make the statements made, in light of the circumstances in which they were made, not misleading.

(j) Omission and Removal of Stockholder Nominees. Notwithstanding anything to the contrary set forth herein, if (i) a Stockholder Nominee and/or the applicable Eligible Stockholder breaches any of its representations, agreements or undertakings or fails to comply with any of its obligations under this Section 8 or Section 2 of this Article II, or (ii) a Stockholder Nominee otherwise becomes ineligible for inclusion in the Corporation's proxy materials pursuant to this Section 8 or dies, becomes disabled or otherwise becomes ineligible or unavailable for election at the annual meeting, in each case as determined by the Board of Directors or the presiding officer of the annual meeting,

then (A) the Corporation may omit or, to the extent feasible, remove the information concerning such Stockholder Nominee and the related Supporting Statement from its proxy materials and otherwise communicate to its stockholders that such Stockholder Nominee will not be eligible for election at the annual meeting and, (B) the Corporation shall not be required to include in its proxy materials any successor or replacement nominee proposed by the applicable Eligible Stockholder or any other Eligible Stockholder.

(k) Restrictions on Re-Nominations. Any Stockholder Nominee who is included in the Corporation's proxy materials for a particular annual meeting of stockholders but either (i) withdraws from or becomes ineligible or unavailable for election at the annual meeting, or (ii) does not receive at least 10% of the votes cast in favor of such Stockholder Nominee's election, will be ineligible to be included in the Corporation's proxy materials pursuant to this Section 8 for the next two annual meetings of stockholders.

(l) General. This Section 8 provides the exclusive method for a stockholder to include nominees for election to the Board of Directors in the Corporation's proxy materials.

Section 9. Other Committees. The Board of Directors may, by vote of a majority of the directors then in office, elect from their number other committees and may delegate to any such committee or committees some or all of the powers of the Board of Directors except those powers which by law, by the Articles of Organization, or by these By-Laws they are prohibited from delegating. Except as the Board of Directors may otherwise determine, each committee may make rules for the conduct of its business, but unless otherwise provided by the Board of Directors or such rules, its business shall be conducted as nearly as may be in the same manner as is provided by these By-Laws for the conduct of business by the Board of Directors. The Board of Directors shall have the power to rescind any vote, resolution, or other action of any committee, provided that the rights of third parties shall not be impaired by such rescission.

Section 10. Regular Meetings. A regular meeting of the Board of Directors shall be held without call or notice immediately after and at the same place as the annual meeting of the stockholders. Other regular meetings of the Board of Directors may be held without call or notice at such places and at such times as the Board of Directors may, from time to time, determine, provided that notice of the first regular meeting following any such determination shall be given to absent directors.

Section 11. Special Meetings. Special meetings of the Board of Directors may be held at any time and at any place designated in the call of the meeting, when called by the Chairman of the Board, the President, or by two or more directors.

Section 12. Notice of the Meetings. It shall be sufficient notice to a director of a meeting of the Board of Directors (i) to send notice by mail at least forty-eight (48) hours before the meeting, addressed to such directors at his usual or last known business or residence address, (ii) to send notice by electronic mail (to the electronic mail address designated by such director) at least twenty-four (24) hours before the meeting, or (iii) to give notice to such director in person

or by telephone at least twenty-four (24) hours before the meeting. A director may waive any notice before or after the date and time of the meeting. The waiver shall be in writing, signed by the director entitled to the notice, or in the form of an electronic transmission by the director to a representative of the Corporation, and filed with the minutes or corporate records. A director's attendance at or participation in a meeting waives any required notice to him or her of the meeting unless the director at the beginning of the meeting, or promptly upon his or her arrival, objects to holding the meeting or transacting business at the meeting and does not thereafter vote for or assent to action taken at the meeting. Neither notice of a meeting nor a waiver of a notice need specify the purposes of the meeting.

Section 13. Quorum of Directors. At any meeting of the Board of Directors, a majority of the directors then in office shall constitute a quorum. Any meeting may be adjourned from time to time by a majority of the votes cast upon the question, whether or not a quorum is present, and the meeting may be held as adjourned without further notice.

Section 14. Action by Vote. When a quorum is present at any meeting, a majority of the directors present may take any action, except when a larger vote is required by law, by the Articles of Organization, or by these By-Laws.

Section 15. Action by Written Consent. Unless the Articles of Organization otherwise provide, any action required or permitted to be taken at any meeting of the Board of Directors or of any committee thereof may be taken without a meeting if all the directors or members of the committee as the case may be, consent to the action. The action must be evidenced by one or more consents describing the action taken, in writing, signed by each director or delivered to the Corporation by electronic transmission, and included in the minutes or filed with the corporate records reflecting the action taken. Such consents shall be treated for all purposes as a vote taken at a meeting.

Section 16. Participation Through Communications Equipment. Unless otherwise provided by law or the Articles of Organization, members of the Board of Directors or of any committee thereof may participate in a meeting of such Board or committee, as the case may be, through conference telephone or similar communications equipment by means of which all persons participating in the meeting can hear each other at the same time, and participation by such means shall constitute presence in person at a meeting.

Section 17. Compensation of Directors. The Board of Directors may provide for the payment to any of the directors, other than officers or employees of the Corporation, of a specified amount for services as a director or member of a committee of the Board, or of a specified amount for attendance at each regular or special Board or committee meeting or of both, and all directors shall be reimbursed for expenses of attendance at any such meeting; provided, however, that nothing herein contained shall be construed to preclude any director from serving the Corporation in any other capacity and receiving compensation therefor.

ARTICLE III

OFFICERS AND AGENTS

Section 1. Enumeration; Qualification. The officers of the Corporation shall be a President, a Treasurer, a Secretary, who may also be referred to in these By-Laws as the Clerk, and such other officers, including, without limitation, a Chairman of the Board, one or more Vice Presidents, Assistant Treasurers, and Assistant Clerks as the Board of Directors from time to time may in their discretion elect or appoint. In addition, the Corporation shall have such other agents as may be appointed by management in accordance with these By-Laws. The Chairman of the Board shall be a director. The President need not be a director. Any two or more offices may be held by the same person.

Section 2. Powers. Subject to law, to the Articles of Organization, and to the other provisions of these By-Laws, each officer shall have, in addition to the duties and powers herein set forth, such duties and powers as are commonly incident to his office and such duties and powers as the Board of Directors may from time to time designate.

Section 3. Election. The Chairman of the Board, if any, the President, the Treasurer, and the Clerk shall be elected annually by the Board of Directors at their first meeting following the annual meeting of the stockholders. Other officers, if any, may be elected or appointed by the Board of Directors at said meeting or at any other time.

Section 4. Tenure. Except as otherwise provided by law, by the Articles of Organization, or by these By-Laws, the Chairman of the Board, if any, the President, the Treasurer, and the Clerk shall hold office until the first meeting of the Board of Directors following the next annual meeting of the stockholders and until their respective successors are chosen and qualified, and each other officer shall hold office for such term as may be designated in the vote electing or appointing him, or in each case until such officer sooner dies, resigns, is removed, or becomes disqualified.

Section 5. Chief Executive Officer. The Chief Executive Officer of the Corporation shall be the Chairman of the Board, the President, or such other officer as may from time to time be designated by the Board of Directors. If no such designation is made, the President shall be the Chief Executive Officer. The Chief Executive Officer shall, subject to the control of the Board of Directors, have general charge and supervision of the business of the Corporation and, except as the Board of Directors shall otherwise determine, shall preside at all meetings of the stockholders and of the Executive Committee. Unless otherwise determined by the Board of Directors, the Chief Executive Officer shall have the authority to appoint such agents, in addition to those officers enumerated in Section 2 of this Article III as being elected or appointed by the Board of Directors, as he shall deem appropriate and to define their respective duties and powers.

Section 6. Chairman of the Board. If a Chairman of the Board of Directors is elected, he shall preside at all meetings of the Board of Directors and shall have the duties and powers specified in these By-Laws and such other duties and powers as may be determined by the Board of Directors.

Section 7. President and Vice Presidents. The President shall have the duties and powers specified in these By-Laws and shall have such other duties and powers as may be determined by the Board of Directors.

The Vice Presidents shall have such duties and powers as shall be designated from time to time by the Board of Directors. Unless the Board of Directors otherwise determines, one Vice President shall be designated as the Chief Financial officer of the Corporation and, as such, shall be the chief financial and accounting officer of the Corporation and shall have the duties and powers commonly incident thereto.

Section 8. Treasurer and Assistant Treasurers. The Treasurer shall have general responsibility for the corporate treasury function, shall be in charge of its funds and valuable papers, books of account, and accounting records, and shall have such other duties and powers as may be designated from time to time by the Board of Directors.

Any Assistant Treasurer shall have such duties and powers as shall be designated from time to time by the Board of Directors or the Treasurer.

Section 9. Clerk and Assistant Clerks. The Clerk shall record all proceedings of the stockholders and Board of Directors in a book or series of books to be kept for that purpose, which book or books shall be kept as the principal office of the Corporation and shall be open at all reasonable times to the inspection of any stockholder. In the absence of the Clerk from any meeting of the stockholders or Board of Directors, an Assistant Clerk, or if there be none or he is absent, a temporary clerk chosen at the meeting, shall record the proceedings thereof in the aforesaid book.

Any Assistant Clerks shall have such other duties and powers as shall be designated from time by the Board of Directors or the Clerk.

ARTICLE IV

CAPITAL STOCK

Section 1. Stock Certificates. The Board of Directors may authorize the issue without certificates of some or all of the shares of any or all of the Corporation’s classes or series of stock. Except to the extent the Board of Directors has determined to issue shares without certificates, a stockholder shall be entitled to a certificate stating the number and the class and the designation of the series, if any, of the shares held by him, in such form as shall, in conformity

to law, be prescribed from time to time by the Board of Directors. Such certificate shall be signed by the President or a Vice President and by the Treasurer or an Assistant Treasurer. Such signatures may be facsimile if the certificate is signed by a transfer agent, or by a registrar, other than a director, officer, or employee of the Corporation. In case any officer who has signed or whose facsimile signature has been placed on such certificate shall have ceased to be such officer before such certificate is issued, it may be issued by the Corporation with the same effect as if he were such officer at the time of its issue.

Every certificate for shares of stock which are subject to any restriction on transfer pursuant to the Articles of Organization, these By-Laws, or any agreement to which the Corporation is a party shall have the existence of the restriction noted conspicuously on the certificate and shall also set forth on the face or back either a summary of the restriction or a statement of the existence of such restriction and a statement that the Corporation will, upon written request, furnish a copy thereof to the holder of such certificate without charge.

Every certificate issued when the Corporation is authorized to issue more that one class or series of stock shall set forth on its face or back either a summary of the preferences, voting powers, qualifications, and special and relative rights of the shares of each class and series authorized to be issued or a statement of the existence of such preferences, powers, qualifications, and rights and a statement that the Corporation will, upon written request, furnish a copy thereof to the holder of such certificate without charge.

Section 2. Lost Certificates. In the case of the alleged loss, destruction, or mutilation of a certificate of stock, a duplicate certificate may be issued in place thereof, upon such conditions as the Board of Directors may prescribe. When authorizing such issue of a new certificate, the Board may in its discretion require the owner of such lost, destroyed, or mutilated certificate, or his legal representative, to give the Corporation a bond, with or without surety, sufficient in the Board's opinion to indemnify the Corporation against any loss or claim that may be made against it with request to the certificate alleged to have been lost, destroyed, or mutilated.

Section 3. Transfer of Shares. Subject to the restrictions, if any, stated or noted on the stock certificates, shares of stock may be transferred on the books of the Corporation by the surrender to the Corporation or its transfer agent of the certificate therefor properly endorsed or accompanied by a written assignment and power of attorney properly executed with necessary transfer stamps affixed, and with such proof of the authenticity of signature as the Board of Directors or the transfer agent of the Corporation may reasonably require. Except as may be otherwise required by law, by the Articles of Organization, or by these By-Laws, the Corporation shall be entitled to treat the record holder of stock as shown on its on its books as the owner of such stock for all purposes, including the payment of dividends and the right to receive notice and to vote with respect thereto, regardless of any transfer, pledge, or other disposition of such stock, until the shares have been transferred on the books of the stock, until the shares have been transferred on the books of the Corporation in accordance with the requirements of these By-Laws.

Section 4. Record Date and Closing Transfer Books. The Board of Directors may fix in advance a time, which shall not be more than sixty (60) days before the date of any meeting of stockholders or the date for the payment of any dividend or making of any distribution to stockholders or the last day on which the consent or dissent of stockholders may be effectively expressed for any purpose, as the record date for determining the stockholders having the right to notice of and to vote at such meeting and any adjournment thereof or the right to receive such dividend or distribution or the right to give such consent or dissent, and in such case only stockholders of record on such record date shall have such right, notwithstanding any transfer of stock on the books of the Corporation after the record date; or without fixing such record date the Board of Directors may for any such purposes close the transfer books for all or any part of such period.

If no record date is fixed and the transfer books are not closed, the record date for determining stockholders having the right to notice of or to vote at a meeting of stockholders shall be at the close of business on the date next preceding the day on which notice is given, and the record date for determining stockholders for any other purpose shall be at the close of business on the date on which the Board of Directors acts with respect thereto.

ARTICLE V

INDEMNIFICATION

Section 1. Directors and Officers. The Corporation shall indemnify, and advance funds to pay for or reimburse the reasonable expenses incurred by, its directors and the officers that have been appointed by the Board of Directors (including persons who serve at its request as directors, officers, or trustees of another organization in which it has any interest, direct or indirect, as a shareholder, creditor, or otherwise or who serve at its request in any capacity with respect to any employee benefit plan) to the fullest extent permitted by law, and may indemnify, and advance funds to pay for or reimburse the reasonable expenses incurred by, such other employees and agents as are identified by the Board of Directors.

The right of indemnification hereby provided shall not be exclusive of or affect any other rights to which any director or officer may be entitled. As used in this section, the terms "director" and "officer" include their respective heirs, executors, and administrators, an "interested" director or officer is one against whom in such capacity the proceedings in question or another proceeding on the same or similar grounds is then pending or threatened, and a "disinterested" director is one against whom no such proceeding is then pending or threatened. Nothing contained in this section shall affect any rights to indemnification to which corporate personnel other than directors and officers may be entitled by contract or otherwise under law.

The Board of Directors may authorize the purchase and maintenance of insurance, in such amounts as the Board of Directors may from time to time deem appropriate, on behalf of any person who is or was a director or officer or agent of the Corporation, or who is or was serving at the request of the Corporation as a director, officer, or agent of another organization in which it has any interest, direct or indirect, as a shareholder, creditor, or otherwise, or with respect to any employee benefit plan, against any liability incurred by him in any such capacity, or arising out of his status as such, whether or not such person is entitled to indemnification by the Corporation pursuant to this Article V or otherwise and whether or not the Corporation would have the power to indemnify him against such liability.

ARTICLE VI

MISCELLANEOUS

Section 1. Corporate Seal. The seal of the Corporation shall be in such form as the Board of Directors may from time to time determine.

Section 2. Fiscal Year. The fiscal year of the Corporation shall be such period as shall from time to time be determined by the Board of Directors.

Section 3. [Intentionally Omitted]

Section 4. Execution of Documents. Except as the Board of Directors may generally or in specific instances authorize the execution thereof in some other manner, all deeds, leases, transfers, contracts, checks, drafts, and other orders for the payment of money out of the funds of the Corporation, and all bonds, notes, debentures, guarantees, and other obligations or evidences or indebtedness of the Corporation shall be executed by the Chairman of the Board, the President, any Vice President, or the Treasurer.

Section 5. Voting of Securities. Except as the Board of Directors may generally or in specific instances direct otherwise, the Chairman of the Board, the President, any Vice President, or the Treasurer shall have the power, in the name and on behalf of the Corporation, to waive notice of, appoint any person or persons to act as proxy or attorney-in-fact of the Corporation (with or without power of substitution) to vote at, or attend and act for the Corporation at, any meeting of holders of shares or other securities of any other organization of which the Corporation holds shares or securities.

Section 6. Appointment of Auditor. The Board of Directors, or a committee thereof, shall each year select independent public accountants to report to the stockholders on the financial statements of the Corporation for such year. The selection of such accountants shall be presented to the stockholders for their approval at the annual meeting

each year; provided, however, that if the shareholders shall not approve the selection made by the Board, the Board shall appoint other independent public accountants for such year.

ARTICLE VII

AMENDMENTS

These By-Laws may be altered, amended, or repealed, and new By-Laws not inconsistent with any provision of the Articles of organization or applicable statute may be made either by the affirmative vote of a majority of the voting power of the then outstanding shares of capital stock of the Corporation entitled to vote generally in the election of directors, voting together as a single class, at any annual or special meeting of the stockholders called for the purpose, or (except with respect to any provision hereof which by law, the Articles of Organization, or these By-Laws requires action by the stockholders) by the affirmative vote of a majority of the Board of Directors then in office. Not later that the time of giving notice of the meeting of stockholders next following the making, amending, or repealing by the Board of Directors of any By-Law, notice thereof stating the substance of such change shall be given to all stockholders entitled to vote on amending the By-Laws. Any By-Law made, amended, or repealed by the Board of Directors may be altered, amended, repealed, or reinstated by the stockholders.

Exhibit 31.1

CERTIFICATION

I, Reshma Kewalramani, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Vertex Pharmaceuticals Incorporated;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c) evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d) disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: May 1, 2020

/s/ Reshma Kewalramani

Reshma Kewalramani
Chief Executive Officer and President

Exhibit 31.2

CERTIFICATION

I, Charles F. Wagner, Jr., certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Vertex Pharmaceuticals Incorporated;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c) evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d) disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: May 1, 2020

/s/ Charles F. Wagner, Jr.

Charles F. Wagner, Jr.
Executive Vice President and Chief Financial Officer

Exhibit 32.1

SECTION 906 CEO/CFO CERTIFICATION

Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (Subsections (a) and (b) of Section 1350, Chapter 63 of Title 18, United States Code) each of the undersigned officers of Vertex Pharmaceuticals Incorporated, a Massachusetts corporation (the "Company"), does hereby certify, to such officer's knowledge, that the Quarterly Report on Form 10-Q for the quarter ended March 31, 2020 (the "Form 10-Q") of the Company fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, and the information contained in the Form 10-Q fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: May 1, 2020

/s/ Reshma Kewalramani

Reshma Kewalramani
Chief Executive Officer and President

Date: May 1, 2020

/s/ Charles F. Wagner, Jr.

Charles F. Wagner, Jr.
Executive Vice President and Chief Financial Officer

A signed original of this written statement required by Section 906 has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.