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

FORM 10-Q

(Mark One)

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

For the quarterly period ended March 31, 2018

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 No. 1-6571

Merck & Co., Inc.

2000 Galloping Hill Road
Kenilworth, N.J. 07033
(908) 740-4000

Incorporated in New Jersey — *I.R.S. Employer Identification No. 22-1918501*

The number of shares of common stock outstanding as of the close of business on April 30, 2018 : 2,690,303,898

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 and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted 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 and post such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, 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. (Check one):

Large accelerated filer	☒	Accelerated filer	☐
Non-accelerated filer	☐ (Do not check if a smaller reporting company)	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 ☒

MERCK & CO., INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENT OF INCOME
(Unaudited, $ in millions except per share amounts)

	Three Months Ended March 31,	
	2018	2017
Sales	$ 10,037	$ 9,434
Costs, Expenses and Other		
Materials and production	3,184	3,049
Marketing and administrative	2,508	2,472
Research and development	3,196	1,830
Restructuring costs	95	151
Other (income) expense, net	(291)	(71)
	8,692	7,431
Income Before Taxes	1,345	2,003
Taxes on Income	604	447
Net Income	741	1,556
Less: Net Income Attributable to Noncontrolling Interests	5	5
Net Income Attributable to Merck & Co., Inc.	$ 736	$ 1,551
Basic Earnings per Common Share Attributable to Merck & Co., Inc. Common Shareholders	$ 0.27	$ 0.56
Earnings per Common Share Assuming Dilution Attributable to Merck & Co., Inc. Common Shareholders	$ 0.27	$ 0.56
Dividends Declared per Common Share	$ 0.48	$ 0.47

MERCK & CO., INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME
(Unaudited, $ in millions)

	Three Months Ended March 31,	
	2018	2017
Net Income Attributable to Merck & Co., Inc.	$ 736	$ 1,551
Other Comprehensive Income (Loss) Net of Taxes:		
Net unrealized loss on derivatives, net of reclassifications	(70)	(232)
Net unrealized (loss) gain on investments, net of reclassifications	(99)	43
Benefit plan net gain (loss) and prior service credit (cost), net of amortization	36	26
Cumulative translation adjustment	257	309
	124	146
Comprehensive Income Attributable to Merck & Co., Inc.	$ 860	$ 1,697

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

MERCK & CO., INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED BALANCE SHEET
(Unaudited, $ in millions except per share amounts)

	March 31, 2018	December 31, 2017
Assets		
Current Assets		
Cash and cash equivalents	$ 4,483	$ 6,092
Short-term investments	2,863	2,406
Accounts receivable (net of allowance for doubtful accounts of $205 in 2018 and $210 in 2017)	7,245	6,873
Inventories (excludes inventories of $1,136 in 2018 and $1,187 in 2017 classified in Other assets - see Note 7)	5,382	5,096
Other current assets	4,112	4,299
Total current assets	24,085	24,766
Investments	11,033	12,125
Property, Plant and Equipment, at cost, net of accumulated depreciation of $16,483 in 2018 and $16,602 in 2017	12,561	12,439
Goodwill	18,304	18,284
Other Intangibles, Net	13,500	14,183
Other Assets	6,558	6,075
	$ 86,041	$ 87,872
Liabilities and Equity		
Current Liabilities		
Loans payable and current portion of long-term debt	$ 2,055	$ 3,057
Trade accounts payable	3,162	3,102
Accrued and other current liabilities	9,709	10,427
Income taxes payable	717	708
Dividends payable	1,317	1,320
Total current liabilities	16,960	18,614
Long-Term Debt	21,501	21,353
Deferred Income Taxes	2,206	2,219
Other Noncurrent Liabilities	11,473	11,117
Merck & Co., Inc. Stockholders' Equity		
Common stock, $0.50 par value Authorized - 6,500,000,000 shares Issued - 3,577,103,522 shares in 2018 and 2017	1,788	1,788
Other paid-in capital	39,874	39,902
Retained earnings	41,107	41,350
Accumulated other comprehensive loss	(5,060)	(4,910)
	77,709	78,130
Less treasury stock, at cost: 884,622,139 shares in 2018 and 880,491,914 shares in 2017	44,041	43,794
Total Merck & Co., Inc. stockholders' equity	33,668	34,336
Noncontrolling Interests	233	233
Total equity	33,901	34,569
	$ 86,041	$ 87,872

The accompanying notes are an integral part of this condensed consolidated financial statement.

MERCK & CO., INC. AND SUBSIDIARIES
CONDENSED CONSOLIDATED STATEMENT OF CASH FLOWS
(Unaudited, $ in millions)

	Three Months Ended March 31,	
	2018	2017
Cash Flows from Operating Activities		
Net income	$ 741	$ 1,556
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	1,137	1,193
Intangible asset impairment charges	—	80
Charge for future payments related to Eisai collaboration license options	650	—
Deferred income taxes	(30)	(54)
Share-based compensation	80	74
Other	50	(28)
Net changes in assets and liabilities	(1,473)	(2,535)
Net Cash Provided by Operating Activities	1,155	286
Cash Flows from Investing Activities		
Capital expenditures	(450)	(339)
Purchases of securities and other investments	(1,326)	(2,929)
Proceeds from sales of securities and other investments	1,848	6,819
Acquisitions of businesses, net of cash acquired	—	(306)
Other	(269)	(52)
Net Cash (Used in) Provided by Investing Activities	(197)	3,193
Cash Flows from Financing Activities		
Net change in short-term borrowings	(1)	3,784
Payments on debt	(1,003)	(300)
Purchases of treasury stock	(566)	(1,019)
Dividends paid to stockholders	(1,299)	(1,294)
Proceeds from exercise of stock options	230	313
Other	(83)	(23)
Net Cash (Used in) Provided by Financing Activities	(2,722)	1,461
Effect of Exchange Rate Changes on Cash, Cash Equivalents and Restricted Cash	154	253
Net (Decrease) Increase in Cash, Cash Equivalents and Restricted Cash	(1,610)	5,193
Cash, Cash Equivalents and Restricted Cash at Beginning of Year (includes restricted cash of $4 million at January 1, 2018 included in Other Assets)	6,096	6,515
Cash, Cash Equivalents and Restricted Cash at End of Period (includes restricted cash of $3 million at March 31, 2018 included in Other Assets)	$ 4,486	$ 11,708

The accompanying notes are an integral part of this condensed consolidated financial statement.

1. Basis of Presentation

The accompanying unaudited condensed consolidated financial statements of Merck & Co., Inc. (Merck or the Company) have been prepared pursuant to the rules and regulations for reporting on Form 10-Q. Accordingly, certain information and disclosures required by accounting principles generally accepted in the United States for complete consolidated financial statements are not included herein. These interim statements should be read in conjunction with the audited financial statements and notes thereto included in Merck's Form 10-K filed on February 27, 2018.

The results of operations of any interim period are not necessarily indicative of the results of operations for the full year. In the Company's opinion, all adjustments necessary for a fair statement of these interim statements have been included and are of a normal and recurring nature. Certain reclassifications have been made to prior year amounts to conform to the current presentation.

Recently Adopted Accounting Standards

In May 2014, the Financial Accounting Standards Board (FASB) issued amended accounting guidance on revenue recognition (ASU 2014-09) that will be applied to all contracts with customers. The objective of the new guidance is to improve comparability of revenue recognition practices across entities and to provide more useful information to users of financial statements through improved disclosure requirements. The new standard permits two methods of adoption: retrospectively to each prior reporting period presented (full retrospective method), or retrospectively with the cumulative effect of adopting the guidance being recognized at the date of initial application (modified retrospective method). The new standard was effective as of January 1, 2018 and was adopted using the modified retrospective method. The Company recorded a cumulative-effect adjustment upon adoption increasing *Retained earnings* by $5 million . See Note 2 for additional information related to the adoption of this standard.

In January 2016, the FASB issued revised guidance for the accounting and reporting of financial instruments (ASU 2016-01) and in 2018 issued related technical corrections (ASU 2018-03). The new guidance requires that equity investments with readily determinable fair values currently classified as available for sale be measured at fair value with changes in fair value recognized in net income. The Company has elected to measure equity investments without readily determinable fair values at cost, less impairment, adjusted for subsequent observable price changes, which will be recognized in net income. The new guidance also changed certain disclosure requirements. ASU 2016-01 was effective as of January 1, 2018 and was adopted using a modified retrospective approach. The Company recorded a cumulative-effect adjustment upon adoption increasing *Retained earnings* by $8 million . ASU 2018-03 was also adopted as of January 1, 2018 on prospective basis and did not result in any additional impacts upon adoption.

In October 2016, the FASB issued guidance on the accounting for the income tax consequences of intra-entity transfers of assets other than inventory (ASU 2016-16). The new guidance requires the recognition of the income tax consequences of an intra-entity transfer of an asset (with the exception of inventory) when the intra-entity transfer occurs, replacing the prohibition against doing so. The current exception to defer the recognition of any tax impact on the transfer of inventory within the consolidated entity until it is sold to a third party remains unaffected. The new standard was effective as of January 1, 2018 and was adopted using a modified retrospective approach. The Company recorded a cumulative-effect adjustment upon adoption increasing *Retained earnings* by $54 million with a corresponding decrease to *Deferred Income Taxes* .

In August 2017, the FASB issued new guidance on hedge accounting (ASU 2017-12) that is intended to more closely align hedge accounting with companies' risk management strategies, simplify the application of hedge accounting, and increase transparency as to the scope and results of hedging programs. The new guidance makes more financial and nonfinancial hedging strategies eligible for hedge accounting, amends the presentation and disclosure requirements, and changes how companies assess effectiveness. The Company elected to early adopt this guidance as of January 1, 2018 on a modified retrospective basis. The new guidance was applied to all existing hedges as of the adoption date. For fair value hedges of interest rate risk outstanding as of the date of adoption, the Company recorded a cumulative-effect adjustment upon adoption to the basis adjustment on the hedged item resulting from applying the benchmark component of the coupon guidance. This adjustment decreased *Retained earnings* by $11 million . Also, in accordance with the transition provisions of ASU 2017-12, the Company was required to eliminate the separate measurement of ineffectiveness for its cash flow hedging instruments existing as of the adoption date through a cumulative effect adjustment to retained earnings; however, all such amounts were *de minimis* .

In February 2018, the FASB issued new guidance to address a narrow-scope financial reporting issue that arose as a consequence of the Tax Cuts and Jobs Act (TCJA) (ASU 2018-02). Existing guidance requires that deferred tax liabilities and assets be adjusted for a change in tax laws or rates with the effect included in income from continuing operations in the reporting period that includes the enactment date. That guidance is applicable even in situations in which the related income tax effects of items in accumulated other comprehensive income were originally recognized in other comprehensive income (rather than in net income), such as amounts related to benefit plans and hedging activity. As a result, the tax effects of items within accumulated other comprehensive income do not reflect the appropriate tax rate (the difference is referred to as stranded tax effects). The new guidance allows for a reclassification of these amounts to retained earnings thereby eliminating these stranded tax effects. The Company elected to early adopt the new guidance in the first quarter of 2018 and reclassified the stranded income tax effects of

the TCJA increasing *Accumulated other comprehensive loss* in the provisional amount of $266 million with a corresponding increase to *Retained earnings* (see Note 15). The Company's policy for releasing the disproportionate income tax effects from *Accumulated other comprehensive loss* is to utilize the item-by-item approach.

The impact of adopting the above standards is as follows:

($ in millions)	ASU 2014-09 (Revenue)	ASU 2016-01 (Financial Instruments)	ASU 2016-16 (Intra-Entity Transfers of Assets Other than Inventory)	ASU 2017-12 (Derivatives and Hedging)	ASU 2018-02 (Reclassification of Certain Tax Effects)	Total
Assets - Debit (Credit)						
Accounts receivable	$ 5					$ 5
Liabilities - Credit (Debit)						
Income Taxes Payable				(3)		(3)
Debt				14		14
Deferred Income Taxes			(54)			(54)
Equity - Credit (Debit)						
Retained earnings	5	8	54	(11)	266	322
Accumulated other comprehensive loss		(8)			(266)	(274)

In March 2017, the FASB amended the guidance related to net periodic benefit cost for defined benefit plans that requires entities to (1) disaggregate the current service cost component from the other components of net benefit cost and present it with other employee compensation costs in the income statement within operations if such a subtotal is presented; (2) present the other components of net benefit cost separately in the income statement and outside of income from operations; and (3) only capitalize the service cost component when applicable. The Company adopted the new standard as of January 1, 2018 using a retrospective transition method to adopt the requirement for separate presentation in the income statement of service costs and other components and a prospective transition method to adopt the requirement to limit the capitalization of benefit costs to the service cost component. The Company utilized a practical expedient that permits it to use the amounts disclosed in its pension and other postretirement benefit plan note for the prior comparative periods as the estimation basis for applying the retrospective presentation requirements. Upon adoption, net periodic benefit cost (credit) other than service cost was reclassified to *Other (income) expense, net* from the previous classification within *Materials and production* costs, *Marketing and administrative* expenses and *Research and development* costs (see Note 12).

In August 2016, the FASB issued guidance on the classification of certain cash receipts and payments in the statement of cash flows intended to reduce diversity in practice. The Company adopted the new standard effective as of January 1, 2018 using a retrospective application. There were no changes to the presentation of the Consolidated Statement of Cash Flows in the prior year period as a result of adopting the new standard.

In November 2016, the FASB issued guidance requiring that amounts generally described as restricted cash and restricted cash equivalents be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. The new standard was effective as of January 1, 2018 and was adopted using a retrospective application. The adoption of the new guidance did not have a material effect on the Company's Consolidated Statement of Cash Flows.

In May 2017, the FASB issued guidance clarifying when to account for a change to the terms or conditions of a share-based payment award as a modification. Under the new guidance, modification accounting is required only if the fair value, the vesting conditions, or the classification of the award (as equity or liability) changes as a result of the change in terms or conditions. The Company adopted the new standard effective as of January 1, 2018 and will apply the new guidance to future share-based payment award modifications should they occur.

Recently Issued Accounting Standards Not Yet Adopted

In February 2016, the FASB issued new accounting guidance for the accounting and reporting of leases. The new guidance requires that lessees recognize a right-of-use asset and a lease liability recorded on the balance sheet for each of its leases (other than leases that meet the definition of a short-term lease). Leases will be classified as either operating or finance. Operating leases will result in straight-line expense in the income statement (similar to current operating leases) while finance leases will result in more expense being recognized in the earlier years of the lease term (similar to current capital leases). The new guidance will be effective for interim and annual periods beginning in 2019 and will be adopted using a modified retrospective approach. The Company intends to elect available practical expedients. The Company is currently evaluating the impact of adoption on its consolidated financial statements.

In June 2016, the FASB issued amended guidance on the accounting for credit losses on financial instruments. The guidance introduces an expected loss model for estimating credit losses, replacing the incurred loss model. The new guidance also changes the impairment model for available-for-sale debt securities, requiring the use of an allowance to record estimated credit losses (and subsequent recoveries). The new guidance is effective for interim and annual periods beginning in 2020, with earlier application permitted in 2019. The new guidance is to be applied on a modified retrospective basis through a cumulative-effect adjustment directly to retained earnings in the beginning of the period of adoption. The Company is currently evaluating the impact of adoption on its consolidated financial statements.

In January 2017, the FASB issued guidance that provides for the elimination of Step 2 from the goodwill impairment test. Under the new guidance, impairment charges are recognized to the extent the carrying amount of a reporting unit exceeds its fair value with certain limitations. The new guidance is effective for interim and annual periods in 2020. Early adoption is permitted. The Company does not anticipate that the adoption of the new guidance will have a material effect on its consolidated financial statements.

2. Summary of Significant Accounting Policies

On January 1, 2018, the Company adopted ASU 2014-09, *Revenue from Contracts with Customers,* and subsequent amendments (ASC 606 or new guidance), using the modified retrospective method. Merck applied the new guidance to all contracts with customers within the scope of the standard that were in effect on January 1, 2018 and recognized the cumulative effect of initially applying the new guidance as an adjustment to the opening balance of retained earnings (see Note 1). Comparative information for prior periods has not been restated and continues to be reported under the accounting standards in effect for those periods.

The new guidance provides principles that an entity applies to report useful information about the amount, timing, and uncertainty of revenue and cash flows arising from its contracts to provide goods or services to customers. The core principle requires an entity to recognize revenue to depict the transfer of goods or services to customers in an amount that reflects the consideration that it expects to be entitled to in exchange for those goods or services. The new guidance introduces a 5-step model to recognize revenue when or as control is transferred: identify the contract with a customer, identify the performance obligations in the contract, determine the transaction price, allocate the transaction price to the performance obligations in the contract, and recognize revenue when or as the performance obligations are satisfied. The Company's significant accounting policies are detailed in Note 2 to the consolidated financial statements included in Merck's Annual Report on Form 10-K for the year ended December 31, 2017. Changes to the Company's revenue recognition policy as a result of adopting ASC 606 are described below. See Note 16 for disaggregated revenue disclosures.

Revenue Recognition — Recognition of revenue requires evidence of a contract, probable collection of sales proceeds and completion of substantially all performance obligations. Merck acts as the principal in substantially all of its customer arrangements and therefore records revenue on a gross basis. The majority of the Company's contracts related to the Pharmaceutical and Animal Health segments have a single performance obligation - the promise to transfer goods. Shipping is considered immaterial in the context of the overall customer arrangement and damages or loss of goods in transit are rare. Therefore, shipping is not deemed a separately recognized performance obligation.

The vast majority of revenues from sales of products are recognized at a point in time when control of the goods is transferred to the customer, which the Company has determined is when title and risks and rewards of ownership transfer to the customer and the Company is entitled to payment. Certain Merck entities, including U.S. entities, have contract terms under which control of the goods passes to the customer upon shipment; however, either pursuant to the terms of the contract or as a business practice, Merck retains responsibility for goods lost or damaged in transit. Prior to the adoption of the new standard, Merck would recognize revenue for these entities upon delivery of the goods. Under the new guidance, the Company is now recognizing revenue at time of shipment for these entities.

For businesses within the Company's Healthcare Services segment and certain services in the Animal Health segment, revenue is recognized over time, generally ratably over the contract term as services are provided.

Merck's payment terms for U.S. customers are typically net 36 days from receipt of invoice; however, certain products have longer payment terms up to 90 days. Outside of the United States, payment terms are typically 30 days to 90 days although certain markets have longer payment terms.

The nature of the Company's business gives rise to several types of variable consideration including discounts and returns, which are estimated at the time of sale generally using the expected value method, although the most likely amount method is also used for certain types of variable consideration. In the United States, sales discounts are issued to customers at the point-of-sale, through an intermediary wholesaler (known as chargebacks), or in the form of rebates. Additionally, sales are generally made with a limited right of return under certain conditions. Revenues are recorded net of provisions for sales discounts and

returns, which are established at the time of sale. In addition, revenues are recorded net of time value of money discounts if collection of accounts receivable is expected to be in excess of one year.

The provision for aggregate customer discounts covers chargebacks and rebates. Chargebacks are discounts that occur when a contracted customer purchases directly through an intermediary wholesaler. The contracted customer generally purchases product from the wholesaler at its contracted price plus a mark-up. The wholesaler, in turn, charges the Company back for the difference between the price initially paid by the wholesaler and the contract price paid to the wholesaler by the customer. The provision for chargebacks is based on expected sell-through levels by the Company's wholesale customers to contracted customers, as well as estimated wholesaler inventory levels. Rebates are amounts owed based upon definitive contractual agreements or legal requirements with private sector and public sector (Medicaid and Medicare Part D) benefit providers, after the final dispensing of the product by a pharmacy to a benefit plan participant. The provision for rebates is based on expected patient usage, as well as inventory levels in the distribution channel to determine the contractual obligation to the benefit providers. The Company uses historical customer segment utilization mix, sales forecasts, changes to product mix and price, inventory levels in the distribution channel, government pricing calculations and prior payment history in order to estimate the expected provision. Amounts accrued for aggregate customer discounts are evaluated on a quarterly basis through comparison of information provided by the wholesalers, health maintenance organizations, pharmacy benefit managers, federal and state agencies, and other customers to the amounts accrued. These discounts, in the aggregate, reduced U.S. sales by $2.4 billion and $2.5 billion in the first quarter of 2018 and 2017 , respectively.

Outside of the United States, variable consideration in the form of discounts and rebates are a combination of commercially-driven discounts in highly competitive product classes, discounts required to gain or maintain reimbursement, or legislatively mandated rebates. In certain European countries, legislatively mandated rebates are calculated based on an estimate of the government's total unbudgeted spending and the Company's specific payback obligation. Rebates may also be required based on specific product sales thresholds. In all cases, the Company applies an estimated factor against its actual invoiced sales to represent the expected level of future discount or rebate obligation associated with the sale.

The Company maintains a returns policy that allows its U.S. pharmaceutical customers to return product within a specified period prior to and subsequent to the expiration date (generally, three to six months before and 12 months after product expiration). The estimate of the provision for returns is based upon historical experience with actual returns. Additionally, the Company considers factors such as levels of inventory in the distribution channel, product dating and expiration period, whether products have been discontinued, entrance in the market of generic competition, changes in formularies or launch of over-the-counter products, among others. Outside of the United States, returns are only allowed on a limited basis in certain countries.

The following table provides the effects of adopting ASC 606 on the Consolidated Statement of Income in the first quarter of 2018:

	Three Months Ended March 31, 2018		
($ in millions)	As Reported	Effects of Adopting ASC 606	Amounts Without Adoption of ASC 606
Sales	$ 10,037	$ (24)	$ 10,013
Materials and production	3,184	(11)	3,173
Income before taxes	1,345	(13)	1,332
Taxes on income	604	(2)	602
Net income attributable to Merck & Co., Inc.	736	(11)	725

The following table provides the effects of adopting ASC 606 on the consolidated balance sheet as of March 31, 2018:

	March 31, 2018		
($ in millions)	As Reported	Effects of Adopting ASC 606	Amounts Without Adoption of ASC 606
Assets			
Accounts receivable	$ 7,245	$ (36)	$ 7,209
Inventories	5,382	13	5,395
Liabilities			
Accrued and other current liabilities	9,709	(3)	9,706
Income taxes payable	717	(4)	713
Equity			
Retained earnings	41,107	(16)	41,091

3. Acquisitions, Research Collaborations and License Agreements

The Company continues to pursue the acquisition of businesses and establishment of external alliances such as research collaborations and licensing agreements to complement its internal research capabilities. These arrangements often include upfront payments, as well as expense reimbursements or payments to the third party, and milestone, royalty or profit share arrangements, contingent upon the occurrence of certain future events linked to the success of the asset in development. The Company also reviews its marketed products and pipeline to examine candidates which may provide more value through out-licensing and, as part of its portfolio assessment process, may also divest certain assets. Pro forma financial information for acquired businesses is not presented if the historical financial results of the acquired entity are not significant when compared with the Company's financial results.

In March 2018, Merck and Eisai Co., Ltd. (Eisai) announced a strategic collaboration for the worldwide co-development and co-commercialization of Lenvima (lenvatinib mesylate), an orally available tyrosine kinase inhibitor discovered by Eisai. Under the agreement, Merck and Eisai will develop and commercialize Lenvima jointly, both as monotherapy and in combination with Merck's anti-PD-1 therapy, *Keytruda* (pembrolizumab). Eisai will record Lenvima product sales globally, as monotherapy and in combination, and Merck and Eisai will share gross profits equally. Merck will record its share of product sales of Lenvima, net of cost of sales and commercialization costs, as alliance revenue. Expenses incurred during co-development, including for studies evaluating Lenvima as monotherapy, will be shared equally by the two companies. Under the agreement, Merck made upfront payments to Eisai of $750 million and will make payments of up to $650 million for certain option rights through 2021 ($325 million in January 2019 or earlier in certain circumstances, $200 million in January 2020 and $125 million in January 2021). The Company recorded an aggregate charge of $1.4 billion in *Research and development* expenses in the first quarter of 2018 related to the upfront payments and future option payments. In addition, Eisai is eligible to receive up to $385 million in the future associated with the achievement of certain clinical and regulatory milestones and up to $3.97 billion for the achievement of milestones associated with sales of Lenvima.

In February 2018, Merck and Viralytics Limited (Viralytics) announced a definitive agreement pursuant to which Merck will acquire Viralytics, an Australian publicly traded company focused on oncolytic immunotherapy treatments for a range of cancers, for AUD 1.75 per share. The proposed acquisition values the total issued shares in Viralytics at approximately AUD 502 million ($394 million). Upon completion of the transaction, Merck will gain full rights to Cavatak (CVA21), Viralytics's investigational oncolytic immunotherapy. Cavatak is based on Viralytics's proprietary formulation of an oncolytic virus (Coxsackievirus Type A21) that has been shown to preferentially infect and kill cancer cells. Cavatak is currently being evaluated in multiple Phase 1 and Phase 2 clinical trials, both as an intratumoral and intravenous agent, including in combination with *Keytruda* . Under a previous agreement between Merck and Viralytics, a study is investigating the use of the *Keytruda* and Cavatak combination in melanoma, prostate, lung and bladder cancers. The transaction remains subject to a Viralytics shareholder vote and customary regulatory approvals. Merck anticipates the transaction will close in the second quarter of 2018.

In March 2017, Merck acquired a controlling interest in Vallée S.A. (Vallée), a leading privately held producer of animal health products in Brazil. Vallée has an extensive portfolio of products spanning parasiticides, anti-infectives and vaccines that include products for livestock, horses, and companion animals. Under the terms of the agreement, Merck acquired 93.5% of the shares of Vallée for $358 million . Of the total purchase price, $176 million was placed into escrow pending resolution of certain contingent items. The transaction was accounted for as an acquisition of a business. Merck recognized intangible assets of $297 million related to currently marketed products, net deferred tax liabilities of $102 million , other net assets of $32 million and noncontrolling interest of $25 million . In addition, the Company recorded liabilities of $37 million for contingencies identified at the acquisition date and corresponding indemnification assets of $37 million , representing the amounts to be reimbursed to Merck if and when the contingent liabilities are paid. The excess of the consideration transferred over the fair value of net assets acquired of $156 million was recorded as goodwill. The goodwill was allocated to the Animal Health segment and is not deductible for tax purposes. The estimated fair values of identifiable intangible assets related to currently marketed products were determined using an income approach. The probability-adjusted future net cash flows of each product were discounted to present value utilizing a discount rate of 15.5% . Actual cash flows are likely to be different than those assumed. The intangible assets related to currently marketed products are being amortized over their estimated useful lives of 15 years. In the fourth quarter of 2017, Merck acquired an additional 4.5% interest in Vallée for $18 million , which reduced noncontrolling interest related to Vallée.

4. Collaborative Arrangements

Merck has entered into collaborative arrangements that provide the Company with varying rights to develop, produce and market products together with its collaborative partners. Both parties in these arrangements are active participants and exposed to significant risks and rewards dependent on the commercial success of the activities of the collaboration. Merck's more significant collaborative arrangements are discussed below.

AstraZeneca

In July 2017, Merck and AstraZeneca PLC (AstraZeneca) entered into a global strategic oncology collaboration to co-develop and co-commercialize AstraZeneca's Lynparza (olaparib) for multiple cancer types. Lynparza is an oral poly (ADP-ribose) polymerase (PARP) inhibitor currently approved for certain types of ovarian and breast cancer. The companies are jointly developing and commercializing Lynparza, both as monotherapy and in combination trials with other potential medicines. Independently, Merck and AstraZeneca will develop and commercialize Lynparza in combinations with their respective PD-1 and PD-L1 medicines, *Keytruda* (pembrolizumab) and Imfinzi (durvalumab). The companies will also jointly develop and commercialize AstraZeneca's selumetinib, an oral, potent, selective inhibitor of MEK, part of the mitogen-activated protein kinase (MAPK) pathway, currently being developed for multiple indications including thyroid cancer. Under the terms of the agreement, AstraZeneca and Merck will share the development and commercialization costs for Lynparza and selumetinib monotherapy and non-PD-L1/PD-1 combination therapy opportunities.

Gross profits from Lynparza and selumetinib product sales generated through monotherapies or combination therapies are shared equally. Merck will fund all development and commercialization costs of *Keytruda* in combination with Lynparza or selumetinib. AstraZeneca will fund all development and commercialization costs of Imfinzi in combination with Lynparza or selumetinib. AstraZeneca is currently the principal on Lynparza sales transactions. Merck is recording its share of product sales of Lynparza, net of costs of sales and commercialization costs, as alliance revenue within the Pharmaceutical segment and its share of development costs associated with the collaboration as part of *Research and development* expenses. Reimbursements received from AstraZeneca for research and development expenses are recognized as reductions to *Research and development* costs.

As part of the agreement, Merck made an upfront payment to AstraZeneca of $1.6 billion and is making payments of $750 million over a multi-year period for certain license options ($250 million of which was paid in 2017). The Company recorded an aggregate charge of $2.35 billion in *Research and development* expenses in 2017 related to the upfront payment and future license options payments. In addition, the agreement provides for additional payments from Merck to AstraZeneca of up to an additional $6.15 billion contingent upon successful achievement of regulatory milestones of $2.05 billion and sales-based milestones of $4.1 billion for total aggregate consideration of up to $8.5 billion .

In the first quarter of 2018, Merck determined it was probable that annual sales of Lynparza in the future would trigger a $150 million sales-based milestone payment from Merck to AstraZeneca upon achievement of the sales milestone. Accordingly, in the first quarter of 2018, Merck recorded a $150 million liability and a corresponding intangible asset and also recognized $9 million of cumulative amortization expense within *Materials and production* costs. Merck previously accrued a $100 million sales-based milestone in 2017. The remaining $3.85 billion of potential future sales-based milestone payments have not yet been accrued as they are not deemed by the Company to be probable at this time.

In January 2018, Lynparza received approval in the United States for the treatment of certain patients with metastatic breast cancer, triggering a $70 million milestone payment from Merck to AstraZeneca. This milestone payment was capitalized and will be amortized over the remaining useful life of Lynparza. Potential future regulatory milestone payments of $1.98 billion remain under the agreement.

Summarized information related to this collaboration is as follows:

($ in millions)	Three Months Ended March 31, 2018
Alliance revenues (net of commercialization costs)	$ 33
Materials and production [(1)]	12
Marketing and administrative	7
Research and development	29
Receivables from AstraZeneca	31
Payables to AstraZeneca	783

[(1)] *Includes amortization of intangible assets.*

Bayer AG

In 2014, the Company entered into a worldwide clinical development collaboration with Bayer AG (Bayer) to market and develop soluble guanylate cyclase (sGC) modulators including Bayer's Adempas (riociguat), which is approved to treat pulmonary arterial hypertension and chronic thromboembolic pulmonary hypertension. The two companies equally share costs and profits from the collaboration and implemented a joint development and commercialization strategy. The collaboration also includes clinical development of Bayer's vericiguat, which is in Phase 3 trials for worsening heart failure, as well as opt-in rights

for other early-stage sGC compounds in development by Bayer. Merck in turn made available its early-stage sGC compounds under similar terms. Under the agreement, Bayer leads commercialization of Adempas in the Americas, while Merck leads commercialization in the rest of the world. For vericiguat and other potential opt-in products, Bayer will lead commercialization in the rest of world and Merck will lead in the Americas. For all products and candidates included in the agreement, both companies will share in development costs and profits on sales and will have the right to co-promote in territories where they are not the lead. In 2016, Merck began promoting and distributing Adempas in Europe. Transition from Bayer in other Merck territories, including Japan, continued in 2017.

In 2017, annual sales of Adempas exceeded $500 million triggering a $350 million milestone payment from Merck to Bayer, which was accrued for in 2016 when Merck deemed the payment to be probable. The milestone was paid in the first quarter of 2018. There are $775 million of additional potential future sales-based milestone payments that have not yet been accrued as they are not deemed by the Company to be probable at this time.

Summarized information related to this collaboration is as follows:

	Three Months Ended March 31,	
($ in millions)	2018	2017
Net product sales recorded by Merck	$ 43	$ 31
Merck's profit share from sales in Bayer's marketing territories	25	53
Total sales	68	84
Materials and production [(1)]	27	23
Marketing and administrative	8	7
Research and development	32	22
Receivables from Bayer	35	
Payables to Bayer	—	

[(1)] *Includes amortization of intangible assets.*

5. Restructuring

The Company incurs substantial costs for restructuring program activities related to Merck's productivity and cost reduction initiatives, as well as in connection with the integration of certain acquired businesses. In 2010 and 2013, the Company commenced actions under global restructuring programs designed to streamline its cost structure. The actions under these programs include the elimination of positions in sales, administrative and headquarters organizations, as well as the sale or closure of certain manufacturing and research and development sites and the consolidation of office facilities. The Company also continues to reduce its global real estate footprint and improve the efficiency of its manufacturing and supply network.

The Company recorded total pretax costs of $104 million and $215 million in the first quarter of 2018 and 2017 , respectively, related to restructuring program activities. Since inception of the programs through March 31, 2018 , Merck has recorded total pretax accumulated costs of approximately $13.6 billion and eliminated approximately 44,060 positions comprised of employee separations, as well as the elimination of contractors and vacant positions. The Company estimates that approximately two-thirds of the cumulative pretax costs are cash outlays, primarily related to employee separation expense. Approximately one-third of the cumulative pretax costs are non-cash, relating primarily to the accelerated depreciation of facilities to be closed or divested. While the Company has substantially completed the actions under these programs, approximately $500 million of pretax costs are expected to be incurred in 2018 relating to anticipated employee separations and remaining asset-related costs.

For segment reporting, restructuring charges are unallocated expenses.

The following tables summarize the charges related to restructuring program activities by type of cost:

	Three Months Ended March 31, 2018			
($ in millions)	Separation Costs	Accelerated Depreciation	Other	Total
Materials and production	$ —	$ —	$ 6	$ 6
Marketing and administrative	—	1	—	1
Research and development	—	(3)	5	2
Restructuring costs	55	—	40	95
	$ 55	$ (2)	$ 51	$ 104

($ in millions)	Three Months Ended March 31, 2017			
	Separation Costs	Accelerated Depreciation	Other	Total
Materials and production	$ —	$ 51	$ 12	$ 63
Marketing and administrative	—	—	1	1
Research and development	—	(2)	2	—
Restructuring costs	84	—	67	151
	$ 84	$ 49	$ 82	$ 215

Separation costs are associated with actual headcount reductions, as well as those headcount reductions which were probable and could be reasonably estimated. In the first quarter of 2018 and 2017 , approximately 710 positions and 545 positions, respectively, were eliminated under restructuring program activities.

Accelerated depreciation costs primarily relate to manufacturing, research and administrative facilities and equipment to be sold or closed as part of the programs. Accelerated depreciation costs represent the difference between the depreciation expense to be recognized over the revised useful life of the asset, based upon the anticipated date the site will be closed or divested or the equipment disposed of, and depreciation expense as determined utilizing the useful life prior to the restructuring actions. All of the sites have and will continue to operate up through the respective closure dates and, since future undiscounted cash flows were sufficient to recover the respective book values, Merck is recording accelerated depreciation over the revised useful life of the site assets. Anticipated site closure dates, particularly related to manufacturing locations, have been and may continue to be adjusted to reflect changes resulting from regulatory or other factors.

Other activity in 2018 and 2017 includes asset abandonment, shut-down and other related costs, as well as pretax gains and losses resulting from sales of facilities and related assets. Additionally, other activity includes certain employee-related costs associated with pension and other postretirement benefit plans (see Note 11) and share-based compensation.

The following table summarizes the charges and spending relating to restructuring program activities for the three months ended March 31, 2018 :

($ in millions)	Separation Costs	Accelerated Depreciation	Other	Total
Restructuring reserves January 1, 2018	$ 619	$ —	$ 128	$ 747
Expense	55	(2)	51	104
(Payments) receipts, net	(139)	—	(64)	(203)
Non-cash activity	—	2	1	3
Restructuring reserves March 31, 2018 [(1)]	$ 535	$ —	$ 116	$ 651

[(1)] *The remaining cash outlays are expected to be substantially completed by the end of 2020.*

6. Financial Instruments

Derivative Instruments and Hedging Activities

The Company manages the impact of foreign exchange rate movements and interest rate movements on its earnings, cash flows and fair values of assets and liabilities through operational means and through the use of various financial instruments, including derivative instruments.

A significant portion of the Company's revenues and earnings in foreign affiliates is exposed to changes in foreign exchange rates. The objectives and accounting related to the Company's foreign currency risk management program, as well as its interest rate risk management activities are discussed below.

Foreign Currency Risk Management

The Company has established revenue hedging, balance sheet risk management and net investment hedging programs to protect against volatility of future foreign currency cash flows and changes in fair value caused by volatility in foreign exchange rates.

The objective of the revenue hedging program is to reduce the variability caused by changes in foreign exchange rates that would affect the U.S. dollar value of future cash flows derived from foreign currency denominated sales, primarily the euro and Japanese yen. To achieve this objective, the Company will hedge a portion of its forecasted foreign currency denominated third-party and intercompany distributor entity sales (forecasted sales) that are expected to occur over its planning cycle, typically no more than two years into the future. The Company will layer in hedges over time, increasing the portion of forecasted sales hedged as it gets closer to the expected date of the forecasted sales. The portion of forecasted sales hedged is based on assessments of cost-benefit profiles that consider natural offsetting exposures, revenue and exchange rate volatilities and correlations, and the

cost of hedging instruments. The Company manages its anticipated transaction exposure principally with purchased local currency put options, forward contracts and purchased collar options.

The fair values of these derivative contracts are recorded as either assets (gain positions) or liabilities (loss positions) in the Condensed Consolidated Balance Sheet. Changes in the fair value of derivative contracts are recorded each period in either current earnings or *Other comprehensive income* (*OCI*), depending on whether the derivative is designated as part of a hedge transaction and, if so, the type of hedge transaction. For derivatives that are designated as cash flow hedges, the unrealized gains or losses on these contracts is recorded in *Accumulated other comprehensive income* (*AOCI*) and reclassified into *Sales* when the hedged anticipated revenue is recognized. For those derivatives which are not designated as cash flow hedges, but serve as economic hedges of forecasted sales, unrealized gains or losses are recorded in *Sales* each period. The cash flows from both designated and non-designated contracts are reported as operating activities in the Condensed Consolidated Statement of Cash Flows. The Company does not enter into derivatives for trading or speculative purposes.

The Company manages operating activities and net asset positions at each local subsidiary in order to mitigate the effects of exchange on monetary assets and liabilities. The Company also uses a balance sheet risk management program to mitigate the exposure of net monetary assets that are denominated in a currency other than a subsidiary's functional currency from the effects of volatility in foreign exchange. In these instances, Merck principally utilizes forward exchange contracts to offset the effects of exchange on exposures denominated in developed country currencies, primarily the euro and Japanese yen. For exposures in developing country currencies, the Company will enter into forward contracts to partially offset the effects of exchange on exposures when it is deemed economical to do so based on a cost-benefit analysis that considers the magnitude of the exposure, the volatility of the exchange rate and the cost of the hedging instrument. The cash flows from these contracts are reported as operating activities in the Condensed Consolidated Statement of Cash Flows.

Monetary assets and liabilities denominated in a currency other than the functional currency of a given subsidiary are remeasured at spot rates in effect on the balance sheet date with the effects of changes in spot rates reported in *Other (income) expense, net* . The forward contracts are not designated as hedges and are marked to market through *Other (income) expense, net* . Accordingly, fair value changes in the forward contracts help mitigate the changes in the value of the remeasured assets and liabilities attributable to changes in foreign currency exchange rates, except to the extent of the spot-forward differences. These differences are not significant due to the short-term nature of the contracts, which typically have average maturities at inception of less than one year .

The Company also uses forward exchange contracts to hedge its net investment in foreign operations against movements in exchange rates. The forward contracts are designated as hedges of the net investment in a foreign operation. The Company hedges a portion of the net investment in certain of its foreign operations. The unrealized gains or losses on these contracts are recorded in foreign currency translation adjustment within *OCI* , and remain in *AOCI* until either the sale or complete or substantially complete liquidation of the subsidiary. The Company excludes certain portions of the change in fair value of its derivative instruments from the assessment of hedge effectiveness (excluded component). Changes in fair value of the excluded components are recognized in *OCI* . In accordance with the new guidance adopted on January 1, 2018 (see Note 1), the Company has elected to recognize in earnings the initial value of the excluded component on a straight-line basis over the life of the derivative instrument, rather than using the mark-to-market approach. The cash flows from these contracts are reported as investing activities in the Condensed Consolidated Statement of Cash Flows.

Foreign exchange risk is also managed through the use of foreign currency debt. The Company's senior unsecured euro-denominated notes have been designated as, and are effective as, economic hedges of the net investment in a foreign operation. Accordingly, foreign currency transaction gains or losses due to spot rate fluctuations on the euro-denominated debt instruments are included in foreign currency translation adjustment within *OCI* .

The effect of the Company's net investment hedges on *OCI* and the Consolidated Statement of Income is shown below:

	Amount of Pretax (Gain) Loss Recognized in Other Comprehensive Income [1]			Amount of Pretax (Gain) Loss Recognized in Income For Amounts Excluded from Effectiveness Testing		
	Three Months Ended March 31,		Location of Pretax (Gain) Loss Recognized in Income For Amounts Excluded from Effectiveness Testing	Three Months Ended March 31,		
($ in millions)	2018	2017		2018	2017	
Net Investment Hedging Relationships						
Foreign exchange contracts	$ (2)	$ —	Other (income) expense, net	$ —	$ —	
Euro-denominated notes	178	135	Other (income) expense, net	—	—	

[1] *No amounts were reclassified from AOCI into income related to the sale of a subsidiary.*

Interest Rate Risk Management

The Company may use interest rate swap contracts on certain investing and borrowing transactions to manage its net exposure to interest rate changes and to reduce its overall cost of borrowing. The Company does not use leveraged swaps and, in general, does not leverage any of its investment activities that would put principal capital at risk.

At March 31, 2018 , the Company was a party to 26 pay-floating, receive-fixed interest rate swap contracts designated as fair value hedges of fixed-rate notes in which the notional amounts match the amount of the hedged fixed-rate notes as detailed in the table below.

($ in millions)	March 31, 2018		
Debt Instrument	Par Value of Debt	Number of Interest Rate Swaps Held	Total Swap Notional Amount
1.30% notes due 2018	$ 1,000	4	$ 1,000
5.00% notes due 2019	1,250	3	550
1.85% notes due 2020	1,250	5	1,250
3.875% notes due 2021	1,150	5	1,150
2.40% notes due 2022	1,000	4	1,000
2.35% notes due 2022	1,250	5	1,250

The interest rate swap contracts are designated hedges of the fair value changes in the notes attributable to changes in the benchmark London Interbank Offered Rate (LIBOR) swap rate. The fair value changes in the notes attributable to changes in the LIBOR swap rate are recorded in interest expense along with the offsetting fair value changes in the swap contracts. The cash flows from these contracts are reported as operating activities in the Condensed Consolidated Statement of Cash Flows.

The table below presents the location of amounts recorded on the Consolidated Balance Sheet related to cumulative basis adjustments for fair value hedges:

	Carrying Amount of Hedged Assets (Liabilities)		Cumulative Amount of Fair Value Hedging Adjustment Included in the Carrying Amount	
($ in millions)	March 31, 2018	December 31, 2017	March 31, 2018	December 31, 2017
Balance Sheet Line Item in which Hedged Item is Included				
Loans payable and current portion of long-term debt	$ (998)	$ (983)	$ 2	$ 17
Long-Term Debt [1]	(5,083)	(5,146)	106	41

[1] *Amounts include hedging adjustment gains related to discontinued hedging relationships of $9 million and $11 million at March 31, 2018 and December 31, 2017, respectively.*

Presented in the table below is the fair value of derivatives on a gross basis segregated between those derivatives that are designated as hedging instruments and those that are not designated as hedging instruments:

		March 31, 2018			December 31, 2017		
		Fair Value of Derivative			Fair Value of Derivative		
($ in millions)	Balance Sheet Caption	Asset	Liability	U.S. Dollar Notional	Asset	Liability	U.S. Dollar Notional
Derivatives Designated as Hedging Instruments							
Interest rate swap contracts	Other assets	$ —	$ —	$ —	$ 2	$ —	$ 550
Interest rate swap contracts	Accrued and other current liabilities	—	1	1,000	—	3	1,000
Interest rate swap contracts	Other noncurrent liabilities	—	114	5,200	—	52	4,650
Foreign exchange contracts	Other current assets	21	—	3,584	51	—	4,216
Foreign exchange contracts	Other assets	30	—	2,407	38	—	1,936
Foreign exchange contracts	Accrued and other current liabilities	—	119	3,205	—	71	2,014
Foreign exchange contracts	Other noncurrent liabilities	—	1	56	—	1	20
		$ 51	$ 235	$ 15,452	$ 91	$ 127	$ 14,386
Derivatives Not Designated as Hedging Instruments							
Foreign exchange contracts	Other current assets	$ 58	$ —	$ 5,434	$ 39	$ —	$ 3,778
Foreign exchange contracts	Accrued and other current liabilities	—	89	6,764	—	90	7,431
		$ 58	$ 89	$ 12,198	$ 39	$ 90	$ 11,209
		$ 109	$ 324	$ 27,650	$ 130	$ 217	$ 25,595

As noted above, the Company records its derivatives on a gross basis in the Condensed Consolidated Balance Sheet. The Company has master netting agreements with several of its financial institution counterparties (see *Concentrations of Credit Risk* below). The following table provides information on the Company's derivative positions subject to these master netting arrangements as if they were presented on a net basis, allowing for the right of offset by counterparty and cash collateral exchanged per the master agreements and related credit support annexes:

	March 31, 2018		December 31, 2017	
($ in millions)	Asset	Liability	Asset	Liability
Gross amounts recognized in the consolidated balance sheet	$ 109	$ 324	$ 130	$ 217
Gross amount subject to offset in master netting arrangements not offset in the consolidated balance sheet	(103)	(103)	(94)	(94)
Cash collateral received	—	—	(3)	—
Net amounts	$ 6	$ 221	$ 33	$ 123

The table below provides information regarding the location and amount of pretax (gains) losses of derivatives designated in fair value or cash flow hedging relationships:

	Three Months Ended March 31, 2018			Three Months Ended March 31, 2017		
($ in millions)	Sales	Other (income) expense, net [1]	Other comprehensive income (loss)	Sales	Other (income) expense, net [1]	Other comprehensive income (loss)
Financial Statement Line Items in which Effects of Fair Value or Cash Flow Hedges are Recorded	$ 10,037	$ (291)	$ 124	$ 9,434	$ (71)	$ 146
(Gain) loss on fair value hedging relationships						
Interest rate swap contracts						
Hedged items	—	(62)	—	—	(16)	—
Derivatives designated as hedging instruments	—	62	—	—	4	—
Impact of cash flow hedging relationships						
Foreign exchange contracts						
Amount of (loss) recognized in *OCI* on derivatives	—	—	(181)	—	—	(263)
(Decrease) increase in *Sales* as a result of *AOCI* reclassifications	(93)	—	93	94	—	(94)

[1] *Interest expense is a component of* Other (income) expense, net.

The table below provides information regarding the income statements effects of derivatives not designated as hedging instruments:

		Amount of Derivative Pretax (Gain) Loss Recognized in Income	
		Three Months Ended March 31,	
($ in millions)	Location of Derivative Pretax (Gain) Loss Recognized in Income	2018	2017
Derivatives Not Designated as Hedging Instruments			
Foreign exchange contracts [1]	Other (income) expense, net	$ 28	$ (47)
Foreign exchange contracts [2]	Sales	8	—

[1] *These derivative contracts mitigate changes in the value of remeasured foreign currency denominated monetary assets and liabilities attributable to changes in foreign currency exchange rates.*

[2] *These derivative contracts serve as economic hedges of forecasted transactions.*

At March 31, 2018 , the Company estimates $264 million of pretax net unrealized losses on derivatives maturing within the next 12 months that hedge foreign currency denominated sales over that same period will be reclassified from *AOCI* to *Sales* . The amount ultimately reclassified to *Sales* may differ as foreign exchange rates change. Realized gains and losses are ultimately determined by actual exchange rates at maturity.

Investments in Debt and Equity Securities

Information on investments in debt and equity securities is as follows:

	March 31, 2018				December 31, 2017			
			Gross Unrealized				Gross Unrealized	
($ in millions)	Fair Value	Amortized Cost	Gains	Losses	Fair Value	Amortized Cost	Gains	Losses
Corporate notes and bonds	$ 9,860	$ 9,978	$ 3	$ (121)	$ 9,806	$ 9,837	$ 9	$ (40)
U.S. government and agency securities	1,810	1,833	—	(23)	2,042	2,059	—	(17)
Asset-backed securities	1,569	1,585	1	(17)	1,542	1,548	1	(7)
Foreign government bonds	759	769	—	(10)	733	739	—	(6)
Commercial paper	130	130	—	—	159	159	—	—
Mortgage-backed securities	78	79	—	(1)	626	634	1	(9)
Total debt securities	$ 14,206	$ 14,374	$ 4	$ (172)	$ 14,908	$ 14,976	$ 11	$ (79)
Publicly traded equity securities [(1)]	332				275	265	16	(6)
Total debt and publicly traded equity securities	$ 14,538				$ 15,183	$ 15,241	$ 27	$ (85)

[(1)] Pursuant to the adoption of ASU 2016-01 (see Note 1), beginning on January 1, 2018, changes in the fair value of publicly traded equity securities are recognized in net income. Unrealized net gains of $44 million were recognized during the first quarter of 2018 on equity securities still held at March 31, 2018.

At March 31 2018, the Company also had $516 million of equity investments without readily determinable fair values included in *Other Assets* . During the first quarter of 2018, the Company recognized unrealized gains of $33 million on certain of these equity investments recorded in *Other (income) expense, net* based on observable price changes from transactions involving similar investments of the same investee. In addition, during the first quarter of 2018, the Company recognized impairment losses of $8 million related to certain of these investments.

Available-for-sale debt securities included in *Short-term investments* totaled $2.9 billion at March 31, 2018 . Of the remaining debt securities, $10.6 billion mature within five years. At March 31, 2018 and December 31, 2017 , there were no debt securities pledged as collateral.

Fair Value Measurements

Fair value is defined as the exchange price that would be received for an asset or paid to transfer a liability (an exit price) in the principal or most advantageous market for the asset or liability in an orderly transaction between market participants on the measurement date. The Company uses a fair value hierarchy which maximizes the use of observable inputs and minimizes the use of unobservable inputs when measuring fair value. There are three levels of inputs used to measure fair value with Level 1 having the highest priority and Level 3 having the lowest: *Level 1* - Quoted prices (unadjusted) in active markets for identical assets or liabilities, *Level 2* - Observable inputs other than Level 1 prices, such as quoted prices for similar assets or liabilities, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities, *Level 3* - Unobservable inputs that are supported by little or no market activity. Level 3 assets or liabilities are those whose values are determined using pricing models, discounted cash flow methodologies, or similar techniques with significant unobservable inputs, as well as assets or liabilities for which the determination of fair value requires significant judgment or estimation. If the inputs used to measure the financial assets and liabilities fall within more than one level described above, the categorization is based on the lowest level input that is significant to the fair value measurement of the instrument.

Financial Assets and Liabilities Measured at Fair Value on a Recurring Basis

Financial assets and liabilities measured at fair value on a recurring basis are summarized below:

	Fair Value Measurements Using				Fair Value Measurements Using			
	Quoted Prices In Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total	Quoted Prices In Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
($ in millions)	March 31, 2018				December 31, 2017			
Assets								
Investments								
Corporate notes and bonds	$ —	$ 9,741	$ —	$ 9,741	$ —	$ 9,678	$ —	$ 9,678
U.S. government and agency securities	—	1,585	—	1,585	68	1,767	—	1,835
Asset-backed securities [1]	—	1,517	—	1,517	—	1,476	—	1,476
Foreign government bonds	—	759	—	759	—	732	—	732
Commercial paper	—	130	—	130	—	159	—	159
Mortgage-backed securities	—	—	—	—	—	547	—	547
Publicly traded equity securities	164	—	—	164	104	—	—	104
	164	13,732	—	13,896	172	14,359	—	14,531
Other assets [2]								
U.S. government and agency securities	64	161	—	225	—	207	—	207
Corporate notes and bonds	—	119	—	119	—	128	—	128
Mortgage-backed securities	—	78	—	78	—	79	—	79
Asset-backed securities [1]	—	52	—	52	—	66	—	66
Foreign government bonds	—	—	—	—	—	1	—	1
Publicly traded equity securities	168	—	—	168	171	—	—	171
	232	410	—	642	171	481	—	652
Derivative assets [3]								
Purchased currency options	—	46	—	46	—	80	—	80
Forward exchange contracts	—	63	—	63	—	48	—	48
Interest rate swaps	—	—	—	—	—	2	—	2
	—	109	—	109	—	130	—	130
Total assets	$ 396	$ 14,251	$ —	$ 14,647	$ 343	$ 14,970	$ —	$ 15,313
Liabilities								
Other liabilities								
Contingent consideration	$ —	$ —	$ 919	$ 919	$ —	$ —	$ 935	$ 935
Derivative liabilities [3]								
Forward exchange contracts	—	208	—	208	—	162	—	162
Interest rate swaps	—	115	—	115	—	55	—	55
Written currency options	—	1	—	1	—	—	—	—
	—	324	—	324	—	217	—	217
Total liabilities	$ —	$ 324	$ 919	$ 1,243	$ —	$ 217	$ 935	$ 1,152

[1] *Primarily all of the asset-backed securities are highly-rated (Standard & Poor's rating of AAA and Moody's Investors Service rating of Aaa), secured primarily by auto loan, credit card and student loan receivables, with weighted-average lives of primarily 5 years or less.*

[2] *Investments included in other assets are restricted as to use, primarily for the payment of benefits under employee benefit plans.*

[3] *The fair value determination of derivatives includes the impact of the credit risk of counterparties to the derivatives and the Company's own credit risk, the effects of which were not significant.*

There were no transfers between Level 1 and Level 2 during the first three months of 2018 . As of March 31, 2018 , *Cash and cash equivalents* of $4.5 billion included $3.5 billion of cash equivalents (which would be considered Level 2 in the fair value hierarchy).

Contingent Consideration

Summarized information about the changes in liabilities for contingent consideration is as follows:

($ in millions)	Three Months Ended March 31, 2018	2017
Fair value January 1	$ 935	$ 891
Changes in fair value [(1)]	36	34
Additions	8	—
Payments	(60)	—
Fair value March 31 [(2)]	$ 919	$ 925

[(1)] *Recorded in* Research and development *expenses,* Materials and production *costs and* Other (income) expense, net . *Includes cumulative translation adjustments.*

[(2)] *Includes $337 million recorded as a current liability for amounts expected to be paid within the next 12 months.*

The payments of contingent consideration in the first quarter of 2018 relate to liabilities recorded in connection with the 2016 termination of the Sanofi Pasteur MSD joint venture.

Other Fair Value Measurements

Some of the Company's financial instruments, such as cash and cash equivalents, receivables and payables, are reflected in the balance sheet at carrying value, which approximates fair value due to their short-term nature.

The estimated fair value of loans payable and long-term debt (including current portion) at March 31, 2018 , was $24.3 billion compared with a carrying value of $23.6 billion and at December 31, 2017 , was $25.6 billion compared with a carrying value of $24.4 billion . Fair value was estimated using recent observable market prices and would be considered Level 2 in the fair value hierarchy.

Concentrations of Credit Risk

On an ongoing basis, the Company monitors concentrations of credit risk associated with corporate and government issuers of securities and financial institutions with which it conducts business. Credit exposure limits are established to limit a concentration with any single issuer or institution. Cash and investments are placed in instruments that meet high credit quality standards as specified in the Company's investment policy guidelines.

The majority of the Company's accounts receivable arise from product sales in the United States and Europe and are primarily due from drug wholesalers and retailers, hospitals, government agencies, managed health care providers and pharmacy benefit managers. The Company monitors the financial performance and creditworthiness of its customers so that it can properly assess and respond to changes in their credit profile. The Company also continues to monitor global economic conditions, including the volatility associated with international sovereign economies, and associated impacts on the financial markets and its business. At March 31, 2018 , the Company's total net accounts receivable outstanding for more than one year were approximately $80 million . The Company does not expect to have write-offs or adjustments to accounts receivable which would have a material adverse effect on its financial position, liquidity or results of operations.

Derivative financial instruments are executed under International Swaps and Derivatives Association master agreements. The master agreements with several of the Company's financial institution counterparties also include credit support annexes. These annexes contain provisions that require collateral to be exchanged depending on the value of the derivative assets and liabilities, the Company's credit rating, and the credit rating of the counterparty. As of March 31, 2018 , the Company had not received any cash collateral. At December 31, 2017 , the Company had received cash collateral of $3 million from various counterparties and the obligation to return such collateral is recorded in *Accrued and other current liabilities* . The Company had not advanced any cash collateral to counterparties as of March 31, 2018 or December 31, 2017 .

7. Inventories

Inventories consisted of:

($ in millions)	March 31, 2018	December 31, 2017
Finished goods	$ 1,530	$ 1,334
Raw materials and work in process	4,764	4,703
Supplies	199	201
Total (approximates current cost)	6,493	6,238
Increase to LIFO costs	25	45
	$ 6,518	$ 6,283
Recognized as:		
Inventories	$ 5,382	$ 5,096
Other assets	1,136	1,187

Amounts recognized as *Other assets* are comprised almost entirely of raw materials and work in process inventories. At March 31, 2018 and December 31, 2017 , these amounts included $1.1 billion of inventories not expected to be sold within one year. In addition, these amounts included $18 million and $80 million at March 31, 2018 and December 31, 2017 , respectively, of inventories produced in preparation for product launches.

8. Contingencies

The Company is involved in various claims and legal proceedings of a nature considered normal to its business, including product liability, intellectual property, and commercial litigation, as well as certain additional matters including governmental and environmental matters. In the opinion of the Company, it is unlikely that the resolution of these matters will be material to the Company's financial position, results of operations or cash flows.

Given the nature of the litigation discussed below and the complexities involved in these matters, the Company is unable to reasonably estimate a possible loss or range of possible loss for such matters until the Company knows, among other factors, (i) what claims, if any, will survive dispositive motion practice, (ii) the extent of the claims, including the size of any potential class, particularly when damages are not specified or are indeterminate, (iii) how the discovery process will affect the litigation, (iv) the settlement posture of the other parties to the litigation and (v) any other factors that may have a material effect on the litigation.

The Company records accruals for contingencies when it is probable that a liability has been incurred and the amount can be reasonably estimated. These accruals are adjusted periodically as assessments change or additional information becomes available. For product liability claims, a portion of the overall accrual is actuarially determined and considers such factors as past experience, number of claims reported and estimates of claims incurred but not yet reported. Individually significant contingent losses are accrued when probable and reasonably estimable. Legal defense costs expected to be incurred in connection with a loss contingency are accrued when probable and reasonably estimable.

The Company's decision to obtain insurance coverage is dependent on market conditions, including cost and availability, existing at the time such decisions are made. The Company has evaluated its risks and has determined that the cost of obtaining product liability insurance outweighs the likely benefits of the coverage that is available and, as such, has no insurance for most product liabilities effective August 1, 2004.

Product Liability Litigation

Fosamax

As previously disclosed, Merck is a defendant in product liability lawsuits in the United States involving *Fosamax* (*Fosamax* Litigation). As of March 31, 2018 , approximately 4,040 cases are filed and pending against Merck in either federal or state court. In approximately 10 of these actions, plaintiffs allege, among other things, that they have suffered osteonecrosis of the jaw (ONJ), generally subsequent to invasive dental procedures, such as tooth extraction or dental implants and/or delayed healing, in association with the use of *Fosamax* . In addition, plaintiffs in approximately 4,030 of these actions generally allege that they sustained femur fractures and/or other bone injuries (Femur Fractures) in association with the use of *Fosamax* .

Cases Alleging ONJ and/or Other Jaw Related Injuries

In August 2006, the Judicial Panel on Multidistrict Litigation (JPML) ordered that certain *Fosamax* product liability cases pending in federal courts nationwide should be transferred and consolidated into one multidistrict litigation (*Fosamax* ONJ MDL) for coordinated pre-trial proceedings.

In 2014, Merck settled approximately 95% of the ONJ cases pending in the *Fosamax* ONJ MDL and in state courts for a payment of $27.3 million . The escrow agent under the agreement has been making settlement payments to qualifying plaintiffs. The ONJ Master Settlement Agreement has no effect on the cases alleging Femur Fractures discussed below.

Discovery is currently ongoing in some of the approximately 10 remaining ONJ cases that are pending in various federal and state courts and the Company intends to defend against these lawsuits.

Cases Alleging Femur Fractures

In March 2011, Merck submitted a Motion to Transfer to the JPML seeking to have all federal cases alleging Femur Fractures consolidated into one multidistrict litigation for coordinated pre-trial proceedings. All federal cases involving allegations of Femur Fracture have been or will be transferred to a multidistrict litigation in the District of New Jersey (Femur Fracture MDL). In the only bellwether case tried to date in the Femur Fracture MDL, *Glynn v. Merck* , the jury returned a verdict in Merck's favor. In addition, in June 2013, the Femur Fracture MDL court granted Merck's motion for judgment as a matter of law in the *Glynn* case and held that the plaintiff's failure to warn claim was preempted by federal law.

In August 2013, the Femur Fracture MDL court entered an order requiring plaintiffs in the Femur Fracture MDL to show cause why those cases asserting claims for a femur fracture injury that took place prior to September 14, 2010, should not be dismissed based on the court's preemption decision in the *Glynn* case. Pursuant to the show cause order, in March 2014, the Femur Fracture MDL court dismissed with prejudice approximately 650 cases on preemption grounds. Plaintiffs in approximately 515 of those cases appealed that decision to the U.S. Court of Appeals for the Third Circuit (Third Circuit). The Femur Fracture MDL court also dismissed without prejudice another approximately 510 cases pending plaintiffs' appeal of the preemption ruling to the Third Circuit. In March 2017, the Third Circuit issued a decision reversing the Femur Fracture MDL court's preemption ruling and remanding the appealed cases back to the Femur Fracture MDL court. Merck filed a petition for a writ of certiorari to the U.S. Supreme Court in August 2017 seeking review of the Third Circuit's decision. In December 2017, the Supreme Court invited the Solicitor General to file a brief in the case expressing the views of the United States.

In addition, in June 2014, the Femur Fracture MDL court granted Merck summary judgment in the *Gaynor v. Merck* case and found that Merck's updates in January 2011 to the *Fosamax* label regarding atypical femur fractures were adequate as a matter of law and that Merck adequately communicated those changes. The plaintiffs in *Gaynor* did not appeal the Femur Fracture MDL court's findings with respect to the adequacy of the 2011 label change but did appeal the dismissal of their case based on preemption grounds, and the Third Circuit subsequently reversed that dismissal in its March 2017 decision. In August 2014, Merck filed a motion requesting that the Femur Fracture MDL court enter a further order requiring all plaintiffs in the Femur Fracture MDL who claim that the 2011 *Fosamax* label is inadequate and the proximate cause of their alleged injuries to show cause why their cases should not be dismissed based on the court's preemption decision and its ruling in the *Gaynor* case. In November 2014, the court granted Merck's motion and entered the requested show cause order. No plaintiffs responded to or appealed the November 2014 show cause order.

As of March 31, 2018 , approximately 540 cases were pending in the Femur Fracture MDL following the reinstatement of the cases that had been on appeal to the Third Circuit. The 510 cases dismissed without prejudice that were also pending the final resolution of the aforementioned appeal have not yet been reinstated.

As of March 31, 2018 , approximately 2,700 cases alleging Femur Fractures have been filed in New Jersey state court and are pending before Judge James Hyland in Middlesex County. The parties selected an initial group of 30 cases to be reviewed through fact discovery. Two additional groups of 50 cases each to be reviewed through fact discovery were selected in November 2013 and March 2014, respectively. A further group of 25 cases to be reviewed through fact discovery was selected by Merck in July 2015, and Merck has continued to select additional cases to be reviewed through fact discovery from 2016 to the present.

As of March 31, 2018 , approximately 280 cases alleging Femur Fractures have been filed and are pending in California state court. All of the Femur Fracture cases filed in California state court have been coordinated before a single judge in Orange County, California. In March 2014, the court directed that a group of 10 discovery pool cases be reviewed through fact discovery and subsequently scheduled the *Galper v. Merck* case, which plaintiffs selected, as the first trial. The *Galper* trial began in February 2015 and the jury returned a verdict in Merck's favor in April 2015, and plaintiff appealed that verdict to the California appellate court. Oral argument on plaintiff's appeal in *Galper* was held in November 2016 and, in April 2017, the California appellate court issued a decision affirming the lower court's judgment in favor of Merck. The next Femur Fracture trial in California that was scheduled to begin in April 2016 was stayed at plaintiffs' request and a new trial date has not been set.

Additionally, there are four Femur Fracture cases pending in other state courts.

Discovery is ongoing in the Femur Fracture MDL and in state courts where Femur Fracture cases are pending and the Company intends to defend against these lawsuits.

Januvia/Janumet

As previously disclosed, Merck is a defendant in product liability lawsuits in the United States involving *Januvia* and/or *Janumet* . As of March 31, 2018 , Merck is aware of approximately 1,245 product user claims alleging generally that use of *Januvia* and/or *Janumet* caused the development of pancreatic cancer and other injuries. These complaints were filed in several different state and federal courts.

Most of the claims were filed in a consolidated multidistrict litigation proceeding in the U.S. District Court for the Southern District of California called "In re Incretin-Based Therapies Products Liability Litigation" (MDL). The MDL includes federal lawsuits alleging pancreatic cancer due to use of the following medicines: *Januvia, Janumet* , Byetta and Victoza, the latter two of which are products manufactured by other pharmaceutical companies. The majority of claims not filed in the MDL were filed in the Superior Court of California, County of Los Angeles (California State Court).

In November 2015, the MDL and California State Court - in separate opinions - granted summary judgment to defendants on grounds of preemption. Of the approximately 1,245 product user claims, these rulings resulted in the dismissal of approximately 1,100 product user claims.

Plaintiffs appealed the MDL and California State Court preemption rulings. In November 2017, the U.S. Court of Appeals for the Ninth Circuit (Ninth Circuit) reversed the trial court's ruling in the MDL and remanded for further proceedings. The Ninth Circuit did not address the substance of defendants' preemption argument but instead ruled that the district court made various errors during discovery. Jurisdiction returned to U.S. District Court for the Southern District of California on January 2, 2018. The preemption appeal in the California state court litigation has been fully briefed, but the court has not yet scheduled oral argument.

On March 21, 2018, the district court in the MDL entered a case management order setting forth a schedule for completing discovery on general causation and preemption issues and for renewing summary judgment and *Daubert* motions. The filing deadline for *Daubert* and summary judgment motions is set for December 11, 2018.

As of March 31, 2018 , seven product users have claims pending against Merck in state courts other than California state court, including four active product user claims pending in Illinois state court. In June 2017, the Illinois trial court denied Merck's motion for summary judgment on grounds of preemption. Merck sought permission to appeal that order on an interlocutory basis and was granted a stay of proceedings in the trial court. In September 2017, an intermediate appellate court in Illinois denied Merck's petition for interlocutory review. Merck filed a petition for review with the Illinois Supreme Court and, on January 18, 2018, the Illinois Supreme Court directed the appellate court to answer the certified question. Briefing is expected to occur in the second quarter of 2018. Proceedings in the trial court remain stayed.

In addition to the claims noted above, the Company has agreed to toll the statute of limitations for approximately 50 additional claims. The Company intends to continue defending against these lawsuits.

Propecia/Proscar

As previously disclosed, Merck is a defendant in product liability lawsuits in the United States involving *Propecia* and/or *Proscar* . As of March 31, 2018 , there were approximately 600 active lawsuits filed by plaintiffs who allege that they have experienced persistent sexual side effects following cessation of treatment with *Propecia* and/or *Proscar* . Approximately 15 of the plaintiffs also allege that *Propecia* or *Proscar* has caused or can cause prostate cancer, testicular cancer or male breast cancer. The lawsuits have been filed in various federal courts and in state court in New Jersey. The federal lawsuits have been consolidated for pretrial purposes in a federal multidistrict litigation before Judge Brian Cogan of the Eastern District of New York. The matters pending in state court in New Jersey have been consolidated before Judge Hyland in Middlesex County (NJ Coordinated Proceedings). In addition, there is one matter pending in state court in California, one matter pending in state court in Ohio, and one matter pending in state court in Massachusetts.

On April 9, 2018, Merck and the Plaintiffs' Executive Committee in the MDL and the Plaintiffs' Liaison Counsel in the NJ Coordinated Proceedings entered into an agreement to resolve the above mentioned *Propecia/Proscar* lawsuits for an aggregate amount of $4.3 million . The settlement is subject to certain contingencies, including 95% plaintiff participation and a per plaintiff clawback if the participation rate is less than 100% .

The Company intends to defend against any remaining unsettled lawsuits.

Governmental Proceedings

As previously disclosed, the Company received a civil investigative demand from the U.S. Attorney's Office for the Southern District of New York that requested information relating to the Company's contracts with, services from and payments to pharmacy benefit managers with respect to *Maxalt* and Levitra from January 1, 2006 to the present. The Company has been informed that the government is no longer pursuing the investigation as to Merck.

As previously disclosed, the Company received a subpoena from the Office of Inspector General of the U.S. Department of Health and Human Services on behalf of the U.S. Attorney's Office for the District of Maryland and the Civil Division of the U.S. Department of Justice that requested information relating to the Company's marketing of *Singulair* and *Dulera* Inhalation Aerosol and certain of its other marketing activities from January 1, 2006 to 2016. The Company has been informed by the Justice Department that the investigation is closed.

As previously disclosed, the Company's subsidiaries in China have received and may continue to receive inquiries regarding their operations from various Chinese governmental agencies. Some of these inquiries may be related to matters involving other multinational pharmaceutical companies, as well as Chinese entities doing business with such companies. The Company's policy is to cooperate with these authorities and to provide responses as appropriate.

As previously disclosed, from time to time, the Company receives inquiries and is the subject of preliminary investigation activities from competition and other governmental authorities in markets outside the United States. These authorities may include regulators, administrative authorities, and law enforcement and other similar officials, and these preliminary investigation activities may include site visits, formal or informal requests or demands for documents or materials, inquiries or interviews and similar matters. Certain of these preliminary inquiries or activities may lead to the commencement of formal proceedings. Should those proceedings be determined adversely to the Company, monetary fines and/or remedial undertakings may be required.

Commercial and Other Litigation

Merck KGaA Litigation

In January 2016, to protect its long-established brand rights in the United States, the Company filed a lawsuit against Merck KGaA, Darmstadt, Germany (KGaA), historically operating as the EMD Group in the United States, alleging it improperly uses the name "Merck" in the United States. KGaA has filed suit against the Company in France, the UK, Germany, Switzerland, Mexico, India, Australia and Singapore alleging, among other things, unfair competition, trademark infringement and corporate name infringement. In the UK, Australia and Singapore, KGaA also alleges breach of the parties' coexistence agreement. In December 2015, the Paris Court of First Instance issued a judgment finding that certain activities by the Company directed towards France did not constitute trademark infringement and unfair competition while other activities were found to infringe. The Company and KGaA appealed the decision, and the appeal was heard in May 2017. In June 2017, the French appeals court held that certain of the activities by the Company directed to France constituted unfair competition or trademark infringement and no further appeal was pursued. In January 2016, the UK High Court issued a judgment finding that the Company had breached the co-existence agreement and infringed KGaA's trademark rights as a result of certain activities directed towards the UK based on use of the word MERCK on promotional and information activity. As noted in the UK decision, this finding was not based on the Company's use of the sign MERCK in connection with the sale of products or any material pharmaceutical business transacted in the UK. The Company and KGaA have both appealed this decision, and the appeal was heard in June 2017. In November 2017, the UK Court of Appeals affirmed the decision on the co-existence agreement and remitted for re-hearing issues of trademark infringement, the scope of KGaA's UK trademarks for pharmaceutical products, and the relief to which KGaA would be entitled. On March 20, 2018, the UK High Court listed the UK re-hearing for the week commencing July 2, 2018.

Patent Litigation

From time to time, generic manufacturers of pharmaceutical products file abbreviated New Drug Applications with the U.S. Food and Drug Administration (FDA) seeking to market generic forms of the Company's products prior to the expiration of relevant patents owned by the Company. To protect its patent rights, the Company may file patent infringement lawsuits against such generic companies. Similar lawsuits defending the Company's patent rights may exist in other countries. The Company intends to vigorously defend its patents, which it believes are valid, against infringement by companies attempting to market products prior to the expiration of such patents. As with any litigation, there can be no assurance of the outcomes, which, if adverse, could result in significantly shortened periods of exclusivity for these products and, with respect to products acquired through acquisitions, potentially significant intangible asset impairment charges.

Inegy — The patents protecting *Inegy* in Europe have expired but supplemental protection certificates (SPCs) have been granted to the Company in many European countries that will expire in April 2019. There are multiple challenges to the SPCs related to *Inegy* throughout Europe and generic products have been launched in France, Italy, Ireland, Spain, Portugal and Norway. The Company has filed for preliminary injunctions in many countries that are still pending decision. A preliminary injunction has been granted in Germany. Preliminary injunctions have been denied in France, Spain and Ireland and the Company is appealing those decisions. The Company will file actions for patent infringement seeking damages against those companies that launch generic products before April 2019.

Noxafil — In August 2015, the Company filed a lawsuit against Actavis Laboratories Fl, Inc. (Actavis) in the United States in respect of that company's application to the FDA seeking pre-patent expiry approval to sell a generic version of *Noxafil* . In October 2017, the district court held the patent valid and infringed. Actavis appealed this decision. While the appeal was pending, the parties reached a settlement, subject to certain terms of the agreement being met, whereby Actavis can launch its generic version

prior to expiry of the patent and pediatric exclusivity under certain conditions. In March 2016, the Company filed a lawsuit against Roxane Laboratories, Inc. (Roxane) in the United States in respect of that company's application to the FDA seeking pre-patent expiry approval to sell a generic version of *Noxafil* . In November 2017, the parties reached a settlement whereby Roxane can launch its generic version prior to expiry of the patent under certain conditions. In February 2016, the Company filed a lawsuit against Par Sterile Products LLC, Par Pharmaceutical, Inc., Par Pharmaceutical Companies, Inc. and Par Pharmaceutical Holdings, Inc. (collectively, Par) in the United States in respect of that company's application to the FDA seeking pre-patent expiry approval to sell a generic version of *Noxafil* injection. In October 2016, the parties reached a settlement whereby Par can launch its generic version in January 2023, or earlier under certain conditions. In February 2018, the Company filed a lawsuit against Fresenius Kabi USA, LLC., in the United States in respect of that company's application to the FDA seeking pre-patent expiry approval to sell a generic version of *Noxafil.* In March 2018, the Company filed a lawsuit against Mylan Laboratories Limited in the United States in respect of that company's application to the FDA seeking pre-patent expiry approval to sell a generic version of *Noxafil* .

Nasonex — Nasonex lost market exclusivity in the United States in 2016. Prior to that, in April 2015, the Company filed a patent infringement lawsuit against Apotex Inc. and Apotex Corp. (Apotex) in respect of Apotex's marketed product that the Company believed was infringing. In January 2018, the Company and Apotex settled this matter with Apotex agreeing to pay the Company $115 million plus certain other consideration.

Gilead Patent Litigation and Opposition

In August 2013, Gilead Sciences, Inc. (Gilead) filed a lawsuit in the U.S. District Court for the Northern District of California seeking a declaration that two Company patents were invalid and not infringed by the sale of their two sofosbuvir containing products, Sovaldi and Harvoni. The Company filed a counterclaim that the sale of these products did infringe these two patents and sought a reasonable royalty for the past, present and future sales of these products. In March 2016, at the conclusion of a jury trial, the patents were found to be not invalid and infringed. The jury awarded the Company $200 million as a royalty for sales of these products up to December 2015. After the conclusion of the jury trial, the court held a bench trial on the equitable defenses raised by Gilead. In June 2016, the court found for Gilead and determined that Merck could not collect the jury award and that the patents were unenforceable with respect to Gilead. The Company appealed the court's decision. Gilead also asked the court to overturn the jury's decision on validity. The court held a hearing on Gilead's motion in August 2016, and the court subsequently rejected Gilead's request, which Gilead appealed. On April 25, 2018, the appeals court affirmed the decisions that both patents were unenforceable against Gilead.

The Company, through its Idenix Pharmaceuticals, Inc. subsidiary, has pending litigation against Gilead in the United States, Canada, Germany, France, and Australia based on different patent estates that would also be infringed by Gilead's sales of these two products. Gilead opposed the European patent at the European Patent Office (EPO). Trial in the United States was held in December 2016 and the jury returned a verdict for the Company, awarding damages of $2.54 billion . The Company submitted post-trial motions, including on the issues of enhanced damages and future royalties. Gilead submitted post-trial motions for judgment as a matter of law. A hearing on the motions was held in September 2017. Also, in September 2017, the court denied the Company's motion on enhanced damages, granted its motion on prejudgment interest and deferred its motion on future royalties. In February 2018, the court granted Gilead's motion for judgment as a matter of law and found the patent was invalid for a lack of enablement. The Company appealed this decision. In Australia, the Company was initially unsuccessful and the Full Federal Court affirmed the lower court decision. The Company sought leave to appeal to the High Court of Australia for further review. Leave was denied on April 17, 2018. In Canada, the Company was initially unsuccessful and the Federal Court of Appeals affirmed the lower court decision. The Company sought leave to the Supreme Court of Canada for further review. Leave was denied on April 26, 2018. The EPO opposition division revoked the European patent, and the Company appealed this decision. The cases in France and Germany have been stayed pending the final decision of the EPO.

Other Litigation

There are various other pending legal proceedings involving the Company, principally product liability and intellectual property lawsuits. While it is not feasible to predict the outcome of such proceedings, in the opinion of the Company, either the likelihood of loss is remote or any reasonably possible loss associated with the resolution of such proceedings is not expected to be material to the Company's financial position, results of operations or cash flows either individually or in the aggregate.

Legal Defense Reserves

Legal defense costs expected to be incurred in connection with a loss contingency are accrued when probable and reasonably estimable. Some of the significant factors considered in the review of these legal defense reserves are as follows: the actual costs incurred by the Company; the development of the Company's legal defense strategy and structure in light of the scope of its litigation; the number of cases being brought against the Company; the costs and outcomes of completed trials and the most current information regarding anticipated timing, progression, and related costs of pre-trial activities and trials in the associated litigation. The amount of legal defense reserves as of March 31, 2018 and December 31, 2017 of approximately $155 million and

$160 million , respectively, represents the Company's best estimate of the minimum amount of defense costs to be incurred in connection with its outstanding litigation; however, events such as additional trials and other events that could arise in the course of its litigation could affect the ultimate amount of legal defense costs to be incurred by the Company. The Company will continue to monitor its legal defense costs and review the adequacy of the associated reserves and may determine to increase the reserves at any time in the future if, based upon the factors set forth, it believes it would be appropriate to do so.

Environmental Matters

As previously disclosed, Merck's facilities in Oss, the Netherlands, were inspected in 2012 by the Province of Brabant (Province) pursuant to the Dutch Hazards of Major Accidents Decree and the sites' environmental permits. The Province issued penalties for alleged violations of regulations governing preventing and managing accidents with hazardous substances, and the government also issued a fine for alleged environmental violations at one of the Oss facilities, which together totaled $235 thousand . The Company was subsequently advised that a criminal investigation had been initiated based upon certain of the issues that formed the basis of the administrative enforcement action by the Province. The Company has reached a settlement with the Public Prosecutor, without any admission of liability, resolving these allegations against two Merck subsidiaries for an aggregate of €400 thousand .

9. Equity

($ and shares in millions)	Common Stock Shares	Common Stock Par Value	Other Paid-In Capital	Retained Earnings	Accumulated Other Comprehensive Loss	Treasury Stock Shares	Treasury Stock Cost	Non-Controlling Interests	Total
Balance at January 1, 2017	3,577	$ 1,788	$ 39,939	$ 44,133	$ (5,226)	828	$ (40,546)	$ 220	$ 40,308
Net income attributable to Merck & Co., Inc.	—	—	—	1,551	—	—	—	—	1,551
Other comprehensive income, net of taxes	—	—	—	—	146	—	—	—	146
Cash dividends declared on common stock	—	—	—	(1,297)	—	—	—	—	(1,297)
Treasury stock shares purchased	—	—	—	—	—	16	(1,019)	—	(1,019)
Share-based compensation plans and other	—	—	(40)	—	—	(7)	408	—	368
Acquisition of Vallée	—	—	—	—	—	—	—	25	25
Net income attributable to noncontrolling interests	—	—	—	—	—	—	—	5	5
Other changes in noncontrolling ownership interests	—	—	—	—	—	—	—	1	1
Balance at March 31, 2017	3,577	$ 1,788	$ 39,899	$ 44,387	$ (5,080)	837	$ (41,157)	$ 251	$ 40,088
Balance at January 1, 2018	3,577	$ 1,788	$ 39,902	$ 41,350	$ (4,910)	880	$ (43,794)	$ 233	$ 34,569
Adoption of new accounting standards (see Note 1)	—	—	—	322	(274)	—	—	—	48
Net income attributable to Merck & Co., Inc.	—	—	—	736	—	—	—	—	736
Other comprehensive income, net of taxes	—	—	—	—	124	—	—	—	124
Cash dividends declared on common stock	—	—	—	(1,301)	—	—	—	—	(1,301)
Treasury stock shares purchased	—	—	—	—	—	10	(566)	—	(566)
Share-based compensation plans and other	—	—	(28)	—	—	(5)	319	—	291
Net income attributable to noncontrolling interests	—	—	—	—	—	—	—	5	5
Distributions attributable to noncontrolling interests	—	—	—	—	—	—	—	(5)	(5)
Balance at March 31, 2018	3,577	$ 1,788	$ 39,874	$ 41,107	$ (5,060)	885	$ (44,041)	$ 233	$ 33,901

10. Share-Based Compensation Plans

The Company has share-based compensation plans under which the Company grants restricted stock units (RSUs) and performance share units (PSUs) to certain management level employees. In addition, employees and non-employee directors may be granted options to purchase shares of Company common stock at the fair market value at the time of grant.

The following table provides the amounts of share-based compensation cost recorded in the Condensed Consolidated Statement of Income:

	Three Months Ended March 31,	
($ in millions)	2018	2017
Pretax share-based compensation expense	$ 80	$ 74
Income tax benefit	(15)	(22)
Total share-based compensation expense, net of taxes	$ 65	$ 52

During the first three months of 2018 and 2017 , the Company granted 121 thousand RSUs with a weighted-average grant date fair value of $55.88 per RSU and 86 thousand RSUs with a weighted-average grant date fair value of $64.20 per RSU, respectively. During the first three months of 2018 and 2017 , the Company granted 46 thousand stock options with a weighted-average exercise price of $55.88 per option and 190 thousand stock options with a weighted-average exercise price of $64.20 per option, respectively. The weighted-average fair value of options granted for the first three months of 2018 and 2017 was $7.83 and $7.89 per option, respectively, and was determined using the following assumptions:

	Three Months Ended March 31,	
	2018	2017
Expected dividend yield	3.4%	3.7%
Risk-free interest rate	2.7%	2.0%
Expected volatility	19.5%	19.7%
Expected life (years)	6.0	6.2

At March 31, 2018 , there was $798 million of total pretax unrecognized compensation expense related to nonvested stock options, RSU and PSU awards which will be recognized over a weighted-average period of 2.4 years . The Company typically communicates the value of annual share-based compensation awards to employees during the first quarter, but the related share amounts are not established and communicated until early May. Therefore, while the number of RSU and stock option grants disclosed above do not reflect any amounts relating to the annual grants, share-based compensation costs for the first quarter of 2018 and 2017 and unrecognized compensation expense at March 31, 2018 reflect an impact relating to the awards communicated to employees. For segment reporting, share-based compensation costs are unallocated expenses.

11. Pension and Other Postretirement Benefit Plans

The Company has defined benefit pension plans covering eligible employees in the United States and in certain of its international subsidiaries. The net periodic benefit cost (credit) of such plans consisted of the following components:

	Three Months Ended March 31,			
	2018		2017	
($ in millions)	U.S.	International	U.S.	International
Service cost	$ 83	$ 67	$ 77	$ 61
Interest cost	108	46	113	41
Expected return on plan assets	(214)	(113)	(218)	(94)
Amortization of unrecognized prior service credit	(13)	(3)	(13)	(2)
Net loss amortization	56	21	44	23
Termination benefits	11	—	5	1
Curtailments	(2)	—	3	—
Settlements	1	—	—	—
	$ 30	$ 18	$ 11	$ 30

The Company provides medical benefits, principally to its eligible U.S. retirees and similar benefits to their dependents, through its other postretirement benefit plans. The net cost (credit) of such plans consisted of the following components:

	Three Months Ended March 31,	
($ in millions)	2018	2017
Service cost	$ 14	$ 14
Interest cost	18	20
Expected return on plan assets	(21)	(19)
Amortization of unrecognized prior service credit	(21)	(25)
Termination benefits	1	1
Curtailments	(4)	(3)
	$ (13)	$ (12)

In connection with restructuring actions (see Note 5), termination charges were recorded on pension and other postretirement benefit plans related to expanded eligibility for certain employees exiting Merck. Also, in connection with these restructuring actions, curtailments were recorded on pension and other postretirement benefit plans as reflected in the tables above.

The components of net periodic benefit cost (credit) other than the service cost component are included in *Other (income) expense, net* (see Note 12), with the exception of certain amounts for termination benefits and curtailments, which are recorded in *Restructuring costs* if the event giving rise to the termination benefits or curtailment is related to restructuring actions as noted above.

12. Other (Income) Expense, Net

Other (income) expense, net, consisted of:

	Three Months Ended March 31,	
($ in millions)	2018	2017
Interest income	$ (85)	$ (97)
Interest expense	185	182
Exchange losses (gains)	7	(8)
Equity losses from affiliates	52	13
Net periodic defined benefit plan (credit) cost other than service cost	(135)	(129)
Other, net	(315)	(32)
	$ (291)	$ (71)

Other, net (as reflected in the table above) includes a $115 million gain on the settlement of certain patent litigation (see Note 8).

Interest paid for the three months ended March 31, 2018 and 2017 was $186 million and $162 million , respectively.

13. Taxes on Income

The effective income tax rates of 44.9% and 22.3% for the first quarter of 2018 and 2017 , respectively, reflect the impacts of acquisition and divestiture-related costs and restructuring costs, partially offset by the beneficial impact of foreign earnings. In addition, the effective income tax rate for the first quarter of 2018 reflects the unfavorable impact of a $1.4 billion aggregate pretax charge recorded in connection with the formation of an oncology collaboration with Eisai for which no tax benefit was recognized.

On December 22, 2017, new U.S. tax legislation known as the Tax Cuts and Jobs Act of 2017 (TCJA) was enacted. Among other provisions, the TCJA reduced the U.S. federal corporate statutory tax rate from 35% to 21% effective January 1, 2018, requires companies to pay a one-time transition tax on undistributed earnings of certain foreign subsidiaries, and creates new taxes on certain foreign sourced earnings. The Company reflected the impact of the TCJA in its 2017 financial statements as described below. However, application of certain provisions of the TCJA was and remains subject to further interpretation and in these instances the Company made a reasonable estimate of the effects of the TCJA. No changes to these amounts were recognized in the first quarter of 2018 and they remain provisional.

The one-time transition tax is based on the Company's post-1986 undistributed earnings and profits (E&P). For a substantial portion of these undistributed E&P, the Company had not previously provided deferred taxes as these earnings were deemed by Merck to be retained indefinitely by subsidiary companies for reinvestment. The Company recorded a provisional amount for its one-time transition tax liability of $5.3 billion . Merck has not yet finalized its calculation of the total post-1986 undistributed E&P for these foreign subsidiaries. The transition tax is based in part on the amount of undistributed E&P held in cash and other specified assets; therefore, this amount may change when the Company finalizes its calculation of post-1986 undistributed foreign E&P and finalizes the amounts held in cash or other specified assets. This provisional amount was reduced by the reversal of $2.0 billion of deferred taxes that were previously recorded in connection with the merger of Schering-Plough Corporation in 2009 for certain undistributed foreign E&P. The Company anticipates that it will be able to utilize certain foreign tax credits to partially reduce the transition tax payment, resulting in a net transition tax payment of $5.1 billion .

The Company remeasured its deferred tax assets and liabilities at the new federal statutory tax rate of 21%, which resulted in a provisional deferred tax benefit of $779 million . The deferred tax benefit calculation remains subject to certain clarifications, particularly related to executive compensation and benefits.

Beginning in 2018, the TCJA includes a tax on "global intangible low-taxed income" (GILTI) as defined in the TCJA. The Company is allowed to make an accounting policy election to account for the tax effects of the GILTI tax either in the income tax provision in future periods as the tax arises, or as a component of deferred taxes on the related investments in foreign subsidiaries. The Company is currently evaluating the GILTI provisions of the TCJA and the implications on its tax provision and has not finalized the accounting policy election; therefore, the Company has not recorded deferred taxes for GILTI as of December 31, 2017.

14. Earnings Per Share

The calculations of earnings per share are as follows:

	Three Months Ended March 31,	
($ and shares in millions except per share amounts)	2018	2017
Net income attributable to Merck & Co., Inc.	$ 736	$ 1,551
Average common shares outstanding	2,695	2,745
Common shares issuable [(1)]	15	21
Average common shares outstanding assuming dilution	2,710	2,766
Basic earnings per common share attributable to Merck & Co., Inc. common shareholders	$ 0.27	$ 0.56
Earnings per common share assuming dilution attributable to Merck & Co., Inc. common shareholders	$ 0.27	$ 0.56

[(1)] *Issuable primarily under share-based compensation plans.*

For the three months ended March 31, 2018 and 2017 , 14 million and 2 million , respectively, of common shares issuable under share-based compensation plans were excluded from the computation of earnings per common share assuming dilution because the effect would have been antidilutive.

15. Other Comprehensive Income (Loss)

Changes in *AOCI* by component are as follows:

	Three Months Ended March 31,				
($ in millions)	Derivatives	Investments	Employee Benefit Plans	Cumulative Translation Adjustment	Accumulated Other Comprehensive Income (Loss)
Balance January 1, 2017, net of taxes	$ 338	$ (3)	$ (3,206)	$ (2,355)	$ (5,226)
Other comprehensive income (loss) before reclassification adjustments, pretax	(263)	87	(4)	263	83
Tax	92	(7)	9	46	140
Other comprehensive income (loss) before reclassification adjustments, net of taxes	(171)	80	5	309	223
Reclassification adjustments, pretax	(95) [1]	(57) [2]	28 [3]	—	(124)
Tax	34	20	(7)	—	47
Reclassification adjustments, net of taxes	(61)	(37)	21	—	(77)
Other comprehensive income (loss), net of taxes	(232)	43	26	309	146
Balance March 31, 2017, net of taxes	$ 106	$ 40	$ (3,180)	$ (2,046)	$ (5,080)
Balance January 1, 2018, net of taxes	$ (108)	$ (61)	$ (2,787)	$ (1,954)	$ (4,910)
Other comprehensive income (loss) before reclassification adjustments, pretax	(181)	(112)	(1)	319	25
Tax	38	—	3	(62)	(21)
Other comprehensive income (loss) before reclassification adjustments, net of taxes	(143)	(112)	2	257	4
Reclassification adjustments, pretax	92 [1]	12 [2]	41 [3]	—	145
Tax	(19)	1	(7)	—	(25)
Reclassification adjustments, net of taxes	73	13	34	—	120
Other comprehensive income (loss), net of taxes	(70)	(99)	36	257	124
Reclassification of provisional stranded tax effects (see Note 1)	(23)	1	(344)	100	(266)
Adoption of ASU 2016-01 (see Note 1)	—	(8)	—	—	(8)
Balance March 31, 2018, net of taxes	$ (201)	$ (167)	$ (3,095)	$ (1,597)	$ (5,060)

[1] *Relates to foreign currency cash flow hedges that were reclassified from AOCI to Sales.*

[2] *Represents net realized (gains) losses on the sales of available-for-sale investments that were reclassified from* AOCI *to* Other (income) expense, net . *In 2017, these amounts included both debt and equity investments; however, upon adoption of ASU 2016-01 in 2018 (see Note 1), these amounts relate only to available-for-sale debt investments.*

[3] *Includes net amortization of prior service cost and actuarial gains and losses included in net periodic benefit cost (see Note 11).*

16. Segment Reporting

The Company's operations are principally managed on a products basis and include four operating segments, which are the Pharmaceutical, Animal Health, Healthcare Services and Alliances segments. The Pharmaceutical and Animal Health segments are the only reportable segments. The Animal Health segment met the criteria for separate reporting and became a reportable segment in the first quarter of 2018.

The Pharmaceutical segment includes human health pharmaceutical and vaccine products. Human health pharmaceutical products consist of therapeutic and preventive agents, generally sold by prescription, for the treatment of human disorders. The Company sells these human health pharmaceutical products primarily to drug wholesalers and retailers, hospitals, government agencies and managed health care providers such as health maintenance organizations, pharmacy benefit managers and other institutions. Vaccine products consist of preventive pediatric, adolescent and adult vaccines, primarily administered at physician offices. The Company sells these human health vaccines primarily to physicians, wholesalers, physician distributors and government entities. A large component of pediatric and adolescent vaccine sales are made to the U.S. Centers for Disease Control and Prevention Vaccines for Children program, which is funded by the U.S. government. Additionally, the Company sells vaccines to the Federal government for placement into vaccine stockpiles.

The Company's Animal Health segment discovers, develops, manufactures and markets animal health products, including vaccines, which the Company sells to veterinarians, distributors and animal producers.

The Company's Healthcare Services segment provides services and solutions that focus on engagement, health analytics and clinical services to improve the value of care delivered to patients.

Sales of the Company's products were as follows:

	Three Months Ended March 31,					
	2018			2017		
($ in millions)	U.S.	Int'l	Total	U.S.	Int'l	Total
Pharmaceutical:						
Oncology						
Keytruda	$ 838	$ 626	$ 1,464	$ 361	$ 223	$ 584
Emend	79	46	125	86	47	133
Temodar	1	56	57	1	65	66
Alliance revenue - Lynparza	24	9	33	—	—	—
Vaccines						
Gardasil/Gardasil 9	380	280	660	398	134	532
ProQuad/M-M-R II */Varivax*	312	80	392	298	57	355
RotaTeq	151	42	193	178	45	224
Pneumovax 23	112	66	179	114	49	163
Zostavax	16	48	65	109	45	154
Hospital Acute Care						
Bridion	80	124	204	45	102	148
Noxafil	81	94	176	65	76	141
Invanz	91	60	151	82	54	136
Cubicin	47	51	98	54	41	96
Cancidas	3	88	91	5	116	121
Primaxin	5	67	72	—	62	62
Immunology						
Simponi	—	231	231	—	184	184
Remicade	—	167	167	—	229	229
Neuroscience						
Belsomra	23	31	54	20	21	42
Virology						
Isentress/Isentress HD	128	152	281	143	162	305
Zepatier	—	131	131	200	178	378
Cardiovascular						
Zetia	17	287	305	111	222	334
Vytorin	8	158	167	90	151	241
Atozet	—	73	73	—	49	49
Adempas	—	68	68	—	84	84
Diabetes						
Januvia	465	416	880	507	332	839
Janumet	192	352	544	195	302	496
Women's Health						
NuvaRing	171	46	216	113	47	160
Implanon/Nexplanon	128	46	174	132	39	170
Diversified Brands						
Singulair	6	170	175	6	180	186
Nasonex	1	121	122	18	121	139
Cozaar/Hyzaar	7	113	120	3	109	112
Arcoxia	—	83	83	—	103	103
Follistim AQ	29	39	67	42	40	81
Dulera	50	7	57	75	7	82
Fosamax	(2)	57	55	1	60	61
Other pharmaceutical [(1)]	273	717	989	309	688	995
Total Pharmaceutical segment sales	3,716	5,202	8,919	3,761	4,424	8,185
Animal Health:						

Livestock	124	529	652	119	459	578
Companion Animals	183	229	413	164	197	361
Total Animal Health segment sales	307	758	1,065	283	656	939
Other segment sales [2]	84	—	84	94	—	94
Total segment sales	4,107	5,960	10,068	4,138	5,080	9,218
Other [3]	26	(56)	(31)	57	159	216
	$ 4,133	$ 5,904	$ 10,037	$ 4,195	$ 5,239	$ 9,434

[1] Other pharmaceutical primarily reflects sales of other human health pharmaceutical products, including products within the franchises not listed separately.

[2] Represents the non-reportable segments of Healthcare Services and Alliances.

[3] Other is primarily comprised of miscellaneous corporate revenues, including revenue hedging activities, as well as third-party manufacturing sales. Other in the first quarter of 2018 and 2017 also includes $21 million and $50 million , respectively, related to the sale of the marketing rights to certain products.

Consolidated revenues by geographic area where derived are as follows:

($ in millions)	Three Months Ended March 31, 2018	2017
United States	$ 4,133	$ 4,195
Europe, Middle East and Africa	3,191	2,629
Asia Pacific	1,238	1,001
Japan	737	705
Latin America	532	485
Other	206	419
	$ 10,037	$ 9,434

A reconciliation of segment profits to *Income before taxes* is as follows:

($ in millions)	Three Months Ended March 31, 2018	2017
Segment profits:		
Pharmaceutical segment	$ 5,804	$ 5,160
Animal Health segment	413	417
Other segments	63	33
Total segment profits	6,280	5,610
Other profits	(87)	142
Unallocated:		
Interest income	85	97
Interest expense	(185)	(182)
Equity income from affiliates	(50)	(12)
Depreciation and amortization	(350)	(370)
Research and development	(2,982)	(1,632)
Amortization of purchase accounting adjustments	(733)	(778)
Restructuring costs	(95)	(151)
Other unallocated, net	(538)	(721)
	$ 1,345	$ 2,003

Pharmaceutical segment profits are comprised of segment sales less standard costs, as well as marketing and administrative expenses and research and development costs directly incurred by the segment. Animal Health segment profits are comprised of segment sales, less all materials and production costs, as well as marketing and administrative expenses and research and development costs directly incurred by the segment. For internal management reporting presented to the chief operating decision maker, Merck does not allocate the remaining materials and production costs not included in segment profits as described above, research and development expenses incurred in Merck Research Laboratories, the Company's research and development division that focuses on human health-related activities, or general and administrative expenses, nor the cost of financing these activities. Separate divisions maintain responsibility for monitoring and managing these costs, including depreciation related to fixed assets utilized by these divisions and, therefore, they are not included in segment profits. In addition, costs related to restructuring activities, as well as the amortization of purchase accounting adjustments are not allocated to segments.

Other profits are primarily comprised of miscellaneous corporate profits, as well as operating profits related to third-party manufacturing sales.

Other unallocated, net includes expenses from corporate and manufacturing cost centers, goodwill and intangible asset impairment charges, gains or losses on sales of businesses, expense or income related to changes in the estimated fair value of contingent consideration, and other miscellaneous income or expense items.

In the first quarter of 2018, the Company adopted a new accounting standard related to the classification of certain defined benefit plan costs (see Note 1), which resulted in a change to the measurement of segment profits. Net periodic benefit cost (credit) other than service cost is no longer included as a component of segment profits. Prior period amounts have been recast to conform to the new presentation.

Recent Developments

Business Developments

In March 2018, Merck and Eisai Co., Ltd. (Eisai) announced a strategic collaboration for the worldwide co-development and co-commercialization of Lenvima (lenvatinib mesylate), an orally available tyrosine kinase inhibitor discovered by Eisai. Under the agreement, Merck and Eisai will develop and commercialize Lenvima jointly, both as monotherapy and in combination with Merck's anti-PD-1 therapy, *Keytruda* (pembrolizumab). Eisai will record Lenvima product sales globally, as monotherapy and in combination, and Merck and Eisai will share gross profits equally. Merck will record its share of product sales of Lenvima, net of cost of sales and commercialization costs, as alliance revenue. Expenses incurred during co-development, including for studies evaluating Lenvima as monotherapy, will be shared equally by the two companies. Under the agreement, Merck made upfront payments to Eisai of $750 million and will make payments of up to $650 million for certain option rights through 2021 ($325 million in January 2019 or earlier in certain circumstances, $200 million in January 2020 and $125 million in January 2021). The Company recorded an aggregate charge of $1.4 billion in *Research and development* expenses in the first quarter of 2018 related to the upfront payments and future option payments. In addition, Eisai is eligible to receive up to $385 million in the future associated with the achievement of certain clinical and regulatory milestones and up to $3.97 billion for the achievement of milestones associated with sales of Lenvima. In March 2018, Lenvima was approved in Japan for unresectable hepatocellular carcinoma, which was the first regulatory approval under the global strategic collaboration.

In February 2018, Merck and Viralytics Limited (Viralytics) announced a definitive agreement pursuant to which Merck will acquire Viralytics, an Australian publicly traded company focused on oncolytic immunotherapy treatments for a range of cancers, for AUD 1.75 per share. The proposed acquisition values the total issued shares in Viralytics at approximately AUD 502 million ($394 million). Upon completion of the transaction, Merck will gain full rights to Cavatak (CVA21), Viralytics's investigational oncolytic immunotherapy. Cavatak is based on Viralytics's proprietary formulation of an oncolytic virus (Coxsackievirus Type A21) that has been shown to preferentially infect and kill cancer cells. Cavatak is currently being evaluated in multiple Phase 1 and Phase 2 clinical trials, both as an intratumoral and intravenous agent, including in combination with *Keytruda* . Under a previous agreement between Merck and Viralytics, a study is investigating the use of the *Keytruda* and Cavatak combination in melanoma, prostate, lung and bladder cancers. The transaction remains subject to a Viralytics shareholder vote and customary regulatory approvals. Merck anticipates the transaction will close in the second quarter of 2018.

Cyber-attack

On June 27, 2017, the Company experienced a network cyber-attack that led to a disruption of its worldwide operations, including manufacturing, research and sales operations. All of the Company's manufacturing sites are now operational, manufacturing active pharmaceutical ingredient (API), formulating, packaging and shipping product. The Company's external manufacturing was not impacted. Throughout this time, Merck continued to fulfill orders and ship product.

Due to a residual backlog of orders for certain products as a result of the cyber-attack, as anticipated, the Company was unable to fulfill orders for certain products in certain markets, which had an unfavorable effect on sales for the first quarter of 2018 of approximately $75 million. The Company anticipates that sales for the full year of 2018 will be unfavorably affected in certain markets by approximately $200 million from the cyber-attack. In addition, during the first quarter of 2018 the Company recorded manufacturing-related expenses, primarily unfavorable manufacturing variances, in *Materials and production* costs, as well as expenses related to remediation efforts in *Marketing and administrative* expenses and *Research and development* expenses, which aggregated approximately $10 million for the first quarter of 2018, net of insurance recoveries of approximately $15 million. Merck does not expect a significant impairment to the value of intangible assets related to marketed products or inventories as a result of the cyber-attack.

As referenced above, the Company has insurance coverage insuring against costs resulting from cyber-attacks and has received insurance proceeds. However, there may be disputes with the insurers about the availability of the insurance coverage for claims related to this incident.

Additionally, the temporary production shut-down from the cyber-attack contributed to the Company's inability to meet higher than expected demand for *Gardasil* 9 (Human Papillomavirus 9-valent Vaccine, Recombinant), which resulted in Merck's decision to borrow doses of *Gardasil* 9 from the U.S. Centers for Disease Control and Prevention (CDC) Pediatric Vaccine Stockpile in 2017. The Company subsequently replenished a portion of the borrowed doses in 2017. The net effect of the borrowing and subsequent partial replenishment was a reduction in sales of $125 million in 2017. The Company anticipates it will replenish the remaining borrowed doses in the second half of 2018.

Operating Results

Sales

Worldwide sales were $10.0 billion for the first quarter of 2018 , an increase of 6% compared with the first quarter of 2017 including a 3% favorable effect from foreign exchange. Sales growth was driven primarily by higher sales in the oncology franchise reflecting strong growth of *Keytruda* , the Company's anti-PD-1 (programmed death receptor-1) therapy. Also contributing to revenue growth in the quarter were higher sales in the hospital acute care franchise, largely attributable to *Bridion* (sugammadex) Injection and *Noxafil* (posaconazole), and higher sales in the diabetes franchise. Additionally, higher sales of human papillomavirus (HPV) vaccine *Gardasil* (Human Papillomavirus Quadrivalent [Types 6, 11, 16 and 18] Vaccine, Recombinant) */Gardasil* 9 and *NuvaRing* (etonogestrel/ethinyl estradiol vaginal ring), as well as higher sales of animal health products also contributed to sales growth in the quarter.

These increases were partially offset by declines in the virology franchise driven primarily by lower sales of hepatitis C virus (HCV) treatment *Zepatier* (elbasvir and grazoprevir), as well as lower sales of *Zostavax* (Zoster Vaccine Live). The ongoing effects of generic and biosimilar competition for cardiovascular products *Zetia* (ezetimibe), *Vytorin* (ezetimibe and simvastatin), and immunology product *Remicade* (infliximab), as well as lower sales of products within the diversified brands franchise also partially offset revenue growth in the quarter. The diversified brands franchise includes certain products approaching the expiration of their marketing exclusivity or that are no longer protected by patents in development markets.

Global efforts toward health care cost containment continue to exert pressure on product pricing and market access worldwide. In the United States pricing pressures continue on many of the Company's products and, in several international markets, government-mandated pricing actions have reduced prices of generic and patented drugs. In addition, other austerity measures negatively affected the Company's revenue performance in the first quarter of 2018 . The Company anticipates these pricing actions, including the biennial price reductions in Japan, and other austerity measures will continue to negatively affect revenue performance for the remainder of 2018 .

Sales of the Company's products were as follows:

	Three Months Ended March 31,					
	2018			2017		
($ in millions)	U.S.	Int'l	Total	U.S.	Int'l	Total
Pharmaceutical:						
Oncology						
Keytruda	$ 838	$ 626	$ 1,464	$ 361	$ 223	$ 584
Emend	79	46	125	86	47	133
Temodar	1	56	57	1	65	66
Alliance revenue - Lynparza	24	9	33	—	—	—
Vaccines						
Gardasil/Gardasil 9	380	280	660	398	134	532
ProQuad/M-M-R II */Varivax*	312	80	392	298	57	355
RotaTeq	151	42	193	178	45	224
Pneumovax 23	112	66	179	114	49	163
Zostavax	16	48	65	109	45	154
Hospital Acute Care						
Bridion	80	124	204	45	102	148
Noxafil	81	94	176	65	76	141
Invanz	91	60	151	82	54	136
Cubicin	47	51	98	54	41	96
Cancidas	3	88	91	5	116	121
Primaxin	5	67	72	—	62	62
Immunology						
Simponi	—	231	231	—	184	184
Remicade	—	167	167	—	229	229
Neuroscience						
Belsomra	23	31	54	20	21	42
Virology						
Isentress/Isentress HD	128	152	281	143	162	305
Zepatier	—	131	131	200	178	378
Cardiovascular						
Zetia	17	287	305	111	222	334
Vytorin	8	158	167	90	151	241
Atozet	—	73	73	—	49	49
Adempas	—	68	68	—	84	84
Diabetes						
Januvia	465	416	880	507	332	839
Janumet	192	352	544	195	302	496
Women's Health						
NuvaRing	171	46	216	113	47	160
Implanon/Nexplanon	128	46	174	132	39	170
Diversified Brands						
Singulair	6	170	175	6	180	186
Nasonex	1	121	122	18	121	139
Cozaar/Hyzaar	7	113	120	3	109	112
Arcoxia	—	83	83	—	103	103
Follistim AQ	29	39	67	42	40	81
Dulera	50	7	57	75	7	82
Fosamax	(2)	57	55	1	60	61
Other pharmaceutical [(1)]	273	717	989	309	688	995
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Other segment sales [2]	84	—	84	94	—	94
Total segment sales	4,107	5,960	10,068	4,138	5,080	9,218
Other [3]	26	(56)	(31)	57	159	216
	$ 4,133	$ 5,904	$ 10,037	$ 4,195	$ 5,239	$ 9,434

[1] Other pharmaceutical primarily reflects sales of other human health pharmaceutical products, including products within the franchises not listed separately.

[2] Represents the non-reportable segments of Healthcare Services and Alliances.

[3] Other is primarily comprised of miscellaneous corporate revenues, including revenue hedging activities, as well as third-party manufacturing sales. Other in the first quarter of 2018 and 2017 also includes $21 million and $50 million , respectively, related to the sale of the marketing rights to certain products.

Product sales are recorded net of the provision for discounts, including chargebacks, which are customer discounts that occur when a contracted customer purchases directly through an intermediary wholesale purchaser, and rebates that are owed based upon definitive contractual agreements or legal requirements with private sector and public sector (Medicaid and Medicare Part D) benefit providers, after the final dispensing of the product by a pharmacy to a benefit plan participant. These discounts, in the aggregate, reduced U.S. sales by $2.4 billion and $2.5 billion for the three months ended March 31, 2018 and 2017 , respectively. Inventory levels at key U.S. wholesalers for each of the Company's major pharmaceutical products are generally less than one month.

Pharmaceutical Segment

Oncology

Keytruda , an anti-PD-1 therapy, is approved in the United States and in the European Union (EU) as monotherapy for the treatment of certain patients with non-small-cell lung cancer (NSCLC), melanoma, classical Hodgkin lymphoma (cHL) and urothelial carcinoma, a type of bladder cancer. *Keytruda* is also approved in the United States as monotherapy for the treatment of certain patients with head and neck squamous cell carcinoma, gastric or gastroesophageal junction adenocarcinoma and microsatellite instability-high or mismatch repair deficient cancer, and in combination with pemetrexed and carboplatin in certain patients with NSCLC. *Keytruda* is approved in Japan for the treatment of certain patients with melanoma, NSCLC, cHL, and radically unresectable urothelial carcinoma. *Keytruda* is also approved in many other international markets. The *Keytruda* clinical development program includes studies across a broad range of cancer types (see "Research and Development" below).

Global sales of *Keytruda* were $1.5 billion in the first quarter of 2018 compared with $584 million in the first quarter of 2017 . Sales growth was driven by volume growth in all markets as the Company continues to launch *Keytruda* with multiple new indications globally. U.S. sales of *Keytruda* grew to $838 million in the first quarter of 2018 compared with $361 million in the first quarter of 2017 . Sales in the United States continue to build across the multiple approved indications, in particular for the treatment of NSCLC reflecting both the continued adoption of *Keytruda* in the first-line setting as monotherapy for patients with metastatic NSCLC whose tumors have high PD-L1 expression, as well as the uptake of *Keytruda* in combination with pemetrexed and carboplatin, a commonly used chemotherapy regimen, for the first-line treatment of metastatic nonsquamous NSCLC with or without PD-L1 expression. Other indications, including melanoma, head and neck cancer and bladder cancer, also contributed to growth in the first quarter of 2018 . Sales growth in international markets reflects positive performance from recently approved indications, particularly for the treatment of NSCLC, as reimbursement is established in additional markets.

Lynparza (olaparib), an oral poly (ADP-ribose) polymerase (PARP) inhibitor being developed as part of a collaboration with AstraZeneca PLC (AstraZeneca) (see Note 4 to the condensed consolidated financial statements), is currently approved for certain types of ovarian and breast cancer. Merck recorded alliance revenue of $33 million in the first quarter of 2018 related to Lynparza. In January 2018, the U.S. Food and Drug Administration (FDA) approved Lynparza for use in patients with *BRCA* -mutated, human epidermal growth factor receptor 2 (HER2)-negative metastatic breast cancer who have been previously treated with chemotherapy in the neoadjuvant, adjuvant or metastatic setting, triggering a $70 million milestone payment from Merck to AstraZeneca. Also in January 2018, the Japanese Ministry of Health, Labour and Welfare approved Lynparza for use as a maintenance therapy in patients for platinum-sensitive relapsed ovarian cancer, regardless of their *BRCA* mutation status, who responded to their last platinum-based chemotherapy.

Vaccines

Worldwide sales of *Gardasil/Gardasil* 9, vaccines to help prevent certain cancers and diseases caused by certain types of HPV, were $660 million in the first quarter of 2018 , an increase of 24% compared with the first quarter of 2017 including a 4% favorable effect from foreign exchange. Sales growth was driven primarily by higher sales in the Asia Pacific region, particularly in China reflecting continued uptake since launch, as well as volume growth in certain European markets. Sales declines in the United States reflect the ongoing impact of the transition from a 3-dose regimen to the 2-dose regimen that was recommended by the CDC's Advisory Committee on Immunization Practices (ACIP) in December 2016, partially offset by higher pricing.

Global sales of *ProQuad* (Measles, Mumps, Rubella and Varicella Virus Vaccine Live), a pediatric combination vaccine to help protect against measles, mumps, rubella and varicella, were $123 million in the first quarter of 2018 , an increase of 19% compared with $103 million in the first quarter of 2017 . Foreign exchange favorably affected global sales performance by 2% in the first quarter of 2018. Sales growth was driven primarily by higher volumes and pricing in the United States and volume growth in most international markets, particularly in certain European markets.

Worldwide sales of *M-M-R* II (Measles, Mumps and Rubella Virus Vaccine Live), a vaccine to help protect against measles, mumps and rubella, were $94 million for the first quarter of 2018 , up slightly compared with $92 million for the first quarter of 2017 .

Global sales of *Varivax* (Varicella Virus Vaccine Live), a vaccine to help prevent chickenpox (varicella), were $175 million for the first quarter of 2018 , an increase of 10% compared with $159 million for the first quarter of 2017 . Foreign exchange

favorably affected global sales performance by 2% in the first quarter of 2018. Sales growth was largely attributable to volume growth in most international markets, along with higher pricing in the United States.

Worldwide sales of *RotaTeq* (Rotavirus Vaccine, Live Oral, Pentavalent), a vaccine to help protect against rotavirus gastroenteritis in infants and children, were $193 million in the first quarter of 2018 , a decline of 14% compared with the first quarter of 2017 , driven primarily by lower sales in the United States reflecting the timing of public sector purchasing. Foreign exchange favorably affected global sales performance by 1% in the first quarter of 2018.

Global sales of *Pneumovax* 23 (pneumococcal vaccine polyvalent), a vaccine to help prevent pneumococcal disease, were $179 million in the first quarter of 2018 , an increase of 9% compared with the first quarter of 2017 , driven primarily by volume growth in most international markets. Foreign exchange favorably affected global sales performance by 2% in the first quarter of 2018.

Worldwide sales of *Zostavax* , a vaccine to help prevent shingles (herpes zoster) in adults 50 years of age and older, were $65 million in the first quarter of 2018 , a decline of 58% compared with the first quarter of 2017 , including a 2% favorable effect from foreign exchange. The sales decline was driven largely by lower demand in the United States reflecting the approval of a competitor's vaccine that received a preferential recommendation from the CDC's ACIP in October 2017 for the prevention of shingles over *Zostavax* . The Company anticipates this competition will continue to have a material adverse effect on sales of *Zostavax* in future periods.

Hospital Acute Care

Worldwide sales of *Bridion* , for the reversal of two types of neuromuscular blocking agents used during surgery, were $204 million in the first quarter of 2018 , an increase of 38% compared with the first quarter of 2017 including a 7% favorable effect from foreign exchange. Sales growth primarily reflects volume growth in the United States and in certain European markets.

Worldwide sales of *Noxafil* , for the prevention of invasive fungal infections, were $176 million in the first quarter of 2018, an increase of 24% compared with the first quarter of 2017 including a 7% favorable effect from foreign exchange. Sales growth primarily reflects higher demand and pricing in the United States, as well as volume growth in certain European markets.

Global sales of *Invanz* (ertapenem sodium), for the treatment of certain infections, were $151 million in the first quarter of 2018 , an increase of 11% compared with the first quarter of 2017 including a 3% favorable effect from foreign exchange. The patent that provided U.S. market exclusivity for *Invanz* expired in November 2017 and the Company anticipates a significant decline in U.S. *Invanz* sales in future periods as a result of generic competition.

Global sales of *Cancidas* (caspofungin acetate), an anti-fungal product sold primarily outside of the United States, were $91 million in the first quarter of 2018 , a decline of 25% compared with the first quarter of 2017 including a 6% favorable effect from foreign exchange. The sales decline was driven primarily by generic competition in certain European markets. The EU compound patent for *Cancidas* expired in April 2017. Accordingly, the Company is experiencing a significant decline in *Cancidas* sales in these European markets and expects the decline to continue.

Immunology

Sales of *Simponi* (golimumab), a once-monthly subcutaneous treatment for certain inflammatory diseases (marketed by the Company in Europe, Russia and Turkey), were $231 million in the first quarter of 2018 , growth of 26% compared with the first quarter of 2017 including a 15% favorable effect from foreign exchange. Sales growth was driven by volume growth in Europe.

Sales of *Remicade,* a treatment for inflammatory diseases (marketed by the Company in Europe, Russia and Turkey), were $167 million in the first quarter of 2018 , a decline of 27% compared with the first quarter of 2017 including an 8% favorable effect from foreign exchange. The Company lost market exclusivity for *Remicade* in major European markets in 2015 and no longer has market exclusivity in any of its marketing territories. The Company is experiencing pricing and volume declines in these markets as a result of biosimilar competition and expects the declines to continue.

Virology

Global sales of *Isentress/Isentress HD* (raltegravir), an HIV integrase inhibitor for use in combination with other antiretroviral agents for the treatment of HIV-1 infection, were $281 million in the first quarter of 2018 , a decline of 8% compared with the first quarter of 2017 including a 4% favorable effect from foreign exchange. The sales decline primarily reflects lower demand in the United States and competitive pricing pressure in Europe and the Latin America region, particularly in Brazil.

Global sales of *Zepatier* , a treatment for adult patients with certain types of chronic HCV infection, were $131 million in the first quarter of 2018 , a decline of 65% compared with the first quarter of 2017 including a 4% favorable effect from foreign exchange. The sales decline reflects the unfavorable effects of increasing competition and declining patient volumes in most markets, particularly in the United States. The substantial decline in U.S. *Zepatier* sales combined with an unfavorable adjustment

to rebate reserves resulted in the recognition of no U.S. sales of *Zepatier* in the first quarter of 2018. The Company anticipates that sales of *Zepatier* in the future will continue to be materially adversely affected by competition and lower patient volumes.

Cardiovascular

Combined global sales of *Zetia* (marketed in most countries outside the United States as *Ezetrol*), *Vytorin* (marketed outside the United States as *Inegy*), and *Atozet* (ezetimibe and atorvastatin) (marketed in certain countries outside of the United States), medicines for lowering LDL cholesterol, were $544 million in the first quarter of 2018 , a decline of 13% compared with the first quarter of 2017 . Foreign exchange favorably affected global sales performance by 8% in the first quarter of 2018 . The global sales decline was driven primarily by an 87% decline in U.S. sales reflecting lower volumes and pricing of *Zetia* and *Vytorin* as a result of generic competition. *Zetia* and *Vytorin* lost market exclusivity in the United States in December 2016 and April 2017, respectively. Accordingly, the Company is experiencing rapid and substantial declines in U.S. *Zetia* and *Vytorin* sales and expects the declines to continue. The U.S. sales declines were partially offset by higher demand in certain European markets and in Japan. The Company lost market exclusivity in major European markets for *Ezetrol* in April 2018 and has also lost market exclusivity in certain European markets for *Inegy* (see Note 8 to the condensed consolidated financial statements). The Company anticipates sales declines in these markets as a result of generic competition. Sales of *Ezetrol* and *Inegy* in these markets were $165 million and $120 million, respectively, for the first quarter of 2018.

Pursuant to a collaboration with Bayer AG (Bayer) (see Note 4 to the condensed consolidated financial statements), Merck has lead commercial rights for Adempas (riociguat), a cardiovascular drug for the treatment of pulmonary arterial hypertension, in countries outside the Americas while Bayer has lead rights in the Americas, including the United States. The companies share profits equally under the collaboration. In 2016, Merck began promoting and distributing Adempas in Europe. Transition from Bayer in other Merck territories, including Japan, continued in 2017. Merck recorded sales of $68 million and $84 million for Adempas in the first quarter of 2018 and 2017 , respectively, which includes sales in Merck's marketing territories, as well as Merck's share of profits from the sale of Adempas in Bayer's marketing territories.

Diabetes

Worldwide combined sales of *Januvia* (sitagliptin) and *Janumet* (sitagliptin/metformin HCl), medicines that help lower blood sugar levels in adults with type 2 diabetes, were $1.4 billion in the first quarter of 2018 , an increase of 7% compared with the first quarter of 2017 including a 5% favorable effect from foreign exchange. Sales growth reflects increases in international markets driven by higher demand, partially offset by pricing pressure. Sales declines in the United States reflect continued pricing pressure that was partially offset by volume growth, as well as a favorable adjustment to rebate reserves. The Company expects pricing pressure to continue.

Women's Health

Worldwide sales of *NuvaRing* , a vaginal contraceptive product, were $216 million in the first quarter of 2018 , an increase of 36% compared with the first quarter of 2017 including a 4% favorable effect from foreign exchange. The increase was driven by higher sales in the United States reflecting higher pricing, as well as the timing of customer purchases which unfavorably affected sales in the first quarter of 2017. The patent that provided U.S. market exclusivity for *NuvaRing* expired in April 2018 and the Company anticipates a significant decline in U.S. *NuvaRing* sales in future periods as a result of generic competition.

Animal Health Segment

Animal Health includes pharmaceutical and vaccine products for the prevention, treatment and control of disease in all major farm and companion animal species. The Animal Health segment met the criteria for separate reporting and became a reportable segment in the first quarter of 2018. Animal Health sales are affected by competition and the frequent introduction of generic products. Global sales of Animal Health products totaled $1.1 billion for the first quarter of 2018 , an increase of 13% compared with the first quarter of 2017 including a 6% favorable effect from foreign exchange. Sales growth primarily reflects higher sales of livestock products, particularly ruminant and poultry products. Animal Health sales growth was also driven by higher sales of companion animal products, driven largely by companion animal vaccines.

Costs, Expenses and Other

Materials and Production

Materials and production costs were $3.2 billion for the first quarter of 2018 , an increase of 4% compared with the first quarter of 2017 . Costs in both the first quarter of 2018 and 2017 include $733 and $773 million, respectively, of expenses for the amortization of intangible assets recorded in connection with business acquisitions. Additionally, costs in the first quarter of 2017 include a $76 million intangible asset impairment charge related to a licensing agreement. The Company may recognize additional non-cash impairment charges in the future related to intangible assets that were measured at fair value and capitalized in connection with business acquisitions and such charges could be material. Also, included in materials and production costs are expenses associated with restructuring activities which amounted to $6 million and $63 million in the first quarter of 2018 and

2017 , respectively, including accelerated depreciation and asset write-offs related to the planned sale or closure of manufacturing facilities. Separation costs associated with manufacturing-related headcount reductions have been incurred and are reflected in *Restructuring costs* as discussed below.

Gross margin was 68.3% in the first quarter of 2018 compared with 67.7% in the first quarter of 2017 . The gross margin improvement reflects a lower net impact from the amortization of intangible assets, intangible asset impairment charges and restructuring costs as noted above which unfavorably affected gross margin by 7.4 percentage points in 2018 compared with 9.7 percentage points in 2017. The improvement in gross margin was partially offset by the amortization of unfavorable manufacturing variances, resulting in part from the June 2017 cyber-attack, as well as the unfavorable effects of foreign exchange.

Marketing and Administrative

Marketing and administrative (M&A) expenses were $2.5 billion in the first quarter of 2018 , an increase of 1% compared with the first quarter of 2017 . The increase primarily reflects the unfavorable effects of foreign exchange and higher administrative costs, reflecting the prioritization of investment in growth products.

Research and Development

Research and development (R&D) expenses were $3.2 billion for the first quarter of 2018 compared with $1.8 billion for the first quarter of 2017 . The increase was driven primarily by a charge related to the formation of an oncology collaboration with Eisai, the unfavorable effects of foreign exchange, as well as higher clinical development spending and investment in early drug development, partially offset by higher costs in the prior year related to a milestone payment associated with a licensing agreement.

R&D expenses are comprised of the costs directly incurred by Merck Research Laboratories (MRL), the Company's research and development division that focuses on human health-related activities, which were $1.2 billion and $1.1 billion in the first quarter of 2018 and 2017 , respectively. Also included in R&D expenses are costs incurred by other divisions in support of R&D activities, including depreciation, production and general and administrative, as well as licensing activity, and certain costs from operating segments, including the Pharmaceutical and Animal Health segments, which in the aggregate were approximately $630 million and $700 million for the first quarter of 2018 and 2017 , respectively. Additionally, R&D expenses in the first quarter of 2018 include a $1.4 billion aggregate charge related to the formation of an oncology collaboration with Eisai (see Note 3 to the condensed consolidated financial statements).

Restructuring Costs

The Company incurs substantial costs for restructuring program activities related to Merck's productivity and cost reduction initiatives, as well as in connection with the integration of certain acquired businesses. In 2010 and 2013, the Company commenced actions under global restructuring programs designed to streamline its cost structure. The actions under these programs include the elimination of positions in sales, administrative and headquarters organizations, as well as the sale or closure of certain manufacturing and research and development sites and the consolidation of office facilities. The Company also continues to reduce its global real estate footprint and improve the efficiency of its manufacturing and supply network.

Restructuring costs, primarily representing separation and other related costs associated with these restructuring activities, were $95 million and $151 million for the first quarter of 2018 and 2017 , respectively. Separation costs were incurred associated with actual headcount reductions, as well as estimated expenses under existing severance programs for headcount reductions that were probable and could be reasonably estimated. Merck eliminated approximately 710 positions and 545 positions in the first quarter of 2018 and 2017 , respectively, related to these restructuring activities. Also included in restructuring costs are asset abandonment, shut-down and other related costs, as well as employee-related costs such as curtailment, settlement and termination charges associated with pension and other postretirement benefit plans and share-based compensation plan costs. For segment reporting, restructuring costs are unallocated expenses.

Additional costs associated with the Company's restructuring activities are included in *Materials and production* , *Marketing and administrative* and *Research and development* . The Company recorded aggregate pretax costs of $104 million and $215 million in the first quarter of 2018 and 2017 , respectively, related to restructuring program activities (see Note 5 to the condensed consolidated financial statements). While the Company has substantially completed the actions under the programs, approximately $500 million of pretax costs are expected to be incurred in 2018 relating to anticipated employee separations and remaining asset-related costs.

Other (Income) Expense, Net

Other (income) expense, net was $291 million of income in the first quarter of 2018 compared with $71 million of income in the first quarter of 2017 . For details on the components of *Other (income) expense, net* , see Note 12 to the condensed consolidated financial statements.

Segment Profits

($ in millions)	Three Months Ended March 31, 2018	2017
Pharmaceutical segment profits	$ 5,804	$ 5,160
Animal Health segment profits	413	417
Other non-reportable segment profits	63	33
Other	(4,935)	(3,607)
Income before taxes	$ 1,345	$ 2,003

Pharmaceutical segment profits are comprised of segment sales less standard costs, as well as marketing and administrative expenses and research and development costs directly incurred by the segment. Animal Health segment profits are comprised of segment sales, less all materials and production costs, as well as marketing and administrative expenses and research and development costs directly incurred by the segment. For internal management reporting presented to the chief operating decision maker, Merck does not allocate the remaining materials and production costs not included in segment profits as described above, research and development expenses incurred in Merck Research Laboratories, the Company's research and development division that focuses on human health-related activities, or general and administrative expenses, nor the cost of financing these activities. Separate divisions maintain responsibility for monitoring and managing these costs, including depreciation related to fixed assets utilized by these divisions and, therefore, they are not included in segment profits. Also excluded from the determination of segment profits are acquisition and divestiture-related costs, including the amortization of purchase accounting adjustments, intangible asset impairment charges and changes in the estimated fair value measurement of liabilities for contingent consideration, restructuring costs, and a portion of equity income. Additionally, segment profits do not reflect other expenses from corporate and manufacturing cost centers and other miscellaneous income or expense. These unallocated items, including a charge related to the formation of a collaboration with Eisai, are reflected in "Other" in the above table. Also included in "Other" are miscellaneous corporate profits (losses), as well as operating profits (losses) related to third-party manufacturing sales. In the first quarter of 2018, the Company adopted a new accounting standard related to the classification of certain defined benefit plan costs, which resulted in a change to the measurement of segment profits (see Note 16 to the condensed consolidated financial statements). Prior period amounts have been recast to conform to the new presentation.

Pharmaceutical segment profits grew 12% in the first quarter of 2018 driven primarily by higher sales and lower selling and promotion costs. Animal Health segment profits declined 1% in the first quarter of 2018 .

Taxes on Income

The effective income tax rates of 44.9% and 22.3% for the first quarter of 2018 and 2017 , respectively, reflect the impacts of acquisition and divestiture-related costs and restructuring costs, partially offset by the beneficial impact of foreign earnings. In addition, the effective income tax rate for the first quarter of 2018 reflects the unfavorable impact of a $1.4 billion aggregate pretax charge recorded in connection with the formation of an oncology collaboration with Eisai for which no tax benefit was recognized.

Net Income and Earnings per Common Share

Net income attributable to Merck & Co., Inc. was $736 million for the first quarter of 2018 compared with $1.6 billion for the first quarter of 2017 . Earnings per common share assuming dilution attributable to Merck & Co., Inc. common shareholders (EPS) for the first quarter of 2018 were $0.27 compared with $0.56 in the first quarter of 2017 .

Non-GAAP Income and Non-GAAP EPS

Non-GAAP income and non-GAAP EPS are alternative views of the Company's performance that Merck is providing because management believes this information enhances investors' understanding of the Company's results as it permits investors to understand how management assesses performance. Non-GAAP income and non-GAAP EPS exclude certain items because of the nature of these items and the impact that they have on the analysis of underlying business performance and trends. The excluded items (which should not be considered non-recurring) consist of acquisition and divestiture-related costs, restructuring costs and certain other items. These excluded items are significant components in understanding and assessing financial performance. Non-GAAP income and non-GAAP EPS are important internal measures for the Company. Senior management receives a monthly analysis of operating results that includes non-GAAP EPS. Management uses these measures internally for planning and forecasting purposes and to measure the performance of the Company along with other metrics. Senior management's annual compensation is derived in part using non-GAAP income and non-GAAP EPS. Since non-GAAP income and non-GAAP EPS are not measures determined in accordance with GAAP, they have no standardized meaning prescribed by GAAP and, therefore, may not be comparable to the calculation of similar measures of other companies. The information on non-GAAP income and non-GAAP EPS should be considered in addition to, but not as a substitute for or superior to, net income and EPS prepared in accordance with generally accepted accounting principles in the United States (GAAP).

A reconciliation between GAAP financial measures and non-GAAP financial measures is as follows:

	Three Months Ended March 31,	
($ in millions except per share amounts)	2018	2017
Income before taxes as reported under GAAP	$ 1,345	$ 2,003
Increase (decrease) for excluded items:		
Acquisition and divestiture-related costs	733	883
Restructuring costs	104	215
Other items:		
Aggregate charge related to the formation of a collaboration with Eisai	1,400	—
Other	(22)	(9)
Non-GAAP income before taxes	3,560	3,092
Taxes on income as reported under GAAP	604	447
Estimated tax benefit on excluded items [(1)]	107	203
Non-GAAP taxes on income	711	650
Non-GAAP net income	2,849	2,442
Less: Net income attributable to noncontrolling interests	5	5
Non-GAAP net income attributable to Merck & Co., Inc.	$ 2,844	$ 2,437
EPS assuming dilution as reported under GAAP	$ 0.27	$ 0.56
EPS difference [(2)]	0.78	0.32
Non-GAAP EPS assuming dilution	$ 1.05	$ 0.88

[(1)] *The estimated tax impact on the excluded items is determined by applying the statutory rate of the originating territory of the non-GAAP adjustments.*

[(2)] *Represents the difference between calculated GAAP EPS and calculated non-GAAP EPS, which may be different than the amount calculated by dividing the impact of the excluded items by the weighted-average shares for the applicable period.*

Acquisition and Divestiture-Related Costs

Non-GAAP income and non-GAAP EPS exclude the impact of certain amounts recorded in connection with business acquisitions and divestitures. These amounts include the amortization of intangible assets and amortization of purchase accounting adjustments to inventories, as well as intangible asset impairment charges and expense or income related to changes in the estimated fair value measurement of contingent consideration. Also excluded are integration, transaction, and certain other costs associated with business acquisitions and divestitures.

Restructuring Costs

Non-GAAP income and non-GAAP EPS exclude costs related to restructuring actions (see Note 5 to the condensed consolidated financial statements). These amounts include employee separation costs and accelerated depreciation associated with facilities to be closed or divested. Accelerated depreciation costs represent the difference between the depreciation expense to be recognized over the revised useful life of the asset, based upon the anticipated date the site will be closed or divested or the equipment disposed of, and depreciation expense as determined utilizing the useful life prior to the restructuring actions. Restructuring costs also include asset abandonment, shut-down and other related costs, as well as employee-related costs such as curtailment, settlement and termination charges associated with pension and other postretirement benefit plans and share-based compensation costs.

Certain Other Items

Non-GAAP income and non-GAAP EPS exclude certain other items. These items are adjusted for after evaluating them on an individual basis, considering their quantitative and qualitative aspects, and typically consist of items that are unusual in nature, significant to the results of a particular period or not indicative of future operating results. Excluded from non-GAAP income and non-GAAP EPS in 2018 is an aggregate charge related to the formation of a collaboration with Eisai (see Note 3 to the condensed consolidated financial statements).

Research and Development Update

Keytruda is an FDA-approved anti-PD-1 therapy in clinical development for expanded indications in different cancer types.

In April 2018, Merck announced that the FDA accepted for review a supplemental Biologics License Application (sBLA) for *Keytruda* based on results of the Phase 3 KEYNOTE-189 trial. The application seeks approval for *Keytruda* in combination with pemetrexed (Alimta) and platinum chemotherapy (carboplatin or cisplatin) as a first-line treatment for patients with metastatic nonsquamous NSCLC. The FDA has granted Priority Review to this sBLA and has set a Prescription Drug User

Fee Act (PDUFA), or target action, date of September 23, 2018. This supplemental application is based on overall survival (OS) and progression-free survival (PFS) data from the Phase 3 KEYNOTE-189 trial, which were recently presented at the American Association of Cancer Research 2018 Annual Meeting, and published simultaneously in *The New England Journal of Medicine* . KEYNOTE-189 is the confirmatory trial for KEYNOTE-021 (Cohort G), a Phase 2 study that made *Keytruda* the only FDA-approved anti-PD-1 therapy in combination with chemotherapy (pemetrexed plus carboplatin) for the first-line treatment of patients with metastatic nonsquamous NSCLC, regardless of PD-L1 expression.

Also in April 2018, Merck announced that following validation by the EMA, the centralized review process has begun for the Company's Type II Variation, which seeks approval for *Keytruda* in combination with pemetrexed (Alimta) and platinum chemotherapy (cisplatin or carboplatin) for the first-line treatment of patients with metastatic nonsquamous NSCLC. The application was accepted for review based on OS and PFS data from the Phase 3 KEYNOTE-189 trial.

Additionally in April 2018, the FDA accepted for review an sBLA for *Keytruda* as a treatment in previously treated patients with recurrent or metastatic head and neck squamous cell carcinoma (HNSCC) based on data from the Phase 3 KEYNOTE-040 trial. The FDA has set a PDUFA date of Dec. 28, 2018. KEYNOTE-040 will serve as the confirmatory trial and meet the post-marketing requirements for U.S. accelerated approval of KEYNOTE-012/KEYNOTE-055 for second-line HNSCC.

In March 2018, Merck announced that the FDA accepted an sBLA and granted Priority Review for the application seeking approval for *Keytruda* as a treatment for patients with advanced cervical cancer with disease progression on or after chemotherapy. The FDA has set a PDUFA date of June 28, 2018.

The sBLA for *Keytruda* for the treatment of adult and pediatric patients with refractory primary mediastinal B-cell lymphoma, or who have relapsed after two or more prior lines of therapy, remains under review with the FDA. The FDA has extended the PDUFA date by 90 days to July 3, 2018 due to additional data and analyses submitted by Merck.

Additionally, *Keytruda* has received Breakthrough Therapy designation from the FDA in combination with axitnib as a first-line treatment for patients with advanced or metastatic renal cell carcinoma; for the treatment of high-risk early-stage triple-negative breast cancer in combination with neoadjuvant chemotherapy; and for the treatment of Merkel cell carcinoma. Also, the FDA granted Breakthrough Therapy designation for *Keytruda* in combination with Lenvima, Eisai's multiple receptor tyrosine kinase inhibitor, for the potential treatment of patients with advanced and/or metastatic renal cell carcinoma. The Lenvima and *Keytruda* combination therapy is being jointly developed by Merck and Eisai. The FDA's Breakthrough Therapy designation is intended to expedite the development and review of a candidate that is planned for use, alone or in combination, to treat a serious or life-threatening disease or condition when preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints.

In May 2018, Merck announced that the pivotal Phase 3 KEYNOTE-407 trial investigating *Keytruda* in combination with carboplatin-paclitaxel or nab-paclitaxel as first line treatment for metastatic squamous NSCLC met a pre-specified secondary endpoint of overall response rate in an early cohort of participants at an interim analysis. Based on these data, Merck has recently submitted an sBLA to the FDA. This study has been accepted for oral presentation at the American Society of Clinical Oncology (ASCO) 2018 Annual Meeting in June. The Company now expects that an additional interim analysis will be conducted prior to ASCO and additional data may be available for the ASCO 2018 Annual Meeting.

In April 2018, Merck announced that the pivotal Phase 3 KEYNOTE-042 trial evaluating *Keytruda* as monotherapy for the first-line treatment of locally advanced or metastatic NSCLC (including nonsquamous or squamous histologies) met its primary endpoint of OS. An interim analysis conducted by the independent Data Monitoring Committee (DMC) demonstrated that treatment with *Keytruda* resulted in significantly longer OS than platinum-based chemotherapy (carboplatin plus paclitaxel or carboplatin plus pemetrexed) in patients with a PD-L1 TPS of ≥1%. As part of a pre-specified analysis plan, OS was sequentially tested and was significantly improved in patients with a TPS of ≥50%, with a TPS of ≥20% and then in the entire study population with a TPS of ≥1%. The safety profile of *Keytruda* in this trial was consistent with that observed in previously reported monotherapy studies involving patients with advanced NSCLC. Based on the recommendation of the DMC, the trial will continue to evaluate PFS, which is a secondary endpoint. Results from KEYNOTE-042 will be presented at the ASCO 2018 Annual Meeting in June and submitted to regulatory authorities worldwide.

The *Keytruda* clinical development program consists of more than 750 clinical trials, including more than 400 trials that combine *Keytruda* with other cancer treatments. These studies encompass more than 30 cancer types including: bladder, colorectal, esophageal, gastric, head and neck, hepatocellular, Hodgkin lymphoma, non-Hodgkin lymphoma, melanoma, nasopharyngeal, NSCLC, ovarian, primary mediastinal B-cell lymphoma, prostate, renal, small-cell lung cancer and triple-negative breast, many of which are currently in Phase 3 clinical development. Further trials are being planned for other cancers.

In February 2018, the Committee for Medicinal Products for Human Use (CHMP) of the EMA adopted a positive opinion, recommending a marketing authorization of Lynparza for use as a maintenance therapy for patients with platinum-sensitive relapsed high grade, epithelial ovarian, fallopian tube, or primary peritoneal cancer who are in complete response or partial response

to platinum-based chemotherapy, regardless of *BRCA* mutation status. The CHMP positive opinion will be considered by the European Commission.

In April 2018, Merck and AstraZeneca announced that the EMA has validated for review the Marketing Authorization Application for Lynparza for use in patients with deleterious or suspected deleterious *BRCA* -mutated, HER2-negative metastatic breast cancer who have been previously treated with chemotherapy in the neoadjuvant, adjuvant or metastatic setting. This is the first regulatory submission for a PARP inhibitor in breast cancer in Europe.

In March 2018, Merck and Eisai announced a strategic collaboration for the worldwide co-development and co-commercialization of Lenvima, an orally available tyrosine kinase inhibitor discovered by Eisai (see Note 3 to the condensed consolidated financial statements). Under the agreement, Merck and Eisai will develop and commercialize Lenvima jointly, both as monotherapy and in combination with *Keytruda* . Lenvima is currently approved as monotherapy for use in the treatment of thyroid cancer, as well as in combination with everolimus for the treatment of patients with renal cell carcinoma who have failed previous therapy. Applications for regulatory approval of Lenvima monotherapy for the treatment of hepatocellular carcinoma have been submitted in the United States, Europe, China and other countries. In March 2018, Lenvima was approved in Japan for unresectable hepatocellular carcinoma, which was the first regulatory approval under the global strategic collaboration. As a result of this approval, Merck will make a $25 million milestone payment to Eisai. Additionally, a Phase 3 study, sponsored by Eisai, is ongoing to evaluate separate combinations of Lenvima with *Keytruda* or Lenvima with everolimus versus chemotherapy alone for the treatment of rental cell carcinoma. Per the agreement, the companies will also jointly initiate new clinical studies evaluating the Lenvima/ *Keytruda* combination to support 11 potential indications in six types of cancer (endometrial cancer, non-small cell lung cancer, hepatocellular carcinoma, head and neck cancer, bladder cancer and melanoma), as well as a basket trial targeting multiple cancer types.

In March 2018, Merck presented data for doravirine (MK-1439), a late-stage investigational non-nucleoside reverse transcriptase inhibitor for the treatment of HIV-1 infection, at the Conference on Retroviruses and Opportunistic Infections. Doravirine, as a once-daily tablet for use in combination with other antiretroviral agents, and doravirine with lamivudine and tenofovir disoproxil fumarate in a once-daily fixed-dose combination single tablet as a complete regimen (MK-1439A), are both under review with the FDA and the EMA. The PDUFA date for both applications is October 23, 2018. A CHMP opinion is expected in the second half of 2018.

In April 2018, Merck announced that a pivotal Phase 3 study of relebactam, the Company's investigational beta-lactamase inhibitor, in combination with imipenem/cilastatin (MK-7655A), demonstrated a favorable overall response in the treatment of certain imipenem-non-susceptible bacterial infections, the primary endpoint, with lower treatment-emergent nephrotoxicity (kidney toxicity), a secondary endpoint, compared to a Colistin (colistimethate sodium) plus imipenem regimen. Based on these results, the Company plans to submit a New Drug Application to the FDA seeking regulatory approval of a fixed-dose combination of imipenem/cilastatin and relebactam.

Also in April 2018, Merck announced it is beginning two Phase 3 studies of V114, its investigational polyvalent conjugate vaccine for the prevention of pneumococcal disease. One study will evaluate the safety, tolerability and immunogenicity of V114 followed by Pneumococcal Vaccine Polyvalent one year later in healthy adult subjects 50 years of age or older. The second study will evaluate the safety, tolerability and immunogenicity of V114 followed by Pneumococcal Vaccine Polyvalent administered eight weeks later in adults infected with HIV. The decision to move V114 to Phase 3 is based on the findings of Phase 1 and Phase 2 studies, the results of which were presented at the International Society on Pneumococci and Pneumococcal in April 2018.

V920 is an investigational rVSV-ZEBOV (Ebola) vaccine candidate being studied in large scale Phase 2/3 clinical trials. In November 2014, Merck and NewLink Genetics announced an exclusive licensing and collaboration agreement for the investigational Ebola vaccine. In December 2015, Merck announced that the application for Emergency Use Assessment and Listing (EUAL) for V920 was accepted for review by the World Health Organization (WHO). According to the WHO, the EUAL process is designed to expedite the availability of vaccines needed for public health emergencies such as another outbreak of Ebola. The decision to grant V920 EUAL status will be based on data regarding quality, safety, and efficacy/effectiveness; as well as a risk/benefit analysis for emergency use. While EUAL designation allows for emergency use, the vaccine remains investigational and has not yet been licensed for commercial distribution. In July 2016, Merck announced that the FDA granted V920 Breakthrough Therapy designation, and that the EMA granted the vaccine candidate PRIME (PRIority MEdicines) status. In December 2016, end of study results from the WHO ring vaccination trial were reported in Lancet supporting the July 2015 interim assessment that V920 offers substantial protection against Ebola virus disease, with no reported cases among vaccinated individuals from 10 days after vaccination in both randomized and non-randomized clusters. The Company is planning to file regulatory applications for V920 with the EMA in 2019.

The chart below reflects the Company's research pipeline as of May 1, 2018. Candidates shown in Phase 3 include specific products and the date such candidate entered into Phase 3 development. Candidates shown in Phase 2 include the most advanced compound with a specific mechanism or, if listed compounds have the same mechanism, they are each currently intended for commercialization in a given therapeutic area. Small molecules and biologics are given MK-number designations and vaccine

candidates are given V-number designations. Except as otherwise noted, candidates in Phase 1, additional indications in the same therapeutic area (other than with respect to oncology) and additional claims, line extensions or formulations for in-line products are not shown.

Phase 2	Phase 3 (Phase 3 entry date)	Under Review
Cancer MK-3475 *Keytruda* Advanced Solid Tumors Cutaneous Squamous Cell Carcinoma Ovarian Prostate MK-7902 Lenvima *(1)* Biliary Tract Endometrial Non-Small-Cell Lung **Diabetes Mellitus** MK-8521 *(2)* **HIV Infection** MK-8591 **Schizophrenia** MK-8189	**Bacterial Infection** MK-7655A (relebactam+imipenem/cilastatin) (October 2015) **Cancer** MK-3475 *Keytruda* Breast (October 2015) Colorectal (November 2015) Esophageal (December 2015) Gastric (May 2015) (EU) Head and Neck (November 2014) (EU) Hepatocellular (May 2016) Nasopharyngeal (April 2016) Renal (October 2016) Small-Cell Lung (May 2017) MK-7339 Lynparza *(1)* Pancreatic (December 2014) Prostate (April 2017) MK-5618 (selumetinib) *(1)* Thyroid (June 2013) **Chronic Cough** MK-7264 (March 2018) **Ebola Vaccine** V920 (March 2015) **Heart Failure** MK-1242 (vericiguat) (September 2016) *(1)* **Herpes Zoster** V212 (inactivated VZV vaccine) (December 2010) *(2)* **Pneumoconjugate Vaccine** V114 *(3)*	**New Molecular Entities/Vaccines** **HIV** MK-1439 (doravirine) (U.S.) (EU) MK-1439A (doravirine/lamivudine/tenofovir disoproxil fumarate) (U.S.) (EU) **Pediatric Hexavalent Combination Vaccine** V419 (U.S.) *(1)(4)* **Certain Supplemental Filings** **Cancer** MK-3475 *Keytruda* • Combination with Carboplatin and Pemetrexed in First Line Non-Squamous Non-Small-Cell Lung Cancer KEYNOTE-189 (U.S.) (EU) • Relapsed or Refractory Primary Mediastinal B-Cell Lymphoma (PMBCL) KEYNOTE-170 (U.S.) • Second Line Cervical Cancer KEYNOTE-158 (U.S.) • Second Line Head and Neck Squamous Cell Carcinoma KEYNOTE-040 (U.S.) (EU) MK-7339 Lynparza *(1)* • Second Line Metastatic Breast Cancer (EU) • Broader Approval for Ovarian Cancer (EU) MK-7902 Lenvima *(1)* • Hepatocellular Cancer (U.S.) (EU)
		Footnotes: *(1)* Being developed in a collaboration. *(2)* Development is currently on hold. *(3)* Trial has not yet started. *(4)* V419 is an investigational pediatric hexavalent combination vaccine, DTaP5-IPV-Hib-HepB, that is being developed and, if approved, will be commercialized through a partnership of Merck and Sanofi. In November 2015, the FDA issued a CRL with respect to V419. Both companies are working to provide additional data requested by the FDA.

Liquidity and Capital Resources

($ in millions)	March 31, 2018	December 31, 2017
Cash and investments	$ 18,379	$ 20,623
Working capital	7,125	6,152
Total debt to total liabilities and equity	27.4%	27.8%

Cash provided by operating activities was $1.2 billion in the first three months of 2018 compared with $286 million in the first three months of 2017 . Cash provided by operating activities in the first three months of 2018 includes $750 million of upfront payments made by the Company related to the formation of a collaboration with Eisai (see Note 3 to the condensed consolidated financial statements). Cash provided by operating activities in the first three months of 2017 includes a $625 million payment made by the Company related to the previously disclosed settlement of worldwide *Keytruda* patent litigation. Cash provided by operating activities continues to be the Company's primary source of funds to finance operating needs, capital expenditures, treasury stock purchases and dividends paid to shareholders.

Cash used in investing activities was $197 million in the first three months of 2018 compared with cash provided by investing activities of $3.2 billion in the first three months of 2017 . The change was driven primarily by lower proceeds from the sales of securities and other investments, as well as a $350 million milestone payment in the first quarter of 2018 related to a collaboration to Bayer (see Note 4 to the condensed consolidated financial statements), partially offset by lower purchases of securities and other investments and the use of cash in the prior year quarter for the acquisitions of businesses.

Cash used in financing activities was $2.7 billion in the first three months of 2018 compared with $1.5 billion of cash provided by financing activities in the first three months of 2017 . The change was driven primarily by lower short-term borrowings and higher payments on debt, partially offset by lower purchases of treasury stock.

Capital expenditures totaled $450 million and $339 million for the first three months of 2018 and 2017 , respectively.

Dividends paid to stockholders were $1.3 billion for both the first three months of 2018 and 2017 . In January 2018, the Board of Directors declared a quarterly dividend of $0.48 per share on the Company's common stock for the second quarter that was paid in April 2018.

In November 2017, Merck's board of directors authorized additional purchases of up to $10 billion of Merck's common stock for its treasury. The treasury stock purchase has no time limit and will be made over time in open-market transactions, block transactions on or off an exchange, or in privately negotiated transactions. During the first three months of 2018 , the Company purchased $566 million (10 million shares) for its treasury. As of March 31, 2018 , the Company's remaining share repurchase authorization was $10.5 billion , which includes $475 million in authorized repurchases remaining under a program announced in March 2015.

In January 2018, $1.0 billion of 1.10% notes matured in accordance with their terms and were repaid.

The Company has a $6.0 billion, five-year credit facility that matures in June 2022. The facility provides backup liquidity for the Company's commercial paper borrowing facility and is to be used for general corporate purposes. The Company has not drawn funding from this facility.

In March 2018, the Company filed a securities registration statement with the U.S. Securities and Exchange Commission (SEC) under the automatic shelf registration process available to "well-known seasoned issuers" which is effective for three years.

Critical Accounting Policies

The Company's significant accounting policies, which include management's best estimates and judgments, are included in Note 2 to the consolidated financial statements for the year ended December 31, 2017 included in Merck's Form 10-K filed on February 27, 2018. Certain of these accounting policies are considered critical as disclosed in the Critical Accounting Policies section of Management's Discussion and Analysis of Financial Condition and Results of Operations included in Merck's Form 10-K because of the potential for a significant impact on the financial statements due to the inherent uncertainty in such estimates. There have been no significant changes in the Company's critical accounting policies since December 31, 2017 . See Note 1 to the condensed consolidated financial statements for information on the adoption of new accounting standards during the quarter.

Recently Issued Accounting Standards

For a discussion of recently issued accounting standards, see Note 1 to the condensed consolidated financial statements.

Item 4. Controls and Procedures

Management of the Company, with the participation of its Chief Executive Officer and Chief Financial Officer, has evaluated the effectiveness of the Company's disclosure controls and procedures over financial reporting for the period covered by this Form 10–Q. Based on this assessment, the Company's Chief Executive Officer and Chief Financial Officer have concluded that as of March 31, 2018 , the Company's disclosure controls and procedures are effective. For the period covered by this report, there have been no changes in internal control over financial reporting that have materially affected, or are reasonably likely to materially affect, the Company's internal control over financial reporting.

CAUTIONARY FACTORS THAT MAY AFFECT FUTURE RESULTS

This report and other written reports and oral statements made from time to time by the Company may contain so-called "forward-looking statements," all of which are based on management's current expectations and are subject to risks and uncertainties which may cause results to differ materially from those set forth in the statements. One can identify these forward-looking statements by their use of words such as "anticipates," "expects," "plans," "will," "estimates," "forecasts," "projects" and other words of similar meaning, or negative variations of any of the foregoing. One can also identify them by the fact that they do not relate strictly to historical or current facts. These statements are likely to address the Company's growth strategy, financial results, product development, product approvals, product potential and development programs. One must carefully consider any such statement and should understand that many factors could cause actual results to differ materially from the Company's forward-looking statements. These factors include inaccurate assumptions and a broad variety of other risks and uncertainties, including some that are known and some that are not. No forward-looking statement can be guaranteed and actual future results may vary materially.

The Company does not assume the obligation to update any forward-looking statement. One should carefully evaluate such statements in light of factors, including risk factors, described in the Company's filings with the Securities and Exchange Commission, especially on Forms 10-K, 10-Q and 8-K. In Item 1A. "Risk Factors" of the Company's Annual Report on Form 10-K for the year ended December 31, 2017 , as filed on February 27, 2018, the Company discusses in more detail various important risk factors that could cause actual results to differ from expected or historic results. The Company notes these factors for investors as permitted by the Private Securities Litigation Reform Act of 1995. One should understand that it is not possible to predict or identify all such factors. Consequently, the reader should not consider any such list to be a complete statement of all potential risks or uncertainties.

PART II - Other Information

Item 1. Legal Proceedings

The information called for by this Item is incorporated herein by reference to Note 8 included in Part I, Item 1, Financial Statements (unaudited) — Notes to Condensed Consolidated Financial Statements.

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

Issuer purchases of equity securities for the three months ended March 31, 2018 were as follows:

ISSUER PURCHASES OF EQUITY SECURITIES

			($ in millions)
Period	Total Number of Shares Purchased [1]	Average Price Paid Per Share	Approximate Dollar Value of Shares That May Yet Be Purchased Under the Plans or Programs [1]
January 1 - January 31	3,141,216	$58.03	$10,858
February 1 - February 28	2,987,967	$55.91	$10,691
March 1 - March 31	3,958,700	$54.62	$10,475
Total	10,087,883	$56.07	$10,475

[1] *Shares purchased during the period were made as part of a plan approved by the Board of Directors in March 2015 to purchase up to $10 billion of Merck's common stock for its treasury. In November 2017, the Board of Directors authorized additional purchases of up to $10 billion of Merck's common stock for its treasury.*

Item 6. Exhibits

Number		**Description**
3.1	—	Restated Certificate of Incorporation of Merck & Co., Inc. (November 3, 2009) – Incorporated by reference to Current Report on Form 8-K filed on November 4, 2009 (No. 1-6571)
3.2	—	By-Laws of Merck & Co., Inc. (effective July 22, 2015) – Incorporated by reference to Current Report on Form 8-K filed on July 28, 2015 (No. 1-6571)
10	—	2018 Performance Share Unit Award Terms under the Merck & Co., Inc. 2010 Stock Incentive Plan
31.1	—	Rule 13a – 14(a)/15d – 14(a) Certification of Chief Executive Officer
31.2	—	Rule 13a – 14(a)/15d – 14(a) Certification of Chief Financial Officer
32.1	—	Section 1350 Certification of Chief Executive Officer
32.2	—	Section 1350 Certification of Chief Financial Officer
101	—	The following materials from Merck & Co., Inc.'s Quarterly Report on Form 10-Q for the quarter ended March 31, 2018, formatted in XBRL (Extensible Business Reporting Language): (i) the Condensed Consolidated Statement of Income, (ii) the Condensed Consolidated Statement of Comprehensive Income, (iii) the Condensed Consolidated Balance Sheet, (iv) the Condensed Consolidated Statement of Cash Flows, and (v) Notes to the Condensed Consolidated Financial Statements.

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.

MERCK & CO., INC.

Date: May 8, 2018

/s/ Jennifer Zachary

JENNIFER ZACHARY

Executive Vice President and General Counsel

Date: May 8, 2018

/s/ Rita A. Karachun

RITA A. KARACHUN

Senior Vice President Finance - Global Controller

EXHIBIT INDEX

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EXHIBIT 10

2018 PERFORMANCE SHARE UNIT
AWARD TERMS
UNDER THE MERCK & CO., INC. 2010 STOCK INCENTIVE PLAN

I. GENERAL. These Performance Share Units ("PSUs") are granted under and subject to the following Award Terms and the Merck & Co., Inc. 2010 Stock Incentive Plan (the "Merck ISP").

Grant Type:	PSU - Annual
Grant Date:	March 29, 2018
Award Period:	Jan. 1, 2018 - Dec. 31, 2020

I. DEFINITIONS. For the purpose of these Award Terms:

" Adjusted Operating Cash Flow " means the sum of the Company's after-tax Non-GAAP net income less the change in working capital (working capital includes Trade Accounts Receivable and Inventory – including Trade Accounts Receivables and Inventory included in Other Assets – net of Accounts Payable) plus Non-GAAP depreciation and amortization during the Award Period.

The above result shall be adjusted to exclude charges or items from the measurement of performance relating to (1) fluctuations in foreign exchange rates versus Plan rates; (2) the impact of significant unplanned acquisitions and/or divestitures, extraordinary items and other unusual or non-recurring charges and/or events; (3) an event either not directly related to Company operations or not reasonably within the control of Company management; and (4) the effects of significant accounting changes in accordance with U.S. GAAP, or other significant legislative changes.

" Award Period " means the three-year period commencing on January 1, 2018 and ending on December 31, 2020.

" Cash Flow Performance Payout " means the percentage of Target Shares to be paid out based upon the Company's three-year Cumulative Adjusted Operating Cash Flow goal as determined under paragraph C of Section III.

" Code " means the Internal Revenue Code of 1986 or any successor thereto.

" Earnings Per Share or EPS " means the Company's net income divided by the weighted average of the number of shares of Company common stock on a fully diluted basis during the Award Period.

The above result shall be adjusted to exclude charges or items from the measurement of performance relating to (1) fluctuations in foreign exchange rates versus Plan rates; (2) the impact of significant unplanned acquisitions and/or divestitures, extraordinary items and other unusual or non-recurring charges and/or events; (3) an event either not directly related to Company operations or not reasonably within the control of Company management; (4) the effects of significant accounting changes in accordance with U.S. GAAP, or other significant legislative changes; and (5) the impact of share repurchases above or below Plan levels.

" EPS Performance Payout " means the percentage of Target Shares to be paid out based upon the Company's three-year Cumulative EPS goal as determined under paragraph D of Section III.

" Final Award " means the percentage of the Target described in Section III hereof.

" Grant Date " means the date a Performance Share Unit is granted.

" Peer Healthcare Companies " are the healthcare companies used by the Committee in evaluating the Company's TSR Performance for the entire Award Period. For 2018 and for so long thereafter during the Award Period that such companies are publicly traded on a nationally recognized stock exchange, the following are the Peer Healthcare Companies except as described below.

AbbVie	Eli Lilly	Novartis
Amgen	GlaxoSmithKline	Pfizer
Astra Zeneca	Roche	Sanofi-Aventis
Bristol-Myers Squibb	Johnson & Johnson	

The Committee intends that the Peer Healthcare Companies be subject to such adjustment as may be necessary to reflect merger, reorganization, recapitalization, extraordinary cash dividend, combination of shares, consolidation, rights offering, spin off, split off, split up, bankruptcy, liquidation, acquisition, or other similar change in any Peer Healthcare Company.

" Performance Share " means a phantom share of Common Stock. Until distributed pursuant to Article VI, Performance Shares shall not entitle the holder to any of the rights of a holder of Common Stock, including voting rights; provided, however, that the Committee retains the right to make adjustments as described in Section 7 of the Merck ISP.

" Performance Unit Grantee " or " Grantee " means an eligible employee who receives a Performance Share Unit.

" Performance Share Unit " or " PSU " means an award of Performance Shares as described in these Award Terms.

" Target Shares " means the number of Performance Shares that will be distributable if the Performance Measures are achieved at the level identified as "target" for the entire Award Period.

" Total Shareholder Return " or " TSR " means the change in value of one share of a company's Common Stock over the Award Period, taking into account both stock price appreciation (or depreciation) and the reinvestment of dividends. The beginning and ending stock prices will be based on the average closing stock prices during the months of December 2017 and December 2020, respectively. TSR will be calculated on a compound annualized basis over the Award Period.

" TSR Performance Payout " means the percentage of Target Shares to be paid out based upon the Company's TSR Performance as determined under paragraph B of Section III.

III. CALCULATION OF FINAL AWARD OF PERFORMANCE SHARE UNITS

The Performance Unit Grantee shall vest in the number of PSUs to the extent provided for in this Section III unless otherwise provided for in Section V ("Termination of Employment").

A. Performance Metrics. The Final Award will equal the TSR Performance Payout plus the Cash Flow Performance Payout plus the EPS Performance Payout as follows:

a. 50% of the Target Shares will be determined based upon the Company's TSR Performance as determined under paragraph B (the " TSR Performance Payout ")
b. 25% of the Target Shares will be determined based upon the Company's level of achievement of the Adjusted Operating Cash Flow goal as described in paragraph C (the " Cash Flow Performance Payout ")
c. 25% of the Target Shares will be determined based on upon the Company's level of achievement of the EPS goal as described in paragraph D (the " EPS Performance Payout ").

TSR Performance Payout % **x Target Shares** **x 50%**	+	**Adjusted Operating Cash Flow Payout %** **x Target Shares** **x 25**	+	**EPS Payout % x Target Shares x 25%**	=	**Final Award**

B. **TSR Performance Payout** . The TSR Performance Payout shall be determined as follows:

a. If the Company's annualized TSR is greater than the median of the annualized TSR of the Peer Healthcare Companies, then the TSR Performance Payout will equal 100% plus five times the difference in percentage points up to a maximum of 200%; provided, however, that if the Company's annualized TSR is negative, then in no event will the TSR Performance Payout be greater than 100%.

For example, if the Company's annualized TSR is 25% and the median annualized TSR of the Peer Healthcare Companies is 20%, then the TSR Performance Payout would be 125% [100% + ((25% - 20%) x 5%)].

b. If the Company's TSR is less than the median of the annualized TSR among the Peer Healthcare Companies, then the TSR Performance Payout will equal 100% minus five times the difference in percentage points; provided, however, that if such median exceeds the Company's TSR by more than 10 percentage points, no TSR Performance Payout will be earned with respect to this portion of the PSU.

C. **Cash Flow Performance Payout.** The Cash Flow Performance Payout shall be determined in accordance with the following performance schedule:

Adjusted Operating Cash Flow Goals ($ Billion)	**Payout Percentage**
Less than $37.04	0%
$37.04 (Threshold)	25%
$40.70 (Target)	100%
$43.14	150%
$44.77 (Stretch)	200%

A Payout Percentage corresponding to performance between two discrete values in the table will be interpolated.

D. **EPS Performance Payout.** The EPS Performance Payout shall be determined in accordance with the following performance schedule:

Earnings Per Share Goals	**Payout Percentage**
Less than $12.12	0%
$12.12 (Threshold)	25%
$13.32 (Target)	100%
$14.12	150%
$14.65 (Stretch)	200%

A Payout Percentage corresponding to performance between two discrete values in the table will be interpolated.

E. **Maximum Award** . Anything in these Award Terms to the contrary notwithstanding, the Final Award shall be reduced to the extent necessary to reflect that the value of the Final Award may not exceed four times the Target Share, valued as of the Grant Date.

IV. **DIVIDENDS**

During the Award Period, dividend equivalents will be accrued on the Performance Shares if and to the extent dividends are paid by the Company on Merck Common Stock. Payment of such dividends

will be made, without interest or earnings, at the end of the Award only on the Final Award. Such dividends shall be paid as additional shares in an amount equal to the sum of the dividends paid during the Award Period on the Final Award divided by the price of a share of Merck common stock on the date the Final Award is determined. If any portion of this PSU award lapses, is forfeited or expires, no dividend equivalents will be credited or paid on such portion. Any payment of dividend equivalents will be reduced to the extent necessary for the Company to satisfy any tax or other withholding obligations.

V. TERMINATION OF EMPLOYMENT

A. **General Rule.** If a Grantee's employment is terminated during the Award Period for any reason other than those specified in the following paragraphs, this PSU award will be forfeited on the date employment ends.

B. **Involuntary Termination.** If a Grantee's employment terminates during the Award Period and the Company determines that employment was involuntarily terminated on or after the first anniversary of the first day of the Award Period, a pro rata portion (based on the number of completed months held during the Award Period prior to the date employment terminated) of this PSU Award will be distributed at such time as it would have been paid if employment had continued, based on actual performance during the Award Period as determined in accordance with Section III. The remainder will be forfeited on the date employment ends. The pro rata portion shall be determined by multiplying the Final Award by a fraction, the numerator of which is the number of completed months in the Award Period during which the Grantee was employed by the Company or JV, and the denominator of which is 36. An "involuntary termination" includes termination of employment by the Company as the result of a restructuring or job elimination, but excludes non-performance of duties and the reasons listed under paragraphs C through G of this section.

C. **Sale.** If a Grantee's employment is terminated during the Award Period and the Company determines that such termination resulted from the sale of his or her subsidiary, division or joint venture, the following portion of this PSU Award will be distributed at such time as it would have been paid if employment had continued, based on the Final Award: one third if employment terminates on or after the Grant Date but before the first anniversary of the Award Period thereof; and all if employment terminates on or after the first anniversary of the first day of the Award Period. The remainder will be forfeited on the date a Grantee's employment ends.

D. **Retirement.** If a Grantee terminates employment during the Award Period by retirement (including early and disability retirement), then this PSU Award will continue and be distributable on a pro rata basis at the time active Grantees receive such distributions with respect to that Award Period based on the Final Award. The pro rata portion shall be determined by multiplying the Final Award by a fraction, the numerator of which is the number of completed months in the Award Period during which the Grantee was employed by the Company or JV, and the denominator of which is 36. For Grantees who are employed in the U.S., "retirement" means a termination of employment after attaining the earliest of (a) age 55 with at least 10 years of service (b) such age and service that provides eligibility for subsidized retiree medical coverage or (c) age 65 without regard to years of service. For other Grantees, "retirement" is determined by the Company.

E. **Death.** If a Grantee's employment terminates due to death during the Award Period, all of this PSU Award will continue and be distributed to his or her estate at the time active Grantees receive such distributions with respect to this PSU Award, based on the Final Award. If a Grantee dies while any portion of this PSU Award remains outstanding, but after employment terminates for the reasons listed under paragraphs B, C, D or G of this section, the portion that remains outstanding will continue and be distributable at the time active Grantees receive such distributions with respect to that Award Period based on the Final Award.

F. **Misconduct.** If a Grantee's employment is terminated as a result of deliberate, willful or gross misconduct, this PSU Award will be forfeited immediately upon the Grantee's receipt of notice of such termination.

G. **Disability.** If a Grantee's employment is terminated during the Award Period and the Company determines that such termination resulted from inability to perform the material duties of his or her role by reason of a physical or mental infirmity that is expected to last for at least six months or to result in death, whether or not he or she is eligible for disability benefits from any applicable disability program, then this PSU Award will continue and be distributable in accordance with its terms as if employment had continued based on the Final Award and will be distributed at the time active PSU Grantees receive distributions with respect to this PSU Award.

H. **Joint Venture Service.** A transfer of a Grantee's employment to a joint venture, including, in the case of grants to Legacy Merck Employees, any other entity in which the Company has determined that it has a significant business or ownership interest, is not considered termination of employment for purposes of this PSU Award. Such employment must be approved by, and contiguous with employment by, the Company. The terms set out in paragraphs A-G above apply to this PSU Award while a Grantee is employed by the joint venture or other entity.

VI. DISTRIBUTION OF PERFORMANCE SHARES

A. **General Rule.** Following the end of the Award Period, each Grantee shall be entitled to receive a number of shares of Common Stock equal to the Final Award plus the shares for accrued dividend equivalents set forth in Section IV, rounded to the nearest whole number (no fractional shares shall be issued). Such distribution shall be made as soon as administratively feasible, but in no event later than the end of the calendar year in which the Final Award is determined in accordance with Section III. Unless otherwise determined by the Committee, the Company shall withhold any applicable taxes directly from a Performance Share Unit before it is denominated in actual shares of Common Stock.

B. **Death.** In the case of distribution on account of a Grantee's death, the portion of the Performance Share Unit distributable shall be distributed to the Grantee's estate. Unless the Committee determines otherwise, the Company will withhold any applicable taxes directly from a Performance Unit before it is denominated in actual shares of Common Stock.

VII. TRANSFERABILITY

Prior to distribution pursuant to Section VI, the PSU Award shall not be transferable, assignable or alienable except by will or the laws of descent or distribution following a Grantee's death.

VIII. ADMINISTRATIVE POWERS

In addition to the Committee's powers set forth in the Merck ISP, anything in these Award Terms to the contrary notwithstanding, the Committee may revise the terms of any PSU not yet granted or, with respect to any PSU not intended to constitute "performance-based compensation" under Section 162(m) of the Code, granted but prior to the end of an Award Period if unforeseen events occur and which, in the judgment of the Committee, make the application of the Terms of this PSU Award unfair and contrary to their intentions unless a revision is made.

IX. CLAWBACK POLICY FOR PSUS UPON SIGNIFICANT RESTATEMENT OF FINANCIAL RESULTS AND CERTAIN COMPLIANCE VIOLATIONS

A. **PSUs Subject to Clawback.** For employees in Band 600 and above, this PSU Award will be subject to recoupment in the event of violations of the Company policy for Recoupment of Compensation for Compliance violations as set forth in Appendix A as amended from time to time. In addition, PSUs,

and any proceeds therefrom, are subject to the Company's right to reclaim their benefits in the event of a significant restatement of financial results for any Award Period, pursuant to the process described below.

1. The Audit Committee of the Board will review the issues and circumstances that resulted in a restatement of financial results to determine if the restatement was significant and make an initial determination of the cause of the restatement—that is whether the restatement was caused, in whole or in part, by Executive Fault (as those terms are defined below); and

2. The Compensation and Benefits Committee of the Board will (a) recalculate the Company's results for any Award Period with respect to PSUs that included an Award Period which occurred during the restatement period; and (b) if it is determined that such restatement was caused in whole or in part by the Executive's Fault, the Compensation and Benefits Committee will seek reimbursement from the Executive of that portion of the payout of the PSU that the Executive received within 18 months of the restatement based on the erroneous financial results.

B. **"Executive"** means executive officers for the purposes of the Securities Exchange Act of 1934, as amended.

C. **"Fault"** means fraud or willful misconduct. "Willful misconduct" is generally viewed as dereliction of a duty or unlawful or improper behavior committed voluntarily and intentionally; something more than negligence. If the Audit Committee determines that Fault may have been a factor causing the restatement, the Audit Committee will appoint an independent investigator whose determination shall be final and binding.

D. **Exclusions from Clawback.** This Section does not apply to restatements that the Audit Committee determines (1) are required or permitted under generally accepted accounting principles ("GAAP") in connection with the adoption or implementation of a new accounting standard or (2) are caused due to the Company's decision to change its accounting practice as permitted under GAAP.

E. **Compliance Violations.** For employees in Band 600 and above, this PSU will be subject to recoupment in the event of certain violations of Company policy in accordance with the Company's policy for Recoupment of Compensation for Compliance Violations, as set forth in Appendix A (as may be amended from time to time).

X. **Change-in-Control**

Upon the occurrence of a change-in-control (as such term is defined in the Merck ISP), the Final Award shall be 100%. The Final Award will be distributed at the same time and in the same manner as described in Section VI.

If the Company terminates a Grantee's employment except as described in Section V(F), (1) during the Award Period and (2) within two years following a change-in-control, the Final Award will be 100% and will be distributed when distributed to active Grantees.

XI. **SECTION 409A COMPLIANCE** .

Anything in the ISP or these Award Terms to the contrary notwithstanding, no distribution of PSUs may be made unless in compliance with Section 409A of the Code or any successor thereto. In addition, distributions, if any, to a "Specified Employee" as defined in Treas. Reg. Sec. 1.409A-1(i) or any successor thereto, to the extent required by Section 409A of the Code, made due to a separation from service (as defined in Section 409A) will not be made before the first day of the sixth month following the separation from service, in the same form as they would have been made had this restriction not applied; provided further, that no dividend or dividend equivalents will be paid, accrued or accumulated in respect of the period during which distribution was suspended.

APPENDIX A
Recoupment of Compensation for Compliance Violations

POLICIES AND PROCEDURES

Policy
It is the policy of the Compensation and Benefits Committee of the Board of Directors (the "Committee") that the Committee will exercise its discretion to determine whether to seek Recoupment of any bonus and/or other incentive compensation paid or awarded to an Affected Employee with respect to any performance period beginning after December 31, 2013, where it determines, in consultation with the Audit Committee, that: a) the Affected Employee engaged in misconduct, or failed to reasonably supervise an employee who engaged in misconduct, that resulted in a Material Policy Violation relating to the research, development, manufacturing, sales, or marketing of Company products; and b) the Committee concludes that the Material Policy Violation caused Significant Harm to the Company, as those terms are defined in this policy. The Committee's exercise of its discretion may take into account any considerations determined by the Committee to be relevant.

Definitions
1. "Recoupment" is defined to include any and all of the following actions to the extent permitted by law: (a) reducing the amount of a current or future bonus or other cash or non-cash incentive compensation award, (b) requiring reimbursement of a bonus or other cash-based incentive compensation award paid with respect to the most recently completed performance period, (c) cancelling all or a portion of a future-vesting equity award, (d) cancelling all or a portion of an equity award that vested within the previous twelve- month period, (e) requiring return of shares paid upon vesting and/or reimbursement of any proceeds received from the sale of an equity award, in each case that vested within the previous twelve-month period, and (f) any other method of reducing the total compensation paid to an employee for any prior twelve-month period or any current or future period.

2. A "Material Policy Violation" is defined as a material violation of a Company policy relating to the research, development, manufacturing, sales, or marketing of Company products.

3. An "Affected Employee" is an employee in Band 600 or higher who (i) engaged in misconduct that results in a Material Policy Violation; or (ii) failed in his or her supervisory responsibilities to reasonably manage or monitor the conduct of an employee who engaged in misconduct that results in a Material Policy Violation.

4. "Significant Harm" means a significant negative impact on the Company's financial operating results or reputation.

Procedures
1. The Committee, acting in consultation with the Audit Committee, shall administer this policy and have full discretion to interpret and to make any and all determinations under this policy, subject to the approval of the full Board of Directors in the case of a determination to seek or waive Recoupment from the Chief Executive Officer.

2. The General Counsel, in consultation with the Chief Ethics and Compliance Officer and the Executive Vice President, Human Resources, is responsible for determining whether to refer a matter to the Committee for review under this policy and for assisting the Committee with its review. The Committee may consult with other Board Committees and any external or internal advisors as it deems appropriate.

3. If the Committee, acting in consultation with the Audit Committee, determines that there is a basis for seeking Recoupment under this policy, the Committee shall exercise its discretion to determine for each Affected Employee, on an individual basis, whether, and to what extent and in which manner, to seek Recoupment.

4. In exercising its discretion, the Committee may take into consideration, as it deems appropriate, all of the facts and circumstances of the particular matter and the general interests of the Company.

Delegation to Management for Certain Recoupment Decisions The Committee hereby delegates to the Chief Executive Officer (who may further delegate as he deems appropriate) the authority to administer this policy and to make any and all decisions under it regarding Affected Employees who are not Section 16 Officers of the Company. Section 16 Officers are employees of the Company who are subject to Section 16 of the Securities Exchange Act of 1934. Management shall report to the Committee on any affirmative decisions to seek Recoupment pursuant to this delegation.

Disclosure of Recoupment Decisions
The Company will comply with all applicable securities laws and regulations, including Securities and Exchange Commission disclosure requirements regarding executive compensation. The Company may also, but is not obligated to, provide additional disclosure beyond that required by law when the Company deems it to be appropriate and determines that such disclosure is in the best interest of the Company and its shareholders.

Miscellaneous
Nothing in this policy shall limit or otherwise affect any of the following: 1) management's ability to take any disciplinary action with respect to any Affected Employee; 2) the Committee's ability to use its negative discretion with respect to any incentive compensation performance target at any time; or 3) the Committee's or management's ability to reduce the amount (in whole or in part) of a current or future bonus or other cash or non- cash incentive compensation award to any executive or other employee for any reason as they may deem appropriate and to the extent permitted by law. Nothing in this policy shall replace or otherwise limit or affect the Clawback Policy for EIP Awards Upon Significant Restatement of Financial Results and/or the Clawback Policy for PSUs Upon Significant Restatement of Financial Results.

Exhibit 31.1

CERTIFICATION

I, Kenneth C. Frazier, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Merck & Co., Inc.;

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

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

4. The registrant's other certifying officer(s) 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(s) 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 8, 2018

By: /s/ Kenneth C. Frazier

KENNETH C. FRAZIER
Chairman, President and Chief Executive Officer

Exhibit 31.2

CERTIFICATION

I, Robert M. Davis, certify that:

1. I have reviewed this quarterly report on Form 10-Q of Merck & Co., Inc.;

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

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

4. The registrant's other certifying officer(s) 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(s) 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 8, 2018

By: /s/ Robert M. Davis

ROBERT M. DAVIS
Executive Vice President, Chief Financial Officer
& Global Services

Exhibit 32.1

Section 1350
Certification of Chief Executive Officer

Pursuant to 18 U.S.C. Section 1350, the undersigned officer of Merck & Co., Inc. (the "Company"), hereby certifies that the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2018 (the "Report") fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and that the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: May 8, 2018

/s/ Kenneth C. Frazier

Name: KENNETH C. FRAZIER
Title: Chairman, President and Chief Executive Officer

Exhibit 32.2

Section 1350
Certification of Chief Financial Officer

Pursuant to 18 U.S.C. Section 1350, the undersigned officer of Merck & Co., Inc. (the "Company"), hereby certifies that the Company's Quarterly Report on Form 10-Q for the quarter ended March 31, 2018 (the "Report") fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and that the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: May 8, 2018

/s/ Robert M. Davis

Name: ROBERT M. DAVIS
Title: Executive Vice President, Chief Financial Officer & Global Services