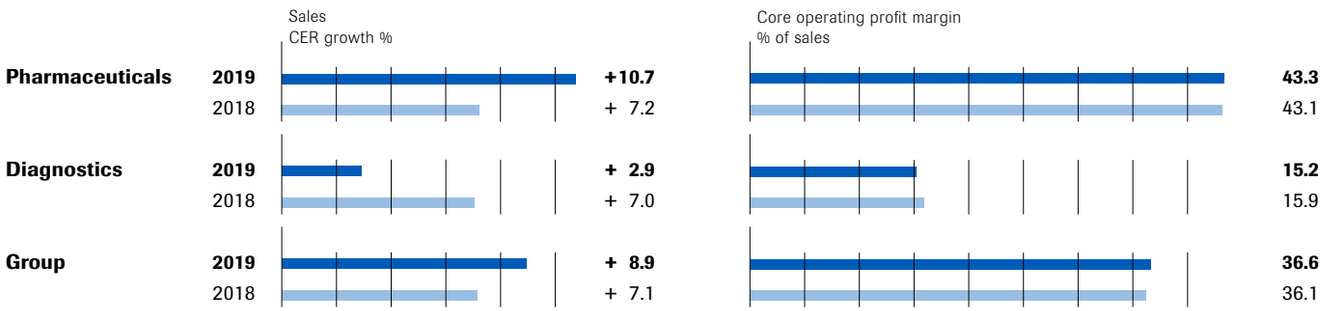
Finance Report 2019

Finance in Brief

Key results



	2019 (CHF m)	2018 (CHF m)	% change (CHF)	% change (CER)	% of sales 2019	% of sales 2018
IFRS results						
Sales	61,466	56,846	+8	+9		
Operating profit	17,548	14,769	+19	+21	28.5	26.0
Net income	14,108	10,865	+30	+32	23.0	19.1
Net income attributable to Roche shareholders	13,497	10,500	+29	+31	22.0	18.5
Diluted EPS (CHF)	15.62	12.21	+28	+30		
Dividend per share (CHF)	9.00[1]	8.70	+3			
Core results						
Research and development	11,696	11,047	+6	+6	19.0	19.4
Core operating profit	22,479	20,505	+10	+11	36.6	36.1
Core EPS (CHF)	20.16	18.14	+11	+13		
Free cash flow						
Operating free cash flow	20,921	18,741	+12	+11	34.0	33.0
Free cash flow	16,764	14,811	+13	+12	27.3	26.1

	2019 (CHF m)	2018 (CHF m)	% change (CHF)	% change (CER)
Net debt	(2,505)	(5,652)	–56	–53
Capitalisation	50,230	49,136	+2	+4
– Debt	14,363	18,770	–23	–22
– Equity	35,867	30,366	+18	+19

1) Proposed by the Board of Directors.

CER (Constant Exchange Rates): The percentage changes at constant exchange rates are calculated using simulations by reconsolidating both the 2019 and 2018 results at constant exchange rates (the average rates for the year ended 31 December 2018). For the definition of CER see page 168.

Core results and Core EPS (earnings per share): These exclude non-core items such as global restructuring plans and amortisation and impairment of goodwill and intangible assets. This allows an assessment of both the actual results and the underlying performance of the business. A full income statement for the Group and the operating results of the divisions are shown on both an IFRS and core basis. The core concept is fully described on pages 161–164 and reconciliations between the IFRS and core results are given there.

Free cash flow is used to assess the Group's ability to generate the cash required to conduct and maintain its operations. It also indicates the Group's ability to generate cash to finance dividend payments, repay debt and to undertake merger and acquisition activities. The free cash flow concept is used in the internal management of the business. The free cash flow concept is fully described on pages 164–166 and reconciliations between the IFRS cash flow and free cash flow are given there.

Finance – 2019 in Brief

Roche in 2019

The **Roche Group** reported strong overall results in 2019. Sales grew by 9% at constant exchange rates (CER). IFRS net income increased by 32% (CER) and core earnings per share increased by 13% (CER).

Sales

Group sales increased by 9% (CER) to CHF 61.5 billion (8% growth in CHF terms).
Pharmaceuticals sales growth was 11% (CER) due to the new medicines Ocrevus, Hemlibra, Tecentriq and Perjeta. In oncology, in addition to Tecentriq, there was continued growth in the HER2 franchise and Avastin. Biosimilars had an estimated negative impact of CHF 1.5 billion on 2019 sales. Immunology sales increased, led by Actemra/RoActemra and Esbriet.
Diagnostics sales showed growth of 3% (CER) with the immunodiagnostics business being the major contributor.

Operating results

Core operating profit increased by 11% (CER) to CHF 22.5 billion (10% increase in CHF terms).
Research and development expenditure grew by 6% (CER) to CHF 11.7 billion on a core basis, with focus on the oncology, neuroscience and immunology therapeutic areas. Research and development costs represented 19.0% of Group sales.
IFRS operating results include non-core expenses (pre-tax) of CHF 5.0 billion. The major factors were CHF 1.5 billion amortisation charges for intangible assets, CHF 1.8 billion impairment of goodwill and intangible assets, notably CHF 0.8 billion relating to the Diabetes Care business.

Non-operating results

Financing costs (IFRS) increased by 28% to CHF 1.0 billion due to early debt redemption losses of CHF 0.2 billion.
Income tax expenses (IFRS) decreased by 23% at CER to CHF 2.5 billion. The effective core tax rate for 2019 decreased to 16.3% mainly due to the impacts from the resolution of several tax disputes.

Net income

IFRS net income increased by 32% at CER to CHF 14.1 billion (+30% in CHF terms) due to the base effect of high goodwill impairment in 2018.
Core earnings per share increased by 13% at CER to CHF 20.16 (+11% in CHF terms).

Cash flows

Operating free cash flow increased to CHF 20.9 billion. The underlying cash generation led to an increase of operating free cash flow of 11% at CER (+12% in CHF terms).
Free cash flow increased by 12% at CER (+13% in CHF terms) to CHF 16.8 billion, driven by the higher operating free cash flow.

Financial position

Net working capital decreased by 16% (CER) driven by the Pharmaceuticals Division.
Net debt decreased by CHF 3.1 billion to CHF 2.5 billion. The free cash flow more than covered the dividends and the CHF 4.6 billion net cash payments for Spark Therapeutics. Gross debt decreased by 22% (CER) to CHF 14.4 billion.
Credit ratings strong: Moody's at Aa3 and Standard & Poor's at AA.

Shareholder return

Dividends. A proposal will be made to increase dividends by 3% to CHF 9.00 per share. This would represent the 33rd consecutive year of dividend growth and would result in a pay-out ratio of 44.6%, subject to AGM approval.
Total Shareholder Return (TSR) was 33% representing the combined performance of share and non-voting equity security.

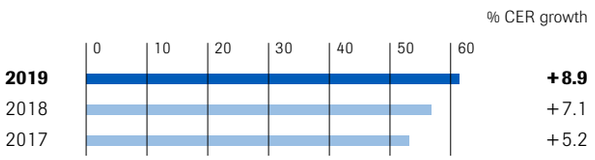
Roche Group

Roche Holding Ltd, Basel

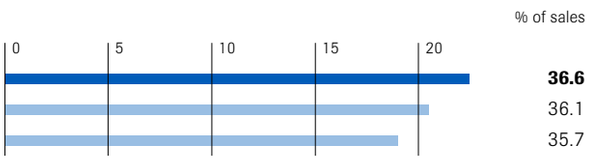
Financial Review

Roche Group results

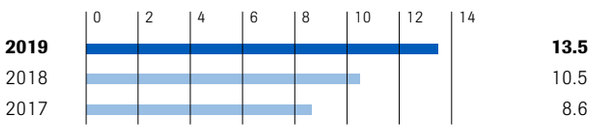
Sales in billions of CHF



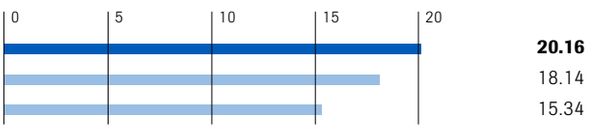
Core operating profit in billions of CHF



Net income attributable to Roche shareholders in billions of CHF



Core EPS in CHF



In 2019 the Roche Group reported sales growth of 9% at constant exchange rates (CER) and this led to core operating profit growth of 11% and an increase in Core EPS of 13%. IFRS net income increased by 32% due to this business growth and the base impact of the high goodwill impairments in 2018. The sales growth continued to be driven by the Pharmaceuticals Division's new medicines, which more than compensated for biosimilar competition. The Group further improved its operating profitability, while continuing its investments in research and development and supporting the launch of new products. Operating free cash flow was CHF 20.9 billion, an increase of 11%, driven by the higher cash generation of the pharmaceuticals business.

Divisional operating results for 2019

	Pharmaceuticals (CHF m)	Diagnostics (CHF m)	Corporate (CHF m)	Group (CHF m)
Sales	48,516	12,950	–	61,466
Core operating profit	21,015	1,966	(502)	22,479
– margin, % of sales	43.3	15.2	–	36.6
Operating profit	17,946	242	(640)	17,548
– margin, % of sales	37.0	1.9	–	28.5
Operating free cash flow	20,536	963	(578)	20,921
– margin, % of sales	42.3	7.4	–	34.0

Divisional operating results – Development of results compared to 2018

	Pharmaceuticals	Diagnostics	Corporate	Group
Sales				
– % increase at CER	+11	+3	–	+9
Core operating profit				
– % increase at CER	+12	+1	+7	+11
– margin: percentage point increase	+0.4	–0.4	–	+0.6
Operating profit				
– % increase at CER	+23	–46	+3	+21
– margin: percentage point increase	+3.6	–2.3	–	+2.7
Operating free cash flow				
– % increase at CER	+14	–28	+11	+11
– margin: percentage point increase	+1.1	–3.3	–	+0.5

Sales in the Pharmaceuticals Division were CHF 48.5 billion (2018: CHF 44.0 billion), an increase of 11% at CER. New products were the major growth driver, with Ocrevus, Hemlibra, Tecentriq and Perjeta together contributing an additional CHF 4.4 billion (CER) of new sales. This more than offset the estimated CHF 1.5 billion (CER) impact of biosimilars on sales in Europe, Japan and, from the second half of 2019, the US. Broader market penetration led to a 36% sales increase in China to CHF 3.1 billion. Ocrevus sales were 57% higher at CHF 3.7 billion, led by the US. The launch and rollouts of Hemlibra continued with sales reaching CHF 1.4 billion. Tecentriq sales grew in all regions, with the largest contributions coming from higher demand in the US and Europe as well as newly launched indications. Perjeta sales were CHF 3.5 billion, an increase of 29%, with growth across all regions. Avastin sales were 4% higher mainly due to growth in China and the US. In Europe and Japan, sales of MabThera/Rituxan and Herceptin fell by CHF 1.2 billion (CER) in 2019 due to biosimilar competition. In the US, the first biosimilar versions of MabThera/Rituxan, Herceptin and Avastin came to market in the second half of 2019, and had an estimated CHF 0.3 billion (CER) impact on sales. The Diagnostics Division reported sales of CHF 12.9 billion, an increase of 3% at CER. The major growth area was Centralised and Point of Care Solutions, which represented 60% of the division's sales and which grew by 3%, led by growth in the immunodiagnostics business of 6%. Molecular Diagnostics sales increased by 6% due to increased demand in blood screening. Diabetes Care sales increased by 1% driven by the Accu-Chek Guide product line in North America.

The Pharmaceuticals Division's core operating profit increased by 12% at CER, ahead of the sales growth. Royalty and other operating income decreased by CHF 0.4 billion in total, with a fall of CHF 0.7 billion following the expiry of the Cabilly patent at the end of 2018, partially offset by product disposal gains and higher profit-share income. Cost of sales increased by 7%, below the sales growth, with manufacturing costs growing 3% due to a favourable product mix and lower inventory write-offs, and royalty expenses growing 33%. Marketing and distribution costs grew by 10% due to increased spending on product launches and rollouts including Tecentriq, Ocrevus and Xofluza as well as ramp-up of marketing activities in new strategic businesses. Research and development costs grew by 6%, with oncology, neuroscience and immunology representing significant areas of spending.

In the Diagnostics Division core operating profit increased by 1% at CER, behind the 3% sales growth. Cost of sales grew by 6% due to higher costs from external suppliers and for technical and engineering services. Research and development increased by 1% due to spending on new projects within the Centralised and Point of Care Solutions portfolio and on laboratory automation.

IFRS operating profit increased by 23% in the Pharmaceuticals Division and fell by 46% in the Diagnostics Division, with the results of both divisions impacted by impairments of goodwill and intangible assets in both the current year and the comparative period. The 2019 results include CHF 1.8 billion of these impairments, with the largest item being the goodwill impairment of CHF 0.8 billion relating to the Diabetes Care business. Impairments of goodwill and intangible assets in 2018 were CHF 3.3 billion, including CHF 1.8 billion relating to the InterMune acquisition. Amortisation of intangible assets was CHF 1.5 billion and there were CHF 1.2 billion of expenses from global restructuring plans.

Operating free cash flow was CHF 20.9 billion, an increase of 11% at CER, due to higher cash generation of the pharmaceuticals business and lower capital expenditure, partly offset by higher investments in intangible assets. Net working capital decreased compared to 2018 driven by the Pharmaceuticals Division with higher rebate and chargeback accruals and lower net trade working capital. The free cash flow was CHF 16.8 billion, an increase of CHF 2.0 billion, mainly due to the higher operating free cash flow.

Financing costs were 28% (CER) higher on an IFRS basis at CHF 1.0 billion mainly due to losses on early debt redemption of CHF 0.2 billion in 2019. Net income from equity securities showed gains of CHF 0.2 billion from Roche Venture Fund investments. Income tax expenses were lower, with the Group's effective core tax rate at 16.3% compared to 19.7% in 2018. This was mainly due to the impacts from the resolution of several tax disputes, which had an impact of 2.1 percentage points on the effective core tax rate in 2019. The implementation of the Swiss tax reform in 2019 had a non-core transitional impact on the Group's deferred tax positions of CHF 0.2 billion, which had no impact on tax payments in 2019.

Net income increased by 32% at CER on an IFRS basis to CHF 14.1 billion and by 14% on a core basis to CHF 18.1 billion, driven in both cases by the operating results. The IFRS net income was additionally affected by the base impact of significant goodwill impairments in 2018.

The results expressed in Swiss francs were negatively impacted by the stronger Swiss franc on average against the euro and Latin American currencies, partly offset by the appreciation of the US dollar against the Swiss franc. There was a 1 percentage point impact on sales and core operating profit expressed in Swiss francs compared to constant exchange rates and a 2 percentage point impact on Core EPS.

Income statement

	2019 (CHF m)	2018 (CHF m)	% change (CHF)	% change (CER)
IFRS results				
Sales	61,466	56,846	+8	+9
Royalties and other operating income	2,285	2,651	–14	–15
Revenue	**63,751**	**59,497**	**+7**	**+8**
Cost of sales	(18,351)	(17,269)	+6	+7
Marketing and distribution	(10,960)	(10,109)	+8	+9
Research and development	(12,774)	(12,092)	+6	+5
General and administration	(4,118)	(5,258)	–22	–21
Operating profit	**17,548**	**14,769**	**+19**	**+21**
Financing costs	(993)	(770)	+29	+28
Other financial income (expense)	59	149	–60	–64
Profit before taxes	**16,614**	**14,148**	**+17**	**+19**
Income taxes	(2,506)	(3,283)	–24	–23
Net income	**14,108**	**10,865**	**+30**	**+32**
Attributable to				
– Roche shareholders	13,497	10,500	+29	+31
– Non-controlling interests	611	365	+67	+64
EPS – Basic (CHF)	15.77	12.29	+28	+31
EPS – Diluted (CHF)	15.62	12.21	+28	+30
Core results[1]				
Sales	61,466	56,846	+8	+9
Royalties and other operating income	2,285	2,635	–13	–14
Revenue	**63,751**	**59,481**	**+7**	**+8**
Cost of sales	(16,363)	(15,464)	+6	+7
Marketing and distribution	(10,513)	(9,905)	+6	+7
Research and development	(11,696)	(11,047)	+6	+6
General and administration	(2,700)	(2,560)	+5	+6
Operating profit	**22,479**	**20,505**	**+10**	**+11**
Financing costs	(962)	(744)	+29	+28
Other financial income (expense)	59	149	–60	–64
Profit before taxes	**21,576**	**19,910**	**+8**	**+10**
Income taxes	(3,514)	(3,929)	–11	–10
Net income	**18,062**	**15,981**	**+13**	**+14**
Attributable to				
– Roche shareholders	17,416	15,593	+12	+13
– Non-controlling interests	646	388	+66	+63
Core EPS – Basic (CHF)	20.35	18.25	+12	+13
Core EPS – Diluted (CHF)	20.16	18.14	+11	+13

1) See pages 161–164 for the definition of core results and Core EPS.

Leases

Effective 1 January 2019 the Group has implemented IFRS 16 'Leases'. IFRS 16 replaces existing leases guidance, including IAS 17 'Leases'. The Group applied the cumulative catch-up method option for the transition, meaning that the comparative 2018 results have not been restated. Further details are given in Note 28 to the Annual Financial Statements.

The main impact of the new standard is to bring operating leases onto the balance sheet. The new standard results in the carrying value of leased assets ('right-of-use assets') increasing by CHF 1.2 billion as of 1 January 2019, with lease liabilities increasing by a similar amount. These leases represent primarily office facilities and motor vehicles. The application of the new standard results in part of what has been previously reported as operating lease costs being recorded as interest expenses. Given the leases involved and the prevailing low interest rate environment, the Group does not currently expect this effect to be material, with the amount in 2019 being CHF 18 million.

The application of the new standard does not materially impact the Group's Alternative Performance Measures. There are classification changes within Core EPS and operating free cash flow, but the totals are largely unaffected, while the Group's definition of net debt does not include lease liabilities. The new standard does have an impact on EBITDA. Further details are given on pages 161 to 168.

Mergers and acquisitions

On 17 December 2019 the Group acquired a 100% controlling interest in Spark Therapeutics, Inc. ('Spark Therapeutics'), a publicly owned US company based in Philadelphia, Pennsylvania, that had been listed on Nasdaq Stock Market. Spark Therapeutics is a fully integrated commercial company committed to discovering, developing and delivering gene therapies. Spark Therapeutics is reported in the Pharmaceuticals Division. The cash purchase consideration was USD 4.8 billion (equivalent to CHF 4.7 billion). During 2019 there was CHF 146 million of non-core income from the reversal of contingent consideration provisions. Further details are given in Notes 6 and 31 to the Annual Financial Statements.

Global restructuring plans

During 2019 the Group continued with the implementation of various global restructuring plans initiated in prior years.

Global restructuring plans: costs incurred in 2019 in millions of CHF

	Diagnostics[1]	Site consolidation[2]	Other plans[3]	Total
Global restructuring costs				
– Employee-related costs	176	171	526	873
– Site closure costs	38	69	28	135
– Divestment of products and businesses	(16)	1	0	(15)
– Other reorganisation expenses	143	15	55	213
Total global restructuring costs	**341**	**256**	**609**	**1,206**
Additional costs				
– Impairment of goodwill	0	0	0	0
– Impairment of intangible assets	0	0	0	0
– Legal and environmental cases	(1)	43	0	42
Total costs	**340**	**299**	**609**	**1,248**

1) Includes strategy plans in the Diagnostics Division.
2) Includes the Pharmaceuticals Division's strategic realignment of its manufacturing network and resourcing flexibility in the biologics manufacturing network.
3) Includes plans for outsourcing of IT and other functions to shared service centres and external providers.

Diagnostics Division. Strategy plans in the Diagnostics Division incurred costs of CHF 228 million mainly for employee-related matters. Expenses for IT process optimisation plans were CHF 71 million.

Site consolidation. Costs from the Pharmaceuticals Division's strategic realignment of its manufacturing network were CHF 132 million and mainly related to the exit from the manufacturing site at Clarecastle, Ireland. The expected costs of the environmental remediation at the Clarecastle site were reassessed and resulted in an increase in the provisions by CHF 43 million. Employee-related costs of CHF 91 million were recorded for the redesign of manufacturing at the South San Francisco site. Costs for the resourcing flexibility plan in the biologics manufacturing network were CHF 84 million, which included the closure of the manufacturing plant in Rio de Janeiro in Brazil.

Other global restructuring plans. Initiatives in the Pharmaceuticals Division incurred costs of CHF 272 million, mainly employee-related. Other major items were CHF 90 million for plans for outsourcing of IT and other functions to shared service centres and external providers and CHF 72 million at Chugai.

In 2018 total global restructuring costs were CHF 0.9 billion. Further details are given in Note 7 to the Annual Financial Statements.

Impairment of goodwill and intangible assets

Pharmaceuticals Division. The Pharmaceuticals Division recorded impairment charges to intangible assets of CHF 633 million. Impairment charges of CHF 381 million related to the full or partial impairments of five different compounds due to either clinical data assessments or decisions to stop the development of the respective compounds. A charge of CHF 168 million related to the full impairment of a compound purchased separately, driven by a change in the development plan. Impairment charges of CHF 78 million related to the partial impairment of a compound developed together with an alliance partner, mainly driven by reduced revenue forecasts.

Diagnostics Division. The Diagnostics Division recorded impairment charges of CHF 1,123 million. The major part of this was a charge of CHF 779 million for the partial write-off of goodwill related to the Diabetes Care business. The impairment is a result of revised market assumptions related to the blood glucose monitoring area and a slower than expected growth in other parts of this business. In the Molecular Diagnostics business there was a charge for a full impairment of CHF 259 million for the product intangible assets acquired as part of the GeneWeave acquisition. The main factors leading to this were updated assumptions on timelines, research and development expenses and production costs. In addition, there was an impairment of CHF 85 million in the Sequencing business for the full write-off of product intangible assets acquired as part of the Ariosa acquisition. This was mainly due to a change in timelines for the launch of related sequencing products.

In 2018 there were impairment charges of CHF 2.4 billion in the Pharmaceuticals Division. The largest item was a charge of CHF 1.8 billion relating to the goodwill and intangible assets from the InterMune acquisition in 2014. The Diagnostics Division recorded impairment charges of CHF 1.0 billion. The major part of this was in the sequencing business.

Further details are given in Notes 9 and 10 to the Annual Financial Statements.

Legal and environmental cases

Based on the development of the various litigations, notably the Avastin/Lucentis investigations and the Meso case, there was a net increase in provisions of CHF 369 million. This was a major element of the 2019 expenses for legal cases of CHF 422 million. The expected costs of the environmental remediation at the Clarecastle site in Ireland were reassessed and resulted in an increase in the provisions. There were no other significant developments affecting the 2019 financial results. Further details are given in Note 20 to the Annual Financial Statements.

Net income and earnings per share

IFRS net income increased by 30% in CHF terms and by 32% at CER, while the diluted EPS increased by 28% in CHF terms and by 30% at CER. Core net income increased by 14% and Core EPS increased by 13%, both at CER. The core basis excludes non-core items such as global restructuring costs, amortisation and impairment of goodwill and intangible assets, and income and impacts from the accounting for merger and acquisition transactions and alliance arrangements. The amount of net income attributable to non-controlling interests increased by 64% due to the increased contribution of Chugai to the overall Group results.

Net income

	2019 (CHF m)	2018 (CHF m)	% change (CHF)	% change (CER)
IFRS net income	**14,108**	**10,865**	**+30**	**+32**
Reconciling items (net of tax)				
– Global restructuring plans	970	759	+28	+29
– Intangible asset amortisation	1,380	1,110	+24	+23
– Goodwill and intangible asset impairment	1,570	3,107	–49	–50
– Mergers and acquisitions and alliance transactions	(52)	21	–	–
– Legal and environmental cases	417	131	+218	+221
– Pension plan settlements	(1)	4	–	–
– Transitional effect of changes in US tax rates	–	(35)	–	–
– Transitional effect of Swiss tax reform	(236)	–	–	–
– Normalisation of equity compensation plan tax benefit	(94)	19	–	–
Core net income	**18,062**	**15,981**	**+13**	**+14**

Supplementary net income and EPS information is given on pages 161 to 164. This includes calculations of Core EPS and reconciles the core results to the Group's published IFRS results.

Financial position

Financial position

	2019 (CHF m)	2018 (CHF m)	% change (CHF)	% change (CER)
Pharmaceuticals				
Net working capital	1,441	2,472	–42	–36
Long-term net operating assets	29,116	25,215	+15	+17
Diagnostics				
Net working capital	2,742	2,697	+2	+5
Long-term net operating assets	11,036	11,625	–5	–3
Corporate				
Net working capital	(240)	(214)	+12	+13
Long-term net operating assets	(5)	(44)	–89	–78
Net operating assets	**44,090**	**41,751**	**+6**	**+8**
Net debt	(2,505)	(5,652)	–56	–53
Lease liabilities	(1,219)	–	–	–
Pensions	(6,535)	(6,140)	+6	+9
Income taxes	1,312	(89)	–	–
Other non-operating assets, net	724	496	+46	+45
Total net assets	**35,867**	**30,366**	**+18**	**+19**

Compared to the start of the year the Swiss franc appreciated against the euro and the US dollar. This had a negative translation impact on the net operating assets, which was partly offset at Group level by the natural hedge from the Group's US dollar-denominated debt. The exchange rates used are given on page 30.

In the Pharmaceuticals Division net working capital decreased by 36% at CER. This was mainly due to higher rebate and chargeback accruals. Excluding this, net trade working capital in the Pharmaceuticals division was 1% lower, with a decrease in inventories due to write-offs and lower inventories for mature products. Trade receivables increased due to the underlying sales growth. Long-term net operating assets increased by 17% largely due to the Spark Therapeutics acquisition, where the initial purchase price allocation added CHF 4.5 billion to goodwill. In the Diagnostics Division there were increases in net working capital of 5% and 4% in net trade working capital. These were driven by an increase in trade receivables due to the growth in sales, and by an increase of inventories due to quality issues and an increase in instruments pending placement. Long-term net operating assets decreased by 3% following impairment charges to goodwill and intangible assets.

The decrease in net debt was due to the free cash flow of CHF 16.8 billion, partly offset by the dividend payments of CHF 7.7 billion and net cash payments of CHF 4.6 billion for the Spark Therapeutics acquisition. This led to a reduction in gross debt to CHF 14.4 billion from CHF 18.8 billion at the end of 2018. The net pension liability was 9% higher at CHF 6.5 billion following decreases in discount rates. Net deferred tax assets increased mainly due to the Swiss tax reform, impairment of intangible assets and equity compensation plans. The resolution of tax disputes reduced current tax liabilities. Lease liabilities of CHF 1.2 billion were a result of the accounting changes in IFRS 16 that brought operating leases onto the balance sheet effective 1 January 2019.

Free cash flow

Free cash flow

	2019 (CHF m)	2018 (CHF m)	% change (CHF)	% change (CER)
Pharmaceuticals	20,536	17,851	+15	+14
Diagnostics	963	1,416	–32	–28
Corporate	(578)	(526)	+10	+11
Operating free cash flow	**20,921**	**18,741**	**+12**	**+11**
Treasury activities	(614)	(642)	–4	–5
Taxes paid	(3,543)	(3,288)	+8	+7
Free cash flow	**16,764**	**14,811**	**+13**	**+12**

See pages 164–166 for the definition of free cash flow and a detailed breakdown.

The Group's operating free cash flow was CHF 20.9 billion, an increase of 11% at CER. This was due to higher cash generation of the pharmaceuticals business partly offset by higher investments in intangible assets. Net working capital was lower due to increases in accruals for rebates and chargebacks and a reduction in net trade working capital in the Pharmaceuticals Division. The free cash flow was CHF 16.8 billion, an increase of 12% at CER. This was due to the higher operating free cash flow, partly offset by higher tax payments.

Pharmaceuticals Division operating results

Pharmaceuticals Division operating results

	2019 (CHF m)	2018 (CHF m)	% change (CHF)	% change (CER)
IFRS results				
Sales	48,516	43,967	+10	+11
Royalties and other operating income	2,198	2,553	–14	–15
Revenue	**50,714**	**46,520**	**+9**	**+9**
Cost of sales	(11,593)	(10,491)	+11	+11
Marketing and distribution	(7,905)	(7,068)	+12	+12
Research and development	(11,221)	(10,299)	+9	+9
General and administration	(2,049)	(3,874)	–47	–47
Operating profit	**17,946**	**14,788**	**+21**	**+23**
– margin, % of sales	37.0	33.6	+3.4	+3.6
Core results[1]				
Sales	48,516	43,967	+10	+11
Royalties and other operating income	2,198	2,553	–14	–15
Revenue	**50,714**	**46,520**	**+9**	**+9**
Cost of sales	(10,180)	(9,504)	+7	+7
Marketing and distribution	(7,604)	(6,939)	+10	+10
Research and development	(10,228)	(9,586)	+7	+6
General and administration	(1,687)	(1,549)	+9	+8
Core operating profit	**21,015**	**18,942**	**+11**	**+12**
– margin, % of sales	43.3	43.1	+0.2	+0.4
Financial position				
Net working capital	1,441	2,472	–42	–36
Long-term net operating assets	29,116	25,215	+15	+17
Net operating assets	**30,557**	**27,687**	**+10**	**+12**
Free cash flow[2]				
Operating free cash flow	20,536	17,851	+15	+14
– margin, % of sales	42.3	40.6	+1.7	+1.1

1) See pages 161–164 for the definition of core results.
2) See pages 164–166 for the definition of free cash flow.

Sales overview

Pharmaceuticals Division – Sales by therapeutic area

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
Oncology	27,571	26,183	+6	56.8	59.6
Immunology	8,514	8,160	+4	17.5	18.6
Neuroscience	4,358	3,005	+45	9.0	6.8
Ophthalmology	1,826	1,659	+8	3.8	3.8
Haemophilia A	1,380	224	Over +500	2.8	0.5
Infectious diseases	1,089	1,084	+2	2.2	2.5
Other therapeutic areas	3,778	3,652	+2	7.9	8.2
Total sales	**48,516**	**43,967**	**+11**	**100**	**100**

Sales in the Pharmaceuticals Division were CHF 48.5 billion, an increase of 11% at CER. New product sales more than compensated for the biosimilar competition to MabThera/Rituxan, Herceptin and Avastin. China reported continuously strong growth of 36% due to broader market penetration.

The sales growth was driven by the continuing rollout of the new products Ocrevus, Hemlibra, Tecentriq and Perjeta, which together contributed an additional CHF 4.4 billion (CER) of new sales, representing 93% of the division's growth. Ocrevus in particular continued its high growth development with total sales now reaching CHF 3.7 billion (2018: CHF 2.4 billion) due to continuing growth in the US and continuing uptake in other markets, notably Germany and Italy. The launch and rollout of Hemlibra continued with sales reaching CHF 1.4 billion, across all regions. Tecentriq sales grew in all regions, mostly due to higher demand in the US and launches in Japan, Italy, Spain, Germany and France. Perjeta sales were up by 29% to CHF 3.5 billion with growth across all regions.

Biosimilar competition had a negative impact during the year, estimated at CHF 1.5 billion. Sales of MabThera/Rituxan and Herceptin fell by CHF 1.2 billion (CER) in Europe and Japan in 2019. In the US, the first biosimilar versions of Herceptin, Avastin and MabThera/Rituxan came to market in the second half of 2019, and had an estimated impact of CHF 0.3 billion on 2019 sales. The first biosimilar versions of Avastin were registered in Japan in late 2019, which had limited impact on sales so far. In total, Avastin, MabThera/Rituxan and Herceptin sales in 2019 were CHF 19.6 billion, a decrease of CHF 0.9 billion (CER) or 4%.

The oncology therapeutic area grew by 6%, led by the new products Tecentriq and Perjeta. Kadcyla sales increased by 45% with growth across all regions, mainly in the US due to the launch of a new indication. Avastin sales grew by 4%, mainly in China due to broader market penetration and across the US, despite the launch of a biosimilar in mid-2019. Herceptin sales fell by 12% affected by biosimilar competition in Europe, Japan and the US. MabThera/Rituxan sales decreased by 4% due to biosimilar pressure in Europe and Japan. The launches of the first biosimilar of MabThera/Rituxan in the US in late 2019 had limited impact on sales so far. Alecensa (+38%) showed continuing post-launch growth across all regions.

Sales in immunology grew by 4%, with Actemra/RoActemra and Esbriet increasing by 8% and 9% respectively. MabThera/Rituxan sales increased by 1% driven by the US. Lucentis sales grew 8% in the US in all approved indications. Infectious diseases sales were 2% higher mainly due to higher Rocephin sales in China partly offset by lower sales of Valcyte/Cymevene in the US and Europe due to generic competition. In other therapeutic areas, sales of Activase/TNKase grew 2% in the US.

Product sales

Pharmaceuticals Division – Sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
Oncology					
Avastin	7,073	6,849	+4	14.6	15.6
Herceptin	6,039	6,982	–12	12.4	15.9
MabThera/Rituxan [1]	4,890	5,191	–6	10.1	11.8
Perjeta	3,522	2,773	+29	7.3	6.3
Tecentriq	1,875	772	+143	3.9	1.8
Kadcyla	1,393	979	+45	2.9	2.2
Alecensa	876	637	+38	1.8	1.4
Gazyva/Gazyvaro	552	390	+43	1.1	0.9
Xeloda	406	427	–4	0.8	1.0
Tarceva	298	538	–44	0.6	1.2
Others	647	645	–1	1.3	1.5
Total Oncology	**27,571**	**26,183**	**+6**	**56.8**	**59.6**
Immunology					
Actemra/RoActemra	2,311	2,160	+8	4.8	4.9
Xolair	1,969	1,912	+1	4.1	4.3
MabThera/Rituxan [1]	1,587	1,561	+1	3.3	3.6
Esbriet	1,129	1,031	+9	2.3	2.3
Pulmozyme	751	739	+2	1.5	1.7
CellCept	656	669	0	1.4	1.5
Others	111	88	+46	0.1	0.3
Total Immunology	**8,514**	**8,160**	**+4**	**17.5**	**18.6**
Neuroscience					
Ocrevus	3,708	2,353	+57	7.6	5.3
Madopar	367	341	+12	0.8	0.8
Others	283	311	–7	0.6	0.7
Total Neuroscience	**4,358**	**3,005**	**+45**	**9.0**	**6.8**
Ophthalmology					
Lucentis	1,826	1,659	+8	3.8	3.8
Total Ophthalmology	**1,826**	**1,659**	**+8**	**3.8**	**3.8**
Haemophilia A					
Hemlibra	1,380	224	Over +500	2.8	0.5
Total Haemophilia A	**1,380**	**224**	**Over +500**	**2.8**	**0.5**
Infectious diseases					
Tamiflu	377	378	0	0.8	0.9
Rocephin	342	305	+14	0.7	0.7
Others	370	401	–5	0.7	0.9
Total Infectious diseases	**1,089**	**1,084**	**+2**	**2.2**	**2.5**
Other therapeutic areas					
Activase/TNKase	1,332	1,284	+2	2.7	2.9
Mircera	591	532	+10	1.2	1.2
NeoRecormon/Epogin	262	288	–8	0.5	0.7
Others	1,593	1,548	+2	3.5	3.4
Total other therapeutic areas	**3,778**	**3,652**	**+2**	**7.9**	**8.2**
Total sales	**48,516**	**43,967**	**+11**	**100**	**100**

1) Total MabThera/Rituxan sales of CHF 6,477 million (2018: CHF 6,752 million) split between oncology and immunology therapeutic areas.

MabThera/Rituxan. For non-Hodgkin lymphoma (NHL), chronic lymphocytic leukaemia (CLL), follicular lymphoma (FL) and rheumatoid arthritis (RA) as well as certain types of antineutrophil cytoplasmic antibody (ANCA)-associated vasculitis.

MabThera/Rituxan regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
United States	4,488	4,290	+3	69.3	63.5
Europe	590	916	–33	9.1	13.6
Japan	109	188	–44	1.7	2.8
International	1,290	1,358	–1	19.9	20.1
Total sales	**6,477**	**6,752**	**–4**	**100**	**100**

Sales were 4% lower due to the launch of biosimilars in Europe and Japan. US sales increased by 3%, with growth in the oncology therapeutic area, driven by the subcutaneous formulation, and also in immunology. The first biosimilar version of MabThera/Rituxan was launched in the US in November 2019, which has had only a limited impact on sales so far. Sales in the International region were 1% lower due to competitive pressures across various countries, partially offset by 16% growth in China due to broader market penetration.

HER2 franchise (Herceptin, Perjeta and Kadcyla). For HER2-positive breast cancer and HER2-positive metastatic (advanced) gastric cancer (Herceptin only).

Herceptin regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
United States	2,707	2,908	–8	44.8	41.6
Europe	1,013	1,849	–43	16.8	26.5
Japan	243	249	–5	4.0	3.6
International	2,076	1,976	+10	34.4	28.3
Total sales	**6,039**	**6,982**	**–12**	**100**	**100**

Perjeta regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
United States	1,528	1,325	+13	43.4	47.8
Europe	1,092	915	+24	31.0	33.0
Japan	280	143	+90	8.0	5.2
International	622	390	+71	17.6	14.0
Total sales	**3,522**	**2,773**	**+29**	**100**	**100**

Kadcyla regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
United States	635	359	+74	45.6	36.7
Europe	432	376	+19	31.0	38.4
Japan	82	75	+7	5.9	7.7
International	244	169	+56	17.5	17.2
Total sales	**1,393**	**979**	**+45**	**100**	**100**

Sales in the HER2 franchise grew by 4% to CHF 11.0 billion. Herceptin sales were 12% lower, mainly driven by Europe, partially offset by the growth in China where sales increased by 59% due to broader market penetration. The 43% decline in Europe was mainly due to biosimilar launches from mid-2018. In the US, Herceptin sales were 8% lower. In part this was due to patients switching to Kadcyla (which showed 74% growth in the US) and in part due to the launch of the first US biosimilar in July 2019. Sales of Perjeta grew by 29% with increased demand in all regions, notably in the early breast cancer adjuvant setting. Kadcyla sales increased by 45% globally due to the launch of a new indication.

Avastin. For advanced colorectal, breast, lung, kidney, cervical and ovarian cancer, and relapsed glioblastoma.

Avastin regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
United States	3,019	2,904	+2	42.7	42.4
Europe	1,794	1,820	+2	25.4	26.6
Japan	871	847	0	12.3	12.4
International	1,389	1,278	+13	19.6	18.6
Total sales	**7,073**	**6,849**	**+4**	**100**	**100**

Overall sales increased by 4% compared to prior year. In the US, the continued sales growth in all approved indications, with US sales growing at 9% through the first six months of 2019, was impacted by the launch of the first US biosimilar in July 2019. In Europe sales were 2% higher, mainly driven by Germany. In the International region, sales grew by 13%, largely due to broader market penetration in China, where sales increased by 47%. In Japan sales remained stable. The launches of the biosimilar versions of Avastin in Japan in late 2019 had limited impact on sales so far.

Actemra/RoActemra. For rheumatoid arthritis (RA), systemic juvenile idiopathic arthritis, polyarticular juvenile idiopathic arthritis and giant cell arteritis.

Actemra/RoActemra regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
United States	944	857	+8	40.8	39.7
Europe	705	701	+4	30.5	32.5
Japan	398	354	+9	17.2	16.4
International	264	248	+14	11.5	11.4
Total sales	**2,311**	**2,160**	**+8**	**100**	**100**

Sales increased by 8%, with growth in all regions, driven by the uptake of the subcutaneous formulation. The US was the major contributor to the sales increase, along with Japan.

Xolair. For moderate to severe persistent allergic asthma (AA) and chronic idiopathic urticaria (CIU).

Xolair regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
United States	1,969	1,912	+1	100	100
Total sales	**1,969**	**1,912**	**+1**	**100**	**100**

Sales grew by 1%, driven by demand growth in chronic idiopathic urticaria and expansion of the overall asthma market. Xolair remains the market leader in the allergic asthma indication.

Ocrevus. For relapsing forms of multiple sclerosis (RMS) and primary progressive multiple sclerosis (PPMS).

Ocrevus regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
United States	3,049	2,080	+44	82.2	88.4
Europe	495	206	+148	13.3	8.8
International	164	67	+161	4.5	2.8
Total sales	**3,708**	**2,353**	**+57**	**100**	**100**

There was continuously growing demand in both indications in the US, with growth driven both by new and returning patients. In Europe and the International region Ocrevus continues to show strong uptake where launched, notably in Germany, Italy, Spain and UK.

Lucentis. For wet age-related macular degeneration (wet AMD), macular oedema following retinal vein occlusion (RVO), diabetic macular oedema (DME) and diabetic retinopathy (DR).

Lucentis regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
United States	1,826	1,659	+8	100	100
Total sales	**1,826**	**1,659**	**+8**	**100**	**100**

US sales grew 8% driven by increased market share across all indications and the ongoing rollout of prefilled syringes.

Tecentriq. For advanced bladder cancer, advanced lung cancer, initial therapy of non-squamous non-small cell lung cancer (NSCLC), extensive-stage small cell lung cancer and PD-L1-positive triple-negative breast cancer.

Tecentriq regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
United States	1,180	469	+148	62.9	60.8
Europe	349	152	+138	18.6	19.7
Japan	188	81	+126	10.0	10.5
International	158	70	+138	8.5	9.0
Total sales	**1,875**	**772**	**+143**	**100**	**100**

Sales grew by 143% with growth in all regions, notably the US, where higher sales were driven by the new indications for extensive-stage small cell lung cancer and PD-L1-positive triple-negative breast cancer. In Europe, sales grew mainly due to launches in Italy, Spain and Germany. Sales in Japan increased due to the growth in the treatment of non-squamous NSCLC.

Hemlibra. For haemophilia A.

Hemlibra regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
United States	943	154	Over +500	68.3	68.8
Europe	165	42	+308	12.0	18.8
Japan	232	26	Over +500	16.8	11.6
International	40	2	Over +500	2.9	0.8
Total sales	**1,380**	**224**	**Over +500**	**100**	**100**

Hemlibra was first approved for sale by the US Food and Drug Administration (FDA) in November 2017 and since then has been launched in all regions. In the US, sales grew due to broader market penetration and strong demand in severe non-inhibitor patients.

Activase/TNKase. For acute ischaemic stroke (AIS) and acute myocardial infarction (AMI).

Activase/TNKase regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
United States	1,278	1,231	+2	95.9	96.0
International	54	53	+2	4.1	4.0
Total sales	**1,332**	**1,284**	**+2**	**100**	**100**

Sales were 2% higher, led by the US, and mainly driven by broader use in hospitals and a higher number of patients being treated.

Esbriet. For idiopathic pulmonary fibrosis (IPF).

Esbriet regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
United States	806	754	+5	71.4	73.1
Europe	263	230	+18	23.3	22.3
International	60	47	+34	5.3	4.6
Total sales	**1,129**	**1,031**	**+9**	**100**	**100**

Sales grew by 9%, with continued growth across Europe, the US and International. In Europe sales increased by 18% driven by growth in Italy and Spain.

Pharmaceuticals Division – Sales by region

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
United States	26,711	23,233	+13	55.1	52.8
Europe	8,453	8,693	+1	17.4	19.8
Japan	4,143	3,701	+9	8.5	8.4
International	9,209	8,340	+15	19.0	19.0
Total sales	**48,516**	**43,967**	**+11**	**100**	**100**

United States. Sales grew by 13% led by Ocrevus, Hemlibra and Tecentriq. Ocrevus sales increased by 44% and were driven by both new and returning patient demand. Hemlibra sales showed strong uptake since the launch in November 2017. Tecentriq sales increased by 148%, which was mainly driven by growth in new indications. The HER2 franchise grew by 4%, with the sales increase of Kadcyla being due to the launch of a new indication and the increase in Perjeta being especially driven by the early breast cancer adjuvant setting. Avastin sales increased by 2% due to continued growth in all indications, partly offset by the launch of the first biosimilars from July 2019. The first biosimilars of Herceptin were also launched in mid-2019 and of MabThera/Rituxan in late 2019.

Europe. Sales grew by 1% for the full year (compared to a 4% decline in the first six months of 2019) with the launch and continuous uptake of new products more than compensating for the impact of biosimilars by the full year. Herceptin and MabThera/Rituxan sales decreased 43% and 33% respectively, due to the competition from biosimilars. There was strong growth of Ocrevus and Perjeta, notably in Germany. Tecentriq sales continued to grow, following launches in Italy and Spain and continued uptake in Germany and France. Alecensa sales increased, in particular in France, Italy and Germany. The growth of Hemlibra sales was driven by France, Germany, Italy and the UK.

Japan. Sales increased by 9%, driven by the new products including Hemlibra, Tecentriq and Gazyva/Gazyvaro, which were all launched in 2018. The HER2 franchise grew by 26%, with sales increase of Perjeta of 90% due to the launch of a new indication. This growth was partially offset by lower sales of MabThera/Rituxan (–44%), Xeloda (–36%), Tarceva (–46%) and Herceptin (–5%) which were negatively affected by competing products such as biosimilars and generics. The sales of Avastin remained stable. The launches of the biosimilar versions of Avastin in Japan in late 2019 had limited impact on sales.

International. Sales increased by 15%, mainly due to the 36% growth in China, where there was broader market penetration for Herceptin, Avastin and MabThera/Rituxan and new launches for Perjeta and Alecensa. Sales in China towards the end of 2019 were impacted by a reduction in the level of channel inventory. The growth in Russia of 96% was driven by the inclusion of Perjeta and Kadcyla in the National Oncology Program as well as the launch of Tecentriq. Excluding China and Russia, sales in the rest of the International region increased by 5% with growth in new products (Perjeta, Ocrevus, Tecentriq and Kadcyla) more than offsetting a decline in Herceptin and MabThera/Rituxan.

Pharmaceuticals Division – Sales for E7 leading emerging markets

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
Brazil	889	909	+4	1.8	2.1
China	3,062	2,307	+36	6.4	5.2
India	64	62	+4	0.1	0.1
Mexico	259	260	–2	0.5	0.6
Russia	244	127	+96	0.5	0.3
South Korea	373	340	+14	0.8	0.8
Turkey	250	257	+12	0.5	0.6
Total sales	**5,141**	**4,262**	**+25**	**10.6**	**9.7**

Competition from generic medicines and biosimilars

The Group's pharmaceutical products are generally protected by patent rights, which are intended to provide the Group with exclusive marketing rights in various countries. However, patent rights are of varying scope and duration, and the Group may be required to enter into costly litigation to enforce its patent and other intellectual property rights. Loss of market exclusivity for one or more major products – either due to patent expiration, challenges from generic medicines, biosimilars and non-comparable biologics or other reasons – could have a material adverse effect on the Group's business, results of operations or financial condition. The introduction of a generic, biosimilar or non-comparable biologic version of the same or a similar medicine typically results in a significant reduction in net sales for the relevant product, as other manufacturers typically offer their versions at lower prices.

Patents and their expiry are, and always have been, an integral part of the Group's business model and future growth will remain driven by innovation. The latest information from clinical studies is included in the Annual Report on pages 42 to 57 and details of the Group's Product Development Portfolio are available for download at:
http://www.roche.com/research_and_development/who_we_are_how_we_work/pipeline.htm

2019 product sales affected by recent patent expiry

	2019 (CHF m)	2018 (CHF m)	% change (CER)	Comment
Tarceva	298	538	–44	Patent expiry in US in 2018

The intellectual property for biologics can involve multiple patents and patent timelines for each individual product and therefore it is more difficult to give an exact date for patent expiry for biologic medicines. The basic, primary patents for the Group's major biologic medicines begin to expire as follows:

- MabThera/Rituxan: from 2018 in the US.
- Herceptin: from 2019 in the US.
- Avastin: from 2019 in the US and from 2020 in the EU.
- Subcutaneous formulations of MabThera/Rituxan and Herceptin: beyond 2025 (secondary patent rights).

Biosimilar competition for these three products had an estimated negative impact of CHF 1.5 billion in 2019, with the main impact being sales of MabThera/Rituxan and Herceptin which fell by CHF 1.2 billion (CER) in Europe and Japan.

United States. The first biosimilar versions of Herceptin and Avastin were launched in the US from mid-2019 and the first biosimilar versions of MabThera/Rituxan in late 2019. The estimated impact on 2019 sales was CHF 0.3 billion.

Europe. The first biosimilar versions of MabThera/Rituxan were launched in Europe from mid-2017. They are now marketed in most EU countries and were the major factor in the sales decline of this product in Europe in 2019. The first biosimilar versions of Herceptin were launched in major EU markets from mid-2018. Based on publicly available information from competitor companies, the Group currently anticipates that the first biosimilar versions of Avastin could come to market in Europe in the first half of 2020.

Japan. In Japan, the first biosimilar versions of MabThera/Rituxan and Herceptin were launched in 2018. Sales were impacted by this and by government price cuts. The first biosimilar version of Avastin was launched in late 2019 in the colorectal cancer setting.

2019 product sales affected by biosimilar launches

	2019 (CHF m)	2018 (CHF m)	% change (CER)	Comment
MabThera/Rituxan – US	4,488	4,290	+3	First biosimilar launches from late 2019
Herceptin – US	2,707	2,908	–8	First biosimilar launches from mid-2019
Avastin – US	3,019	2,904	+2	First biosimilar launches from mid-2019
MabThera/Rituxan – Europe	590	916	–33	First biosimilar launches from mid-2017
Herceptin – Europe	1,013	1,849	–43	First biosimilar launches from mid-2018
Avastin – Europe	1,794	1,820	+2	No biosimilar launches by end 2019
MabThera/Rituxan – Japan	109	188	–44	First biosimilar launches from early 2018
Herceptin – Japan	243	249	–5	First biosimilar launches from mid-2018
Avastin – Japan	871	847	0	First biosimilar launches from late 2019[1)]

1) Colorectal cancer indication only.

Sales in 2019 for MabThera/Rituxan, Herceptin and Avastin are disclosed above in the previous sections, including regional breakdowns. These are summarised in the table below. As noted in the previous sections, the year-on-year movements are also driven by regular price and volume changes. Biosimilar competition is only one factor in the overall picture.

Total MabThera/Rituxan, Herceptin and Avastin sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% division sales (2019)	% division sales (2018)
United States	10,214	10,102	0	21.1	23.0
Europe	3,397	4,585	–23	7.0	10.4
Japan	1,223	1,284	–7	2.5	2.9
International	4,755	4,612	+8	9.8	10.5
Total sales	**19,589**	**20,583**	**–4**	**40.4**	**46.8**

The Group derives royalty income from US Patent No. 6,331,415 (known as the Cabilly patent). This patent expired in December 2018. There was residual income after the expiry of CHF 224 million in 2019. Annual royalty income from this patent in 2018 was CHF 929 million.

Operating results

Pharmaceuticals Division – Royalties and other operating income

	2019 (CHF m)	2018 (CHF m)	% change (CER)
Royalty income	1,039	1,670	–39
Income from out-licensing agreements	198	267	–27
Income from disposal of products and other	961	616	+55
Total – IFRS and Core basis	**2,198**	**2,553**	**–15**

Royalties and other operating income decreased by 15% at CER. Royalty income was 39% lower mainly due to the expiry of the Cabilly patent at the end of 2018. The income related to this patent decreased by CHF 705 million to CHF 224 million. Out-licensing income was lower due to the base effect of the higher milestone income in 2018. Income from product disposals and other increased to CHF 961 million driven by income of CHF 446 million from sale of rights for Lexotan, Bactrim and Dormicum and higher profit-share income of CHF 457 million from increased Venclexta and Xolair sales.

Pharmaceuticals Division – Cost of sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)
Manufacturing cost of goods sold and period costs	(6,086)	(5,961)	+3
Royalty expenses	(1,456)	(1,099)	+33
Collaboration and profit-sharing agreements	(2,397)	(2,390)	–1
Impairment of property, plant and equipment	(241)	(54)	+339
Cost of sales – Core basis	**(10,180)**	**(9,504)**	**+7**
Global restructuring plans	(260)	(292)	–10
Amortisation of intangible assets	(1,153)	(969)	+17
Impairment of intangible assets	0	274	–100
Total – IFRS basis	**(11,593)**	**(10,491)**	**+11**

Core costs increased by 7% at CER. As a percentage of sales, cost of sales decreased by 0.7 percentage points to 20.9%. Manufacturing cost of sales grew by 3%, below the sales growth. The volume-driven manufacturing cost increase was partially offset by a favourable product mix and lower inventory write-offs in 2019. Royalty expenses were 33% higher due to increased sales of certain products, notably Ocrevus. In 2019 an impairment of property, plant and equipment for idle plant was recognised. Non-core costs include the amortisation of intangible assets, mainly related to the Esbriet product intangible assets acquired in the InterMune acquisition of 2014. The amortisation charges in 2019 were higher for the Esbriet product intangible assets since the previous impairments were partially reversed at the end of 2018.

Pharmaceuticals Division – Marketing and distribution

	2019 (CHF m)	2018 (CHF m)	% change (CER)
Marketing and distribution – Core basis	**(7,604)**	**(6,939)**	**+10**
Global restructuring plans	(267)	(97)	+171
Amortisation of intangible assets	(33)	(32)	+3
Impairment of intangible assets	(1)	0	–
Total – IFRS basis	**(7,905)**	**(7,068)**	**+12**

Core costs increased by 10% at CER, which was as a percentage of sales a decrease of 0.1 percentage points to 15.7%. Major marketing and distribution activities included supporting the launches and rollouts of Tecentriq, Ocrevus and Xofluza and supporting pre-launch activities. The cost increase was also associated with ramp-up of marketing activities in the Personalised Health Care, Foundation Medicine and Flatiron Health strategic businesses. Restructuring costs were related to the resourcing flexibility initiatives in sales affiliates.

Pharmaceuticals Division – Research and development

	2019 (CHF m)	2018 (CHF m)	% change (CER)
Research and development – Core basis	**(10,228)**	**(9,586)**	**+6**
Global restructuring plans	(141)	(76)	+86
Amortisation of intangible assets	(220)	(130)	+67
Impairment of intangible assets	(632)	(507)	+23
Total – IFRS basis	**(11,221)**	**(10,299)**	**+9**

Core costs increased by 6% at CER and, as a percentage of sales, decreased by 0.7 percentage points to 21.1%. The oncology franchise remained the largest area of research and development with the cancer immunotherapy portfolio being a key driver. Neuroscience and immunology also represent significant areas of spending. In addition, the Pharmaceuticals Division in-licensed pipeline compounds and technologies, which were capitalised as intangible assets. These had a total cost of CHF 1.4 billion (2018: CHF 0.8 billion), of which USD 500 million were initial upfront payments to Adaptive Biotechnologies and Dicerna Pharmaceuticals. Impairment charges of CHF 632 million were incurred for the impairment of different compounds due to either clinical data assessments or decisions to stop the development of the respective compounds.

Pharmaceuticals Division – General and administration

	2019 (CHF m)	2018 (CHF m)	% change (CER)
Administration	(1,496)	(1,422)	+5
Pensions – past service costs	(10)	43	–
Gains (losses) on disposal of property, plant and equipment	(9)	(14)	–40
Business taxes and capital taxes	(195)	(173)	+12
Other general items	23	17	+53
General and administration – Core basis	**(1,687)**	**(1,549)**	**+8**
Global restructuring plans	(68)	(58)	+18
Impairment of goodwill and intangible assets	0	(2,147)	–100
Mergers and acquisitions and alliance transactions	(80)	(91)	–13
Legal and environmental cases	(215)	(24)	Over +500
Pensions – settlement gains (losses)	1	(5)	–
Total – IFRS basis	**(2,049)**	**(3,874)**	**–47**

Core costs increased by 8% in CER and, as a percentage of sales, were stable at 3.5%. Administration costs were higher mainly due to increases at Foundation Medicine and the base effect from Flatiron Health, which was acquired in April 2018. Legal and environmental charges were higher due to an increase in provisions related to the Avastin/Lucentis investigations and an increase in a provision for environmental remediation at the Clarecastle site. Impairment charges in 2018 related to the full write-off of goodwill from the InterMune and Trophos acquisitions.

Roche Pharmaceuticals and Chugai subdivisional operating results

Pharmaceuticals subdivisional operating results in millions of CHF

	Roche Pharmaceuticals		Chugai		Pharmaceuticals Division	
	2019	2018	2019	2018	2019	2018
Sales						
– External customers	44,373	40,266	4,143	3,701	48,516	43,967
– Within division	1,646	1,340	1,224	974	2,870	2,314
Core operating profit	19,217	17,806	2,056	1,186	21,015	18,942
– margin, % of sales to external customers	43.3	44.2	49.6	32.0	43.3	43.1
Operating profit	16,264	13,702	1,940	1,136	17,946	14,788
– margin, % of sales to external customers	36.7	34.0	46.8	30.7	37.0	33.6
Operating free cash flow	18,882	17,193	1,654	658	20,536	17,851
– margin, % of sales to external customers	42.6	42.7	39.9	17.8	42.3	40.6

Pharmaceuticals Division total core operating profit and operating profit both include the elimination of CHF minus 258 million of unrealised intercompany gains between Roche Pharmaceuticals and Chugai (2018: CHF minus 50 million).

The increase in the exchange rate of the Japanese yen had a positive impact of approximately 5% on the Chugai results when expressed in Swiss francs for the Group's consolidated results. At CER (as reported in Japanese yen), sales by Chugai to external customers increased by 9% while sales within the division increased by 22%. Chugai core operating profit increased by 68% due to higher royalty income from Roche Pharmaceuticals as well as higher gross profit from sales to external customers and sales within the division. This was partially offset by lower income from the divestment of established products and higher research and development costs. Operating free cash flow at Chugai increased as a result of the strong operating performance and lower capital expenditures, due to the base effect of the land purchase in Yokohama, Japan, in 2018.

Financial position

Pharmaceuticals Division – Net operating assets

	2019 (CHF m)	2018 (CHF m)	% change (CHF)	% change (CER)	Movement: Transactions (CHF m)	Movement: CTA and other (CHF m)
Trade receivables	7,418	6,746	+10	+13	828	(156)
Inventories	3,696	4,284	–14	–12	(540)	(48)
Trade payables	(2,007)	(1,642)	+22	+23	(387)	22
Net trade working capital	**9,107**	**9,388**	**–3**	**–1**	**(99)**	**(182)**
Other receivables (payables)	(7,666)	(6,916)	+11	+13	(850)	100
Net working capital	**1,441**	**2,472**	**–42**	**–36**	**(949)**	**(82)**
Property, plant and equipment	15,306	15,123	+1	+2	351	(168)
Right-of-use assets	801	–	–	–	11	790
Goodwill and intangible assets	15,784	12,180	+30	+31	3,812	(208)
Provisions	(3,140)	(2,508)	+25	+27	(709)	77
Other long-term assets, net	365	420	–13	–12	(78)	23
Long-term net operating assets	**29,116**	**25,215**	**+15**	**+17**	**3,387**	**514**
Net operating assets	**30,557**	**27,687**	**+10**	**+12**	**2,438**	**432**

The absolute amount of the movement between the 2019 and 2018 consolidated balances reported in Swiss francs is split between actual 2019 transactions (translated at average rates for 2018) and the currency translation adjustment (CTA) that arises on consolidation. The 2019 transactions include non-cash movements and therefore the movements in this table are not the same as the amounts shown in the operating free cash flow (which only includes the cash movements). A full consolidated balance sheet is given on page 45 of the Annual Financial Statements, and a reconciliation between that balance sheet and the information given above is on pages 167–168.

Currency translation effects on balance sheet amounts. Compared to the start of the year the Swiss franc appreciated against the US dollar, resulting in a negative translation impact on net operating assets. The exchange rates used are given on page 30.

Net working capital. Net working capital decreased by 36%, due to a higher net liability for other receivables/payables, while net trade working capital was 1% lower. Trade receivables were higher following the underlying sales growth in the business. Inventories decreased primarily due to write-offs and lower inventory levels for certain mature products. The increase in trade payables was mainly due to the outstanding USD 200 million upfront payment due to Dicerna Pharmaceuticals. The net liability position for other receivables/payables increased mainly due to higher accruals for rebates and chargebacks.

Long-term net operating assets. Overall long-term net operating assets increased by 17% largely due to the Spark Therapeutics acquisition, where the initial purchase price allocation added CHF 4.5 billion to goodwill. There was an increase of CHF 0.8 billion from right-of-use assets because of the implementation of IFRS 16 at the beginning of the year. The increase in provisions is mainly attributable to ongoing litigations and restructuring activities. Capital expenditure includes investments at the Basel and Kaiseraugst site in Switzerland and at the South San Francisco campus in the US, manufacturing investments in Switzerland, the US, Japan and Germany as well as expenditure for the new research facilities in Yokohama, Japan.

Free cash flow

Pharmaceuticals Division – Operating free cash flow

	2019 (CHF m)	2018 (CHF m)	% change (CHF)	% change (CER)
Operating profit	**17,946**	**14,788**	**+21**	**+23**
– Depreciation, amortisation and impairment	3,729	4,777	–22	–23
– Provisions	779	113	Over +500	Over +500
– Equity compensation plans	464	392	+18	+17
– Other	495	624	–21	–73
Operating profit cash adjustments	**5,467**	**5,906**	**–7**	**–14**
Operating profit, net of operating cash adjustments	**23,413**	**20,694**	**+13**	**+12**
(Increase) decrease in net working capital	385	617	–38	–46
Investments in property, plant and equipment	(1,889)	(2,584)	–27	–27
Principal portion of lease liabilities paid	(248)	–	–	–
Investments in intangible assets	(1,125)	(876)	+28	+27
Operating free cash flow	**20,536**	**17,851**	**+15**	**+14**
– as % of sales	42.3	40.6	+1.7	+1.1

See pages 164–166 for the definition of free cash flow and a detailed breakdown.

The Pharmaceuticals Division's operating free cash flow increased by 14% at CER to CHF 20.5 billion. Operating profit, net of operating cash adjustments increased by 12%, in line with the core operating profit growth of 12%. Net working capital was lower due to reductions in net trade working capital, for the reasons described above in the 'Financial position' section, and an increase in accruals for rebates and chargebacks. Capital expenditure was lower due to the base effect in 2018 of the Yokohama land purchase and the final payment of the Genentech property lease option exercise. Investments in intangible assets were higher than in 2018 and include USD 300 million for an initial upfront payment to Adaptive Biotechnologies.

Diagnostics Division operating results

Diagnostics Division operating results

	2019 (CHF m)	2018 (CHF m)	% change (CHF)	% change (CER)
IFRS results				
Sales	12,950	12,879	+1	+3
Royalties and other operating income	87	98	–11	–10
Revenue	**13,037**	**12,977**	**0**	**+3**
Cost of sales	(6,758)	(6,778)	0	+2
Marketing and distribution	(3,055)	(3,041)	0	+2
Research and development	(1,553)	(1,793)	–13	–13
General and administration	(1,429)	(748)	+91	+92
Operating profit	**242**	**617**	**–61**	**–46**
– margin, % of sales	1.9	4.8	–2.9	–2.3
Core results [1]				
Sales	12,950	12,879	+1	+3
Royalties and other operating income	87	82	+6	+6
Revenue	**13,037**	**12,961**	**+1**	**+3**
Cost of sales	(6,183)	(5,960)	+4	+6
Marketing and distribution	(2,909)	(2,966)	–2	0
Research and development	(1,468)	(1,461)	0	+1
General and administration	(511)	(528)	–3	–2
Core operating profit	**1,966**	**2,046**	**–4**	**+1**
– margin, % of sales	15.2	15.9	–0.7	–0.4
Financial position				
Net working capital	2,742	2,697	+2	+5
Long-term net operating assets	11,036	11,625	–5	–3
Net operating assets	**13,778**	**14,322**	**–4**	**–1**
Free cash flow [2]				
Operating free cash flow	963	1,416	–32	–28
– margin, % of sales	7.4	11.0	–3.6	–3.3

1) See pages 161–164 for the definition of core results.
2) See pages 164–166 for the definition of free cash flow.

Sales

Diagnostics Division – Sales by business area

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
Centralised and Point of Care Solutions	7,819	7,768	+3	60.4	60.3
Molecular Diagnostics	2,109	2,019	+6	16.3	15.7
Diabetes Care	1,918	1,980	+1	14.8	15.4
Tissue Diagnostics	1,104	1,112	0	8.5	8.6
Total sales	**12,950**	**12,879**	**+3**	**100**	**100**

The Diagnostics Division reported sales growth of 3% at CER to CHF 12.9 billion. Centralised and Point of Care Solutions, led by its immunodiagnostics business, had 3% sales growth, mainly due to China and emerging markets. Molecular Diagnostics sales increased by 6%, with growth of 6% in the underlying molecular business. Diabetes Care sales increased by 1% driven by higher sales in North America (+15%) partially offset by price pressure in the Europe, Middle East and Africa (EMEA) region. Sales in Tissue Diagnostics were stable due to higher sales of advanced staining reagents offset by lower instrument sales.

Centralised and Point of Care Solutions regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
Europe, Middle East and Africa (EMEA)	2,714	2,723	+3	34.7	35.1
North America	1,523	1,541	–3	19.5	19.8
Rest of the World	3,582	3,504	+5	45.8	45.1
Total sales	**7,819**	**7,768**	**+3**	**100**	**100**

With an increase in sales of 3%, the Centralised and Point of Care Solutions business area was the major contributor to the divisional performance, with growth being primarily driven by the immunodiagnostics business (+6%), due to instrument launches and the ongoing rollouts, mainly in China, the US and South Korea. This was partially offset by a decline in coagulation monitoring sales in North America.

Molecular Diagnostics regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
Europe, Middle East and Africa (EMEA)	783	770	+6	37.1	38.1
North America	807	766	+4	38.3	37.9
Rest of the World	519	483	+10	24.6	24.0
Total sales	**2,109**	**2,019**	**+6**	**100**	**100**

Overall Molecular Diagnostics sales rose by 6%, with 6% growth in the underlying molecular business as well as an increase in the sequencing business. Regional growth was led by Asia-Pacific (+16%), mainly in China, and EMEA (+6%). The sales growth in the molecular business came from an increased demand in blood screening which grew by 7%, mainly in the US, China and Germany.

Diabetes Care regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
Europe, Middle East and Africa (EMEA)	1,120	1,212	–5	58.4	61.2
North America	309	265	+15	16.1	13.4
Rest of the World	489	503	+5	25.5	25.4
Total sales	**1,918**	**1,980**	**+1**	**100**	**100**

Diabetes Care sales increased by 1%, led by North America (+15%) due to growth in the Accu-Chek Guide product line. In EMEA there was a 5% decline due to price pressure in Germany, UK and Italy.

Tissue Diagnostics regional sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
Europe, Middle East and Africa (EMEA)	280	281	+4	25.4	25.3
North America	614	641	–6	55.6	57.6
Rest of the World	210	190	+13	19.0	17.1
Total sales	**1,104**	**1,112**	**0**	**100**	**100**

Tissue Diagnostics sales were stable. The higher sales of advanced-staining reagents were offset by lower sales due to delays in the shipment of instruments. Regionally, the decline in sales was in North America, while Asia-Pacific sales increased by 14%, with China being the main growth market.

Diagnostics Division – Sales by region

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
Europe, Middle East and Africa (EMEA)	4,897	4,986	+2	37.9	38.7
Asia-Pacific	3,437	3,334	+6	26.5	25.9
North America	3,253	3,213	0	25.1	24.9
Latin America	854	844	+12	6.6	6.6
Japan	509	502	–2	3.9	3.9
Total sales	**12,950**	**12,879**	**+3**	**100**	**100**

The immunodiagnostics business in Centralised and Point of Care Solutions was the global driver of sales growth. The sales increase in Asia-Pacific was mainly in China and South Korea following increased reagent sales on installed instruments, partly offset by a reduction in channel inventory in China. In North America sales were stable due to higher sales in blood glucose monitoring and immunodiagnostics offset by a decline in the coagulation monitoring business.

Diagnostics Division – Sales for E7 leading emerging markets

	2019 (CHF m)	2018 (CHF m)	% change (CER)	% of sales (2019)	% of sales (2018)
Brazil	241	245	+5	1.9	1.9
China	2,263	2,208	+5	17.3	17.2
India	192	177	+10	1.5	1.4
Mexico	143	132	+6	1.1	1.0
Russia	180	159	+15	1.4	1.2
South Korea	241	223	+13	1.9	1.7
Turkey	126	120	+22	1.0	0.9
Total sales	**3,386**	**3,264**	**+7**	**26.1**	**25.3**

Operating results

Diagnostics Division – Royalties and other operating income

	2019 (CHF m)	2018 (CHF m)	% change (CER)
Royalty income	65	58	+13
Income from out-licensing agreements	0	2	–97
Income from disposal of products and other	22	22	+1
Royalties and other operating income – Core basis	**87**	**82**	**+6**
Global restructuring plans	0	16	–100
Total – IFRS basis	**87**	**98**	**–10**

Core royalties and other operating income increased by 6% at CER driven by higher royalty income due to the settlement of a royalty dispute.

Diagnostics Division – Cost of sales

	2019 (CHF m)	2018 (CHF m)	% change (CER)
Manufacturing cost of goods sold and period costs	(6,079)	(5,790)	+7
Royalty expenses	(103)	(169)	–39
Impairment of property, plant and equipment	(1)	(1)	+95
Cost of sales – Core basis	**(6,183)**	**(5,960)**	**+6**
Global restructuring plans	(120)	(108)	+12
Amortisation of intangible assets	(111)	(142)	–22
Impairment of intangible assets	(344)	(568)	–40
Total – IFRS basis	**(6,758)**	**(6,778)**	**+2**

Core costs increased by 6% at CER, above the sales growth of 3%. This was due to higher costs from external suppliers and increased costs for technical and engineering services. Royalty expenses were significantly lower as a result of the renegotiation of a licensing agreement. The core cost of sales ratio increased by 1.5 percentage points to 47.8%. Global restructuring costs increased due to strategy plans. Amortisation of intangible assets is lower following the impairments of intangible assets recognised in the second half of 2018. Impairment charges related to intangible assets in Molecular Diagnostics and sequencing businesses.

Diagnostics Division – Marketing and distribution

	2019 (CHF m)	2018 (CHF m)	% change (CER)
Marketing and distribution – Core basis	**(2,909)**	**(2,966)**	**0**
Global restructuring plans	(138)	(71)	+103
Amortisation of intangible assets	(8)	(4)	+74
Total – IFRS basis	**(3,055)**	**(3,041)**	**+2**

Core costs were stable at CER, due to higher marketing expenses for the digital solutions business that were offset by lower bad debt expenses. Regionally, higher spending in Asia-Pacific was offset by lower expenses in Europe and North America. On a core basis, marketing and distribution costs as a percentage of sales decreased to 22.5% compared to 23.0% in 2018. The increase in global restructuring plan cost relates to transformation projects affecting the sales force.

Diagnostics Division – Research and development

	2019 (CHF m)	2018 (CHF m)	% change (CER)
Research and development – Core basis	**(1,468)**	**(1,461)**	**+1**
Global restructuring plans	(78)	(34)	+135
Amortisation of intangible assets	(7)	(17)	–60
Impairment of intangible assets	0	(281)	–100
Total – IFRS basis	**(1,553)**	**(1,793)**	**–13**

Core costs increased by 1% at CER, due to spending in new projects in cardiac disease within the Centralised and Point of Care Solutions portfolio, as well as increased spending for laboratory automation. This was partly offset by lower spending in development projects, notably in Molecular Diagnostics and Diabetes Care. As a percentage of sales, research and development core costs were stable at 11.3%. Global restructuring costs were due to strategy plans. In 2018, impairment charges related to intangible assets of the sequencing business.

Diagnostics Division – General and administration

	2019 (CHF m)	2018 (CHF m)	% change (CER)
Administration	(540)	(549)	0
Pensions – past service costs	(1)	11	–
Gains (losses) on disposal of property, plant and equipment	12	0	–
Gains (losses) on disposal of divestment of subsidiaries	1	0	–
Business taxes and capital taxes	(19)	(8)	+144
Other general items	36	18	+105
General and administration – Core basis	**(511)**	**(528)**	**–2**
Global restructuring plans	(5)	(38)	–84
Impairment of goodwill and intangible assets	(779)	(107)	Over +500
Mergers and acquisitions and alliance transactions	123	56	+116
Legal and environmental cases	(257)	(131)	+94
Total – IFRS basis	**(1,429)**	**(748)**	**+92**

Core costs decreased by 2% at CER due to a gain on property disposal. Administration costs were stable due to cost containment initiatives, while business taxes were higher due to the base effect of the settlement agreement for the Medical Device Excise Tax in the US in 2018. As a percentage of sales, core costs decreased to 3.9% from 4.1% in 2018. The impairment charges of CHF 779 million are the partial write-off of the goodwill related to the Diabetes Care business. Mergers and acquisitions and alliance transactions include income from the reversal of contingent consideration provisions. Legal and environmental costs in 2019 included litigation costs for the Meso case.

Financial position

Diagnostics Division – Net operating assets

	2019 (CHF m)	2018 (CHF m)	% change (CHF)	% change (CER)	Movement: Transactions (CHF m)	Movement: CTA and other (CHF m)
Trade receivables	3,143	3,154	0	+3	74	(85)
Inventories	2,359	2,336	+1	+4	91	(68)
Trade payables	(1,065)	(1,108)	–4	–2	18	25
Net trade working capital	**4,437**	**4,382**	**+1**	**+4**	**183**	**(128)**
Other receivables (payables)	(1,695)	(1,685)	+1	+2	(40)	30
Net working capital	**2,742**	**2,697**	**+2**	**+5**	**143**	**(98)**
Property, plant and equipment	6,598	6,413	+3	+6	365	(180)
Right-of-use assets	303	–	–	–	(12)	315
Goodwill and intangible assets	5,030	6,114	–18	–16	(991)	(93)
Provisions	(958)	(948)	+1	+3	(30)	20
Other long-term assets, net	63	46	+37	+41	19	(2)
Long-term net operating assets	**11,036**	**11,625**	**–5**	**–3**	**(649)**	**60**
Net operating assets	**13,778**	**14,322**	**–4**	**–1**	**(506)**	**(38)**

The absolute amount of the movement between the 2019 and 2018 consolidated balances reported in Swiss francs is split between actual 2019 transactions (translated at average rates for 2018) and the currency translation adjustment (CTA) that arises on consolidation. The 2019 transactions include non-cash movements and therefore the movements in this table are not the same as the amounts shown in the operating free cash flow (which only includes the cash movements). A full consolidated balance sheet is given on page 45 of the Annual Financial Statements, and a reconciliation between that balance sheet and the information given above is on pages 167–168.

Currency translation effects on balance sheet amounts. Compared to the start of the year the Swiss franc appreciated against the euro and the US dollar, resulting in a negative translation impact on net operating assets. The exchange rates used are given on page 30.

Net working capital. Net working capital increased by 5%, while net trade working capital increased by 4%. These increases were mainly attributable to trade receivables and inventories, which increased by 3% and 4% respectively. Trade receivables increased due to the growth in sales and a change in distributor channels in Middle East. The increase in inventories was due to quality issues and an increase in instruments pending placement.

Long-term net operating assets. Overall long-term net operating assets decreased by 3% at CER, which was mainly a result of the impairment of goodwill and intangible assets. The right-of-use assets recorded in 2019 were a result of the implementation of IFRS 16. Provisions increased due to higher litigation and restructuring provisions, partially offset by the reversal of the contingent consideration provisions. Capital expenditure relates to instrument placements, manufacturing expansion projects in Germany and a site consolidation project in the US.

Free cash flow

Diagnostics Division – Operating free cash flow

	2019 (CHF m)	2018 (CHF m)	% change (CHF)	% change (CER)
Operating profit	**242**	**617**	**–61**	**–46**
– Depreciation, amortisation and impairment	2,483	2,217	+12	+13
– Provisions	169	116	+46	+46
– Equity compensation plans	92	78	+18	+16
– Other	187	281	–33	–31
Operating profit cash adjustments	**2,931**	**2,692**	**+9**	**+10**
Operating profit, net of operating cash adjustments	**3,173**	**3,309**	**–4**	**0**
(Increase) decrease in net working capital	(276)	(511)	–46	–43
Investments in property, plant and equipment	(1,551)	(1,379)	+12	+15
Principal portion of lease liabilities paid	(115)	–	–	–
Investments in intangible assets	(268)	(3)	Over +500	Over +500
Operating free cash flow	**963**	**1,416**	**–32**	**–28**
– as % of sales	7.4	11.0	–3.6	–3.3

For the definition of free cash flow and a detailed breakdown see pages 164–166.

The operating free cash flow of the Diagnostics Division was a net cash inflow of CHF 963 million, a decrease of 28% at CER compared to 2018. The cash generation of the business, measured by the operating profit, net of operating cash adjustments, was stable compared to the 1% increase in core operating profit. This difference was due to higher cash spending on restructuring and litigation cases. Net working capital movement absorbed CHF 276 million of cash in 2019, which was due to increases in inventories and trade receivables, as mentioned above in the 'Financial position' comments. Capital expenditure of CHF 1.6 billion was due to the items mentioned above in the 'Financial position' section, with the increased spending relative to 2018 being driven by a site consolidation project in the US of CHF 122 million. Investments in intangible assets were mainly related to an in-licensing deal of CHF 215 million.

Corporate operating results

Corporate operating results summary

	2019 (CHF m)	2018 (CHF m)	% change (CER)
Administration	(470)	(454)	+4
Pensions – past service costs	0	1	–100
Business taxes and capital taxes	(13)	(16)	–20
Other general items	(19)	(14)	–
General and administration costs – Core basis[1]	**(502)**	**(483)**	**+7**
Global restructuring plans	(129)	(149)	–14
Legal and environmental cases	(9)	(4)	+118
Total costs – IFRS basis	**(640)**	**(636)**	**+3**
Financial position			
Net working capital	(240)	(214)	+13
Long-term net operating assets	(5)	(44)	–78
Net operating assets	**(245)**	**(258)**	**–3**
Free cash flow[2]			
Operating free cash flow	(578)	(526)	+11

1) See pages 161–164 for the definition of core results.
2) See pages 164–166 for the definition of free cash flow and a detailed breakdown.

General and administration costs increased by 7% at CER on a core basis, driven by higher project-related administration costs in most corporate functions. The lower restructuring costs came from a reduction in restructuring activities in IT and Procurement. Net working capital was lower due to higher payables. The change in long-term net operating assets was largely attributable to right-of-use assets recorded following the implementation of IFRS 16. Corporate operating free cash flow showed a higher outflow due to settlement of payables.

Foreign exchange impact on operating results

The Group's exposure to movements in foreign currencies affecting its operating results, as expressed in Swiss francs, is summarised by the following key figures and comments.

Growth (reported at CER and in CHF)

	% change (CER)		% change (CHF)	
	2019	2018	2019	2018
Pharmaceuticals Division				
Sales	+11	+7	+10	+7
Core operating profit	+12	+8	+11	+8
Diagnostics Division				
Sales	+3	+7	+1	+7
Core operating profit	+1	+9	–4	+7
Group				
Sales	+9	+7	+8	+7
Core operating profit	+11	+9	+10	+8

Exchange rates against the Swiss franc

	31 December 2019	Average 2019	31 December 2018	Average 2018
1 USD	0.97	0.99	0.98	0.98
1 EUR	1.09	1.11	1.13	1.15
100 JPY	0.89	0.91	0.89	0.89

The results expressed in Swiss francs were negatively impacted by the stronger Swiss franc on average against the euro and Latin American currencies, partly offset by the appreciation of the US dollar against the Swiss franc. There was a 1 percentage point net impact on sales and core operating profit expressed in Swiss francs compared to constant exchange rates and a 2 percentage point net impact on Core EPS. The sensitivity of Group sales and core operating profit to a 1% change in average foreign currency exchange rates against the Swiss franc during 2019 is shown in the table below.

Currency sensitivities

Impact of 1% increase in average exchange rate versus the Swiss franc	Sales (CHF m)	Core operating profit (CHF m)
US dollar	+305	+126
Euro	+92	+35
Japanese yen	+47	+38
All other currencies	+157	+84

The Group's revenues are primarily generated from sales of products to customers. Such revenues are mainly received in the local currency of the customer's home market, although in certain emerging markets invoicing is made in major international currencies such as the US dollar and euro. Cost of sales, marketing and some administration costs follow the same currency pattern as sales. The majority of research and development activities are incurred at the Group's global research facilities, and therefore the costs are mainly concentrated in US dollars, Swiss francs and euros. General and administration costs tend to be incurred mainly at central locations in the US, Switzerland and Germany. Chugai's revenues and costs are denominated in Japanese yen.

Treasury and taxation results

Treasury and taxation results

	2019 (CHF m)	2018 (CHF m)	% change (CHF)	% change (CER)
IFRS results				
Operating profit	17,548	14,769	+19	+21
Financing costs	(993)	(770)	+29	+28
Other financial income (expense)	59	149	–60	–64
Profit before taxes	**16,614**	**14,148**	**+17**	**+19**
Income taxes	(2,506)	(3,283)	–24	–23
Net income	**14,108**	**10,865**	**+30**	**+32**
Attributable to				
– Roche shareholders	13,497	10,500	+29	+31
– Non-controlling interests	611	365	+67	+64
Core results[1]				
Operating profit	22,479	20,505	+10	+11
Financing costs	(962)	(744)	+29	+28
Other financial income (expense)	59	149	–60	–64
Profit before taxes	**21,576**	**19,910**	**+8**	**+10**
Income taxes	(3,514)	(3,929)	–11	–10
Net income	**18,062**	**15,981**	**+13**	**+14**
Attributable to				
– Roche shareholders	17,416	15,593	+12	+13
– Non-controlling interests	646	388	+66	+63
Financial position				
Net debt	(2,505)	(5,652)	–56	–53
Lease liabilities	(1,219)	–	–	–
Pensions	(6,535)	(6,140)	+6	+9
Income taxes	1,312	(89)	–	–
Equity investments	737	559	+32	+32
Derivatives, net	(88)	(15)	+487	+469
Collateral, net	148	6	Over +500	Over +500
Interest payable	(176)	(221)	–20	–19
Other non-operating assets, net	103	167	–38	–39
Total net assets (liabilities)	**(8,223)**	**(11,385)**	**–28**	**–25**
Free cash flow[2]				
Treasury activities	(614)	(642)	–4	–5
Taxes paid	(3,543)	(3,288)	+8	+7
Total	**(4,157)**	**(3,930)**	**+6**	**+5**

1) See pages 161–164 for the definition of core results.
2) See pages 164–166 for the definition of free cash flow.

Financing costs

Core financing costs were CHF 962 million, an increase of 28% at CER compared to 2018 due to losses on early debt redemption of CHF 202 million in 2019 (none in 2018). Interest expenses, including amortisation of debt discount and issue costs, remained stable at CHF 602 million. The net interest cost of defined benefit pension plans was CHF 140 million. A full analysis of financing costs is given in Note 4 to the Annual Financial Statements.

Other financial income (expense)

Core other financial income (expense) was a net income of CHF 59 million compared to a net income of CHF 149 million in 2018. Net income from equity securities was a gain of CHF 185 million, driven by unrealised gains in a Roche Venture Fund investment in Allakos. This compares to a net gain of CHF 311 million in 2018, when the Group realised a gain on sale of Avexis shares of CHF 100 million as well as unrealised gains on Allakos. The net foreign exchange results, which reflect hedging costs and losses on unhedged positions, were losses of CHF 205 million compared to net losses of CHF 160 million in 2018. A full analysis of other financial income (expense) is given in Note 4 to the Annual Financial Statements.

Income taxes

The Group's effective core tax rate decreased by 3.4 percentage points to 16.3% in 2019. This was mainly due to the impacts from the resolution of several tax disputes. Some tax disputes were resolved in the first half of 2019 and additional, unrelated tax disputes were resolved in the second half of 2019. This resulted in a positive income statement impact of CHF 454 million, equivalent to 2.1 percentage points on the effective core tax rate for the full year 2019.

The IFRS results saw the effective tax rate decrease by 8.1 percentage points. In addition to the core impacts mentioned above, the lower goodwill impairments, the non-core impacts from the Swiss tax reform, as described below, and the deferred tax impact from equity compensation plans further decreased the IFRS tax rate. The IFRS results also include the releases of contingent consideration provisions that are not taxable, hence the net effect in the 'Mergers and acquisitions and alliance transactions' line in the table below.

In Switzerland changes to the Swiss federal and canton Basel-Stadt tax laws were enacted during the first half of 2019. The relevant changes for the Roche Group include a decrease in the Basel-Stadt tax rate, effective from 1 January 2019, and new limitations. These changes do not reduce the Group's effective tax rate in Basel-Stadt. Changes in the tax laws in other Swiss cantons where the Group operates were enacted during the second half of 2019. The Group has carried out a remeasurement of its deferred tax positions, which resulted in a transitional deferred tax income of CHF 236 million in 2019. This has been reported as a non-core item and has no impact on tax payments.

Further details of the Group's income tax expenses and related balance sheet positions are given in Note 5 to the Annual Financial Statements.

Analysis of the Group's effective tax rate

	2019			2018		
	Profit before tax (CHF m)	Income taxes (CHF m)	Tax rate (%)	Profit before tax (CHF m)	Income taxes (CHF m)	Tax rate (%)
Group's effective tax rate – Core basis	**21,576**	**(3,514)**	**16.3**	**19,910**	**(3,929)**	**19.7**
Global restructuring plans	(1,206)	236	19.6	(909)	150	16.5
Goodwill and intangible assets	(3,288)	338	10.3	(4,630)	413	8.9
Mergers and acquisitions and alliance transactions	29	23	–	(50)	29	–
Legal and environmental cases	(498)	81	16.3	(168)	37	22.0
Pension plan settlements	1	0	–	(5)	1	20.0
Transitional effect of changes in US tax rates	–	–	–	–	35	–
Transitional effect of Swiss tax reform	–	236	–	–	–	–
Normalisation of equity compensation plan tax benefit	–	94	–	–	(19)	–
Group's effective tax rate – IFRS basis	**16,614**	**(2,506)**	**15.1**	**14,148**	**(3,283)**	**23.2**

Financial position

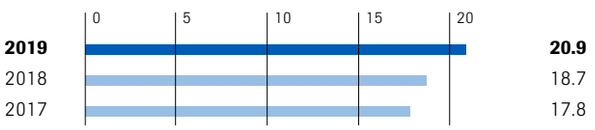
The decrease in net debt was mainly due to the free cash flow of CHF 16.8 billion, partly offset by the dividend payments of CHF 7.7 billion and net cash payments of CHF 4.6 billion for the Spark Therapeutics acquisition. The net pension liability increased due to lower discount rates. Net deferred tax assets increased mainly due to the Swiss tax reform, impairment of intangible assets and equity compensation plans. The resolution of tax disputes reduced current tax liabilities. At 31 December 2019 the Group held equity investments with a market value of CHF 0.7 billion, which consist mostly of holdings in biotechnology and other pharmaceuticals companies which were acquired as part of licensing transactions, scientific collaborations or other investments of the Roche Venture Fund.

Free cash flow

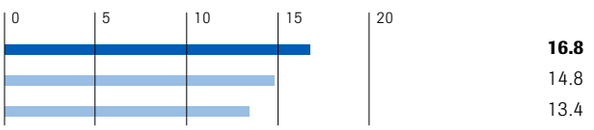
The net cash outflow from treasury activities decreased to CHF 0.6 billion. Total taxes paid in 2019 were up by 7% to CHF 3.5 billion due to higher payments in the US partly offset by refunds received for the resolution of several tax disputes.

Cash flows and net debt

Operating free cash flow in billions of CHF



Free cash flow in billions of CHF



Free cash flow in millions of CHF

	Pharmaceuticals	Diagnostics	Corporate	Group
2019				
Operating profit – IFRS basis	17,946	242	(640)	17,548
Operating profit cash adjustments	5,467	2,931	94	8,492
Operating profit, net of operating cash adjustments	**23,413**	**3,173**	**(546)**	**26,040**
(Increase) decrease in net working capital	385	(276)	40	149
Investments in property, plant and equipment	(1,889)	(1,551)	(63)	(3,503)
Principal portion of lease liabilities paid	(248)	(115)	(9)	(372)
Investments in intangible assets	(1,125)	(268)	0	(1,393)
Operating free cash flow	**20,536**	**963**	**(578)**	**20,921**
Treasury activities				(614)
Taxes paid				(3,543)
Free cash flow				**16,764**
2018				
Operating profit – IFRS basis	14,788	617	(636)	14,769
Operating profit cash adjustments	5,906	2,692	120	8,718
Operating profit, net of operating cash adjustments	**20,694**	**3,309**	**(516)**	**23,487**
(Increase) decrease in net working capital	617	(511)	70	176
Investments in property, plant and equipment	(2,584)	(1,379)	(80)	(4,043)
Investments in intangible assets	(876)	(3)	0	(879)
Operating free cash flow	**17,851**	**1,416**	**(526)**	**18,741**
Treasury activities				(642)
Taxes paid				(3,288)
Free cash flow				**14,811**

For the definition of free cash flow and a detailed breakdown see pages 164–166.

Operating free cash flow increased by 11% at CER to CHF 20.9 billion. This was due to the higher growth in the underlying cash generated from operations, as cash revenues grew more than cash expenses. It was partly offset by higher investments in intangible assets.

The free cash flow of CHF 16.8 billion was 12% higher than in 2018, as a result of higher operating free cash flow, partly offset by the higher tax payments.

Effective 1 January 2019 the Group has implemented IFRS 16 'Leases' and the comparative 2018 results have not been restated. The main impact of the new standard is to bring operating leases onto the balance sheet. The application of the new standard does not materially impact operating free cash flow, as repayment of the principal portion of the lease liabilities paid in the 2019 presentation almost entirely matches the operating lease expenses that were included in operating profit in the 2018 presentation. Net debt is unaffected, as the Group's definition of net debt does not include lease liabilities.

Net debt in millions of CHF

At 1 January 2019	
Cash and cash equivalents	6,681
Marketable securities	6,437
Long-term debt	(16,077)
Short-term debt	(2,693)
Net debt at beginning of period	**(5,652)**
Change in net debt during 2019	
Free cash flow	16,764
Dividend payments	(7,682)
Transactions in own equity instruments	(947)
Mergers and acquisitions, net of divestments of subsidiaries	(4,794)
Hedging and collateral arrangements	(137)
Changes in ownership interests in subsidiaries	(21)
Currency translation, fair value and other movements	(36)
Change in net debt	**3,147**
At 31 December 2019	
Cash and cash equivalents	6,075
Marketable securities	5,783
Long-term debt	(12,668)
Short-term debt	(1,695)
Net debt at end of period	**(2,505)**

For the definition of net debt see page 168.

Net debt – currency profile in millions of CHF

	Cash and marketable securities		Debt	
	2019	2018	2019	2018
US dollar[1]	1,159	2,598	(9,686)	(14,169)
Euro	3,452	4,553	(1,789)	(1,855)
Swiss franc	3,653	3,106	(2,503)	(2,504)
Japanese yen	2,967	2,214	0	(2)
Pound sterling	57	140	(97)	(95)
Other	570	507	(288)	(145)
Total	**11,858**	**13,118**	**(14,363)**	**(18,770)**

1) US dollar-denominated debt includes those bonds and notes denominated in euros that were swapped into US dollars, and therefore in the consolidated results they have economic characteristics equivalent to US dollar-denominated bonds and notes.

The net debt position of the Group at 31 December 2019 was CHF 2.5 billion, a reduction of CHF 3.1 billion from 31 December 2018. The reduction in gross debt was CHF 4.4 billion to a total of CHF 14.4 billion at the end of 2019. This was driven by the free cash flow of CHF 16.8 billion, partly offset by the annual dividend payments of CHF 7.7 billion and net cash payments of CHF 4.6 billion for the Spark Therapeutics acquisition.

Contractual obligations and commitments

The Group has obligations and commitments, as set out in the table below. Carrying values are as shown in the consolidated balance sheet. The potential obligations shown are not discounted and are not risk-adjusted. Any amounts denominated in foreign currencies are translated into Swiss francs at the 31 December 2019 exchange rates.

Contractual obligations and commitments as at 31 December 2019 in millions of CHF

	Potential obligation (undiscounted)					
	Less than 1 year	1–2 years	2–5 years	Over 5 years	Total	Carrying value
On-balance sheet						
Debt [21]						
– Bonds and notes	371	2,234	4,389	9,234	16,228	12,666
– Other debt	1,695	2	0	0	1,697	1,697
Contingent consideration [20, 31]	20	44	343	125	532	205
Accounts payable [17]	3,822	0	0	0	3,822	3,822
Other non-current liabilities [18]	0	496	406	307	1,209	1,144
– *of which lease liabilities*	*0*	*268*	*388*	*288*	*944*	*879*
Other current liabilities [19]	11,792	119	0	0	11,911	11,879
– *of which lease liabilities*	*372*	*0*	*0*	*0*	*372*	*340*
Unfunded defined benefit plans [26]	178	177	564	5,748	6,667	5,269
Total on-balance sheet commitments	**17,878**	**3,072**	**5,702**	**15,414**	**42,066**	**36,682**
Off-balance sheet						
Capital commitments for property, plant and equipment [8]	901	233	1,128	0	2,262	0
Leasing commitments [28]	0	6	123	685	814	0
Contract manufacturing commitments [31]	414	348	555	58	1,375	0
Alliance collaboration commitments [10]	1,584	493	1,163	406	3,646	0
Total off-balance sheet commitments	**2,899**	**1,080**	**2,969**	**1,149**	**8,097**	**0**
Total contractual commitments	**20,777**	**4,152**	**8,671**	**16,563**	**50,163**	**36,682**

References are to the Notes in the Annual Financial Statements.

Debt. This consists mainly of bonds and notes and includes the principal and interest on the Group's debt instruments. Other debt is mainly commercial paper. The carrying values are discounted based on the interest rates inherent in the instruments.

Contingent consideration. These are potential payments arising from mergers and acquisitions. The carrying values are risk-adjusted and discounted.

Lease liabilities. These are the future obligations under non-cancellable lease contracts. The Group has implemented IFRS 16 'Leases' effective 1 January 2019 and since that point these obligations have been reported on the balance sheet.

Unfunded defined benefit plans. These are mainly the pension plans in the Group's German affiliates, where the fully reserved pension obligations are used for self-financing of the local affiliates' operations. The carrying values are discounted. Future company contributions to the Group's funded plans are not shown in the above table.

Capital commitments for property, plant and equipment. These are non-cancellable commitments for the purchase and construction mainly at the Roche sites in Basel, Switzerland, South San Francisco, US, and Mannheim, Germany, and also at the Chugai site in Yokohama.

Leasing commitments. These are the major non-cancellable commitments for signed lease agreements where the lease term has not yet started. These mainly relate to Foundation Medicine's site in Boston, US.

Contract manufacturing commitments. These are the future minimum take-or-pay commitments to purchase inventories arising from the Group's major long-term agreements with external Contract Manufacturing Organisations ('CMOs').

Alliance collaboration commitments. These are potential upfront and milestone payments that may become due from the Group's in-licensing arrangements. Potential payments to alliance partners and for asset deals within the next three years are included assuming all projects currently in development are successful. Potential payments beyond three years are only included for asset deals.

Provisions for legal and environmental matters. These are not included in the above table as the timing and amount of any cash outflow is uncertain and contingent on the development of the matters in question.

Pensions and other post-employment benefits

Post-employment benefit plans are classified for IFRS as 'defined contribution plans' if the Group pays fixed contributions into a separate fund or to a third-party financial institution and will have no further legal or constructive obligation to pay further contributions. In 2019 expenses for the Group's defined contribution plans were CHF 410 million (2018: CHF 419 million). All other plans are classified as 'defined benefit plans', even if the Group's potential obligation is minor or has a relatively remote possibility of arising. Plans are usually established as trusts which are independent of the Group and are funded by payments from the Group and by employees, but in some cases the plan is unfunded and the Group pays pensions to retired employees directly from its own financial resources. In 2019 expenses for the Group's defined benefit plans were CHF 738 million (2018: CHF 657 million).

Defined benefit plans

Funding status and balance sheet position

	2019 (CHF m)	2018 (CHF m)
Funded plans		
– Fair value of plan assets	17,187	15,264
– Defined benefit obligation	(18,586)	(16,500)
Over (under) funding	**(1,399)**	**(1,236)**
Unfunded plans		
– Defined benefit obligation	(5,269)	(5,020)
Total funding status	**(6,668)**	**(6,256)**
Limit on asset recognition	0	(2)
Reimbursement rights	133	118
Net recognised asset (liability)	**(6,535)**	**(6,140)**

Overall the funding status on an IFRS basis of the Group's funded defined benefit plans decreased to 92% compared to 93% at the start of the year. This came mainly from a decrease in the discount rates globally since the end of 2018, largely offset by an increase in the fair value of the plan assets in Switzerland and the US. The funded status of the pension funds is monitored by the local pension fund governance bodies as well as being closely reviewed at a Group level. The total cash outflow from the Group's defined benefit plans in 2019 was CHF 0.7 billion compared to CHF 0.8 billion in 2018. There were higher additional contributions paid into the Group's pension plans in Japan in 2019 and in the US in 2018.

The unfunded plans are mainly those in the Group's German affiliates, where the fully reserved pension obligations are used for self-financing of the local affiliates' operations. The unfunded liabilities for these plans increased during 2019 due to a decrease in the eurozone discount rate.

Full details of the Group's pensions and other post-employment benefits are given in Note 26 to the Annual Financial Statements.

Roche shares

Share price and market capitalisation (at 31 December)

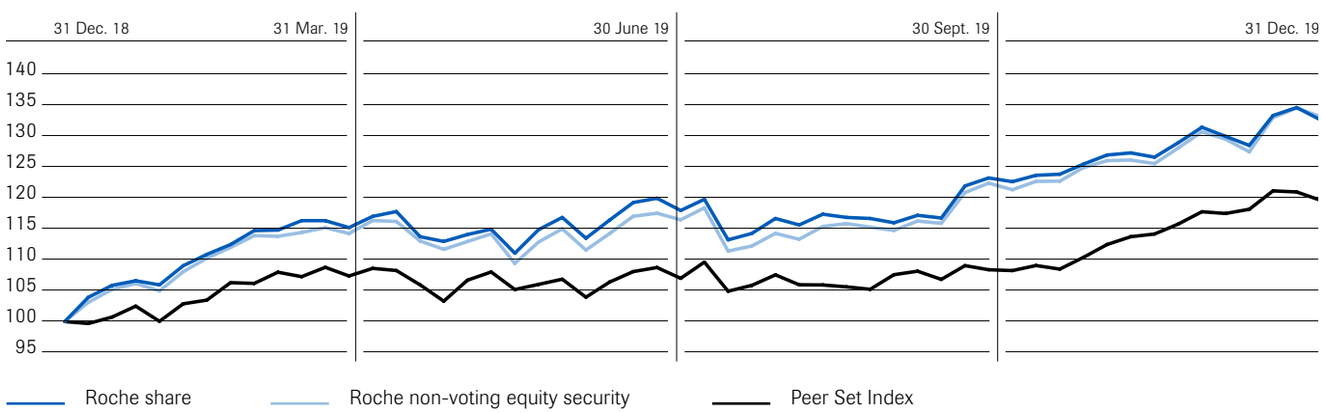
	2019	2018	% change (CHF)
Share price (CHF)	307.60	239.40	+28
Non-voting equity security *(Genussschein)* price (CHF)	314.00	243.40	+29
Market capitalisation (billions of CHF)	268	207	+29

In 2019 Roche ranked number 3 among a peer group consisting of Roche and 15 other healthcare companies[1)] for Total Shareholder Return (TSR), defined as share price growth plus dividends, measured in Swiss francs at actual exchange rates. At constant exchange rates (CER) Roche ranked number 3, with the year-end return being +33% for both Roche shares and Roche non-voting equity securities. The combined performance of share and non-voting equity security was +33% compared to a weighted average return for the peer group of +20% in CHF terms and +21% at CER.

In 2019 strong growth pushed world equity markets to record highs. Growth of the Swiss Market Index (SMI) outperformed major European indices and slightly trailed major US indices. The global healthcare sector grew strongly as well. Roche outperformed its peers, in CHF terms, and the Swiss Market Index, with positive news flow and strong sales growth driven by new products.

1) Peer group for 2019: Abbott, AbbVie, Amgen, Astellas, AstraZeneca, Bayer, Bristol-Myers Squibb, GlaxoSmithKline, Johnson & Johnson, Lilly, Merck & Co., Novartis, Pfizer, Roche, Sanofi and Takeda.

Total Shareholder Return development



Source: Datastream. Data for Roche and the peer index has been re-based to 100 at 1 January 2019. The Peer Index was converted into Swiss francs at daily actual exchange rates. Currency fluctuations have an influence on the representation of the relative performance of Roche versus the peer index.

Proposed dividend

The Board of Directors is proposing an increase of 3% in the dividend for 2019 to CHF 9.00 per share and non-voting equity security (2018: CHF 8.70) for approval at the Annual General Meeting. This would be the 33rd consecutive increase in the dividend. If the dividend proposal is approved by shareholders, dividend payments on the total shares and non-voting equity securities will amount to CHF 7.8 billion (2018: CHF 7.5 billion), resulting in a pay-out ratio (based on core net income) of 44.6% (2018: 48.0%). Based on the prices at year-end 2019, the dividend yield on the Roche share was 2.9% (2018: 3.6%) and the yield on the non-voting equity security was also 2.9% (2018: 3.6%). Further information on the Roche securities is given on pages 169 to 170.

Information per share and non-voting equity security

	2019 (CHF)	2018 (CHF)	% change (CHF)
EPS – Basic	15.77	12.29	+28
EPS – Diluted	15.62	12.21	+28
Core EPS – Basic	20.35	18.25	+12
Core EPS – Diluted	20.16	18.14	+11
Equity attributable to Roche shareholders per share	38.27	32.33	+18
Dividend per share	9.00	8.70	+3

For further details please refer to Notes 22 and 29 of the Annual Financial Statements and page 164. The pay-out ratio is calculated as dividend per share divided by core earnings per share.

Debt

Debt repayments. During 2019 there were the following scheduled debt repayments:
- On the due date of 30 September 2019 of USD 2.0 billion of bonds.
- On 13 December 2019 of USD 0.6 billion of bonds repaid at the option of the issuer at par 3 months before the scheduled due date of 13 March 2020.

Debt redemptions. On 5 December 2019 the Group completed a tender offer to redeem the following instruments:
- USD 656 million 2.875% fixed rate notes due 29 September 2021
- USD 360 million 3.25% fixed rate notes due 17 September 2023
- USD 1,061 million 3.35% fixed rate notes due 30 September 2024
- USD 494 million 3.0% fixed rate notes due 10 November 2025
- USD 37 million 5.25% fixed rate notes due 15 July 2035
- USD 73 million 7.0% fixed rate notes due 1 March 2039

This early debt redemption resulted in a total payment of USD 2,874 million and a reported loss on redemption of CHF 202 million.

Debt issuances. During 2019 there were no debt issuances.

All the above transactions are further described in Note 21 to the Annual Financial Statements.

The maturity schedule of the Group's bonds and notes outstanding at 31 December 2019 is shown in the table below.

Bonds and notes: nominal amounts at 31 December 2019 by contractual maturity

	US dollar (USD m)	Euro (EUR m)	Pound sterling (GBP m)	Swiss franc (CHF m)	Total[1] (USD m)	Total[1] (CHF m)
2020	0	0	0	0	0	0
2021	644	1,140[2]	0	0	1,921	1,862
2022	650	0	0	500	1,166	1,130
2023	390	650	77	0	1,219	1,182
2024	589	0	0	750	1,363	1,321
2025–2029	3,006	1,000	0	850	5,003	4,850
2030 and beyond	2,054	0	0	400	2,467	2,391
Total	**7,333**	**2,790**	**77**	**2,500**	**13,139**	**12,736**

1) Total translated at 31 December 2019 exchange rates.
2) Of the proceeds from these bonds and notes, EUR 850 million has been swapped into US dollars, and therefore in the consolidated results these bonds and notes have economic characteristics equivalent to US dollar-denominated bonds and notes.

The Group plans to meet its debt obligations using existing liquid funds as well as cash generated from business operations. In 2019 the free cash flow was CHF 16.8 billion, which included the cash generated from operations, as well as payment of interest and tax.

For short-term financing requirements, the Group has a commercial paper program in the US under which it can issue up to USD 7.5 billion of unsecured commercial paper notes and has committed credit lines of USD 7.5 billion available as back-stop lines. Commercial paper notes totalling USD 1.4 billion were outstanding as of 31 December 2019 (2018: USD 0.6 billion). For longer-term financing the Group maintains strong long-term investment-grade credit ratings of AA by Standard & Poor's and Aa3 by Moody's, which should facilitate efficient access to international capital markets.

Further information on the Group's debt is given in Note 21 to the Annual Financial Statements.

Financial risks

At 31 December 2019 the Group had a net debt position of CHF 2.5 billion (2018: CHF 5.7 billion). The financial assets of the Group are managed in a conservative way with the objective to meet the Group's financial obligations at all times.

Asset allocation. A considerable portion of the cash and marketable securities the Group currently holds is being used for debt repayment. Liquid funds are either held as cash or are invested in high-quality, investment-grade fixed income securities with an investment horizon to meet those liquidity requirements.

Cash and marketable securities

	2019		2018	
	(CHF m)	(% of total)	(CHF m)	(% of total)
Cash and cash equivalents	6,075	51	6,681	51
Money market instruments	4,963	42	5,381	41
Debt securities	807	7	1,047	8
Equity securities	13	0	9	0
Total cash and marketable securities	**11,858**	**100**	**13,118**	**100**

Credit risk. Credit risk arises from the possibility that counterparties to transactions may default on their obligations causing financial losses for the Group. The rating profile of the Group's CHF 11.9 billion of cash and fixed income marketable securities remained strong with 93% being invested in the A–AAA range. The Group has signed netting and collateral agreements with the counterparties in order to mitigate counterparty risk on derivative positions.

The Group has trade receivables of CHF 11.3 billion. Since the beginning of 2010 there have been financial difficulties in Southern European countries, notably Spain, Italy, Greece and Portugal. The Group is a leading supplier to the healthcare sectors in these countries and at 31 December 2019 has trade receivables of EUR 0.5 billion (CHF 0.6 billion) with public customers in these countries. This is an increase of 8% compared to 31 December 2018 in euro terms. The Group uses different measures to improve collections in these countries, including intense communication with customers, factoring, negotiations of payment plans, charging of interest for late payments, and legal actions. Since 2011 the Group's trade receivables balance in Southern Europe has decreased by 64% in euro terms.

Liquidity risk. Liquidity risk arises through a surplus of financial obligations over available financial assets due at any point in time. The Group's approach to liquidity risk is to maintain sufficient readily available reserves in order to meet its liquidity requirements at any point in time. In addition to the current liquidity position, the Group has strong cash generation ability. Those future cash flows will be used to repay debt instruments in the coming years.

Roche enjoys strong long-term investment-grade credit ratings of AA by Standard & Poor's and Aa3 by Moody's. At the same time Roche is rated at the highest available short-term ratings by those agencies. In the event of financing requirements, the ratings and the strong credit of Roche should permit efficient access to international capital markets, including the commercial paper market. The Group has committed credit lines with various financial institutions totalling USD 7.5 billion available as back-stop lines for the commercial paper program. As at 31 December 2019 no debt has been drawn under these credit lines.

Market risk. Market risk arises from changing market prices of the Group's financial assets or financial liabilities. The exposures are predominantly related to changes in interest rates, foreign exchange rates and equity prices. The Group uses Value-at-Risk (VaR) to assess the impact of market risk on its financial instruments. VaR data indicates the value range within which a given financial instrument will fluctuate with a pre-set probability as a result of movements in market prices. The Group's VaR decreased since December 2018 mainly due to the repayment and early redemption of long-term debt in the second half of 2019 as well as due to the reduction in the underlying interest rates across major Group currencies.

Interest rate risk. Interest rate risk arises from movements in interest rates which could affect the Group's financial result or the value of the Group equity. The Group may use interest rate derivatives to manage its interest rate-related exposure and financial result.

Further information on financial risk management and financial risks and the VaR methodology is included in Note 31 to the Annual Financial Statements.

International Financial Reporting Standards

The Roche Group has been using International Financial Reporting Standards (IFRS) to report its consolidated results since 1990. In 2019 the Group implemented IFRS 16 'Leases', including any consequential amendments to other standards. The Group has also implemented various minor amendments to existing standards and interpretations, including IFRIC 23 'Uncertainty over Income Tax Treatments', which have no material impact on the Group's overall results and financial position.

New and revised standards applied in 2019

IFRS 16 'Leases'. The Group has implemented the new standard effective 1 January 2019 and has applied the cumulative catch-up method option for the transition, meaning that the comparative 2018 results have not been restated. The main impact of the new standard is to bring operating leases onto the balance sheet. The new standard results in the carrying value of leased assets ('right-of-use assets') increasing by CHF 1.2 billion as of 1 January 2019, with lease liabilities increasing by a similar amount. The application of the new standard resulted in part of what has been previously reported as operating lease costs being recorded as interest expenses. Given the leases involved and the prevailing low interest rate environment, the Group does not currently expect this effect to be material, with the amount in 2019 being CHF 18 million.

See Note 28 to the Annual Financial Statements for further details.

Roche Group Consolidated Financial Statements

Roche Group consolidated income statement for the year ended 31 December 2019 in millions of CHF

	Pharmaceuticals	Diagnostics	Corporate	Group
Sales [2, 3]	48,516	12,950	–	61,466
Royalties and other operating income [2, 3]	2,198	87	–	2,285
Revenue [2, 3]	**50,714**	**13,037**	**–**	**63,751**
Cost of sales	(11,593)	(6,758)	–	(18,351)
Marketing and distribution	(7,905)	(3,055)	–	(10,960)
Research and development [2]	(11,221)	(1,553)	–	(12,774)
General and administration	(2,049)	(1,429)	(640)	(4,118)
Operating profit [2]	**17,946**	**242**	**(640)**	**17,548**
Financing costs [4]				(993)
Other financial income (expense) [4]				59
Profit before taxes				**16,614**
Income taxes [5]				(2,506)
Net income				**14,108**
Attributable to				
– Roche shareholders [22]				13,497
– Non-controlling interests [24]				611
Earnings per share and non-voting equity security [29]				
Basic (CHF)				15.77
Diluted (CHF)				15.62

As disclosed in Note 28 and in Note 34, the Group has changed its accounting policies for leases following the implementation of IFRS 16 'Leases', effective 1 January 2019. The Group has applied the cumulative catch-up method for the transition, meaning that the comparative income statement for the year ended 31 December 2018 has not been restated. The changes do not have a material impact on the income statement (see Note 28).

Roche Group consolidated income statement for the year ended 31 December 2018 in millions of CHF

	Pharmaceuticals	Diagnostics	Corporate	Group
Sales [2, 3]	43,967	12,879	–	56,846
Royalties and other operating income [2, 3]	2,553	98	–	2,651
Revenue [2, 3]	**46,520**	**12,977**	**–**	**59,497**
Cost of sales	(10,491)	(6,778)	–	(17,269)
Marketing and distribution	(7,068)	(3,041)	–	(10,109)
Research and development [2]	(10,299)	(1,793)	–	(12,092)
General and administration	(3,874)	(748)	(636)	(5,258)
Operating profit [2]	**14,788**	**617**	**(636)**	**14,769**
Financing costs [4]				(770)
Other financial income (expense) [4]				149
Profit before taxes				**14,148**
Income taxes [5]				(3,283)
Net income				**10,865**
Attributable to				
– Roche shareholders [22]				10,500
– Non-controlling interests [24]				365
Earnings per share and non-voting equity security [29]				
Basic (CHF)				12.29
Diluted (CHF)				12.21

As disclosed in Note 28 and in Note 34, the Group has changed its accounting policies for leases following the implementation of IFRS 16 'Leases', effective 1 January 2019. The Group has applied the cumulative catch-up method for the transition, meaning that the comparative income statement for the year ended 31 December 2018 has not been restated. The changes do not have a material impact on the income statement (see Note 28).

Roche Group consolidated statement of comprehensive income in millions of CHF

	Year ended 31 December	
	2019	2018
Net income recognised in income statement	**14,108**	**10,865**
Other comprehensive income (OCI)		
Remeasurements of defined benefit plans [22]	(414)	134
Fair value changes on equity investments at fair value through OCI [22]	(3)	87
Items that will never be reclassified to the income statement	**(417)**	**221**
Fair value changes on debt securities at fair value through OCI [22]	12	(7)
Cash flow hedges [22]	(39)	(15)
Currency translation of foreign operations [22]	(442)	(290)
Items that are or may be reclassified to the income statement	**(469)**	**(312)**
Other comprehensive income, net of tax	**(886)**	**(91)**
Total comprehensive income	**13,222**	**10,774**
Attributable to		
– Roche shareholders [22]	12,641	10,364
– Non-controlling interests [24]	581	410
Total	**13,222**	**10,774**

As disclosed in Note 28 and in Note 34, the Group has changed its accounting policies for leases following the implementation of IFRS 16 'Leases', effective 1 January 2019. The Group has applied the cumulative catch-up method for the transition, meaning that the comparative statement of comprehensive income for the year ended 31 December 2018 has not been restated. The changes do not have a material impact on the statement of comprehensive income (see Note 28).

Roche Group consolidated balance sheet in millions of CHF

	31 December 2019	31 December 2018	31 December 2017
Non-current assets			
Property, plant and equipment [8]	22,173	21,818	20,912
Right-of-use assets [28]	1,145	–	–
Goodwill [9]	12,456	8,948	10,077
Intangible assets [10]	8,358	9,346	8,368
Deferred tax assets [5]	5,211	3,895	3,576
Defined benefit plan assets [26]	945	877	801
Other non-current assets [15]	1,549	1,389	1,370
Total non-current assets	**51,837**	**46,273**	**45,104**
Current assets			
Inventories [11]	6,055	6,621	7,407
Accounts receivable [12]	10,440	9,776	9,577
Current income tax assets [5]	237	208	348
Other current assets [16]	2,664	2,521	2,243
Marketable securities [13]	5,783	6,437	7,278
Cash and cash equivalents [14]	6,075	6,681	4,719
Total current assets	**31,254**	**32,244**	**31,572**
Total assets	**83,091**	**78,517**	**76,676**
Non-current liabilities			
Long-term debt [21]	(12,668)	(16,077)	(15,839)
Deferred tax liabilities [5]	(298)	(384)	(495)
Defined benefit plan liabilities [26]	(7,480)	(7,017)	(7,421)
Provisions [20]	(1,515)	(1,452)	(1,548)
Other non-current liabilities [18]	(1,144)	(188)	(206)
Total non-current liabilities	**(23,105)**	**(25,118)**	**(25,509)**
Current liabilities			
Short-term debt [21]	(1,695)	(2,693)	(3,121)
Current income tax liabilities [5]	(3,838)	(3,808)	(3,408)
Provisions [20]	(2,885)	(2,329)	(2,042)
Accounts payable [17]	(3,822)	(3,526)	(3,454)
Other current liabilities [19]	(11,879)	(10,677)	(10,135)
Total current liabilities	**(24,119)**	**(23,033)**	**(22,160)**
Total liabilities	**(47,224)**	**(48,151)**	**(47,669)**
Total net assets	**35,867**	**30,366**	**29,007**
Equity			
Capital and reserves attributable to Roche shareholders [22]	32,747	27,622	26,441
Equity attributable to non-controlling interests [24]	3,120	2,744	2,566
Total equity	**35,867**	**30,366**	**29,007**

As disclosed in Note 28 and in Note 34, the Group has changed its accounting policies for leases following the implementation of IFRS 16 'Leases', effective 1 January 2019. The Group has applied the cumulative catch-up method for the transition, meaning that the comparative balance sheets as at 31 December 2018 and 31 December 2017 have not been restated. The transition impact and details of the additional assets and liabilities reported effective 1 January 2019 are provided in Note 28.

Roche Group consolidated statement of cash flows in millions of CHF

	Year ended 31 December	
	2019	2018
Cash flows from operating activities		
Cash generated from operations [30]	26,793	24,424
(Increase) decrease in net working capital	149	176
Payments made for defined benefit plans [26]	(676)	(785)
Utilisation of provisions [20]	(828)	(883)
Disposal of products	490	335
Other operating cash flows	0	0
Income taxes paid	(3,543)	(3,288)
Total cash flows from operating activities	**22,385**	**19,979**
Cash flows from investing activities		
Purchase of property, plant and equipment	(3,503)	(4,043)
Purchase of intangible assets	(1,393)	(879)
Disposal of property, plant and equipment	71	146
Disposal of intangible assets	2	0
Business combinations [6]	(4,706)	(1,550)
Asset acquisitions [6]	–	(1,824)
Divestment of subsidiaries [23]	3	1
Interest and dividends received [30]	69	24
Sales of equity securities and debt securities	587	566
Purchases of equity securities and debt securities	(221)	(412)
Sales (purchases) of money market instruments and time accounts over three months, net	461	672
Other investing cash flows	(4)	104
Total cash flows from investing activities	**(8,634)**	**(7,195)**
Cash flows from financing activities		
Proceeds from issue of bonds and notes [21]	0	2,252
Redemption and repurchase of bonds and notes [21]	(5,414)	(2,152)
Increase (decrease) in commercial paper [21]	858	(199)
Increase (decrease) in other debt [21]	153	(23)
Hedging and collateral arrangements	(137)	12
Changes in ownership interest in subsidiaries	(21)	(2,287)
Equity contribution by non-controlling interests	13	0
Interest paid	(624)	(593)
Principal portion of lease liabilities paid [30]	(372)	–
Dividends paid [30]	(7,682)	(7,253)
Equity-settled equity compensation plans, net of transactions in own equity [27]	(947)	(448)
Other financing cash flows	0	0
Total cash flows from financing activities	**(14,173)**	**(10,691)**
Net effect of currency translation on cash and cash equivalents	(184)	(131)
Increase (decrease) in cash and cash equivalents	**(606)**	**1,962**
Cash and cash equivalents at 1 January	6,681	4,719
Cash and cash equivalents at 31 December [14]	**6,075**	**6,681**

As disclosed in Note 28 and in Note 34, the Group has changed its accounting policies for leases following the implementation of IFRS 16 'Leases', effective 1 January 2019. The Group has applied the cumulative catch-up method for the transition, meaning that the comparative statement of cash flows for the year ended 31 December 2018 has not been restated. In 2018 finance lease liabilities paid are included in 'Increase (decrease) in other debt'.

Roche Group consolidated statement of changes in equity in millions of CHF

	Share capital	Retained earnings	Fair value reserves	Hedging reserves	Translation reserves	Total	Non-controlling interests	Total equity
Year ended 31 December 2018								
At 1 January 2018 (revised)	160	33,371	48	61	(7,204)	26,436	2,566	29,002
Net income recognised in income statement	–	10,500	–	–	–	10,500	365	10,865
Net change in fair value – financial assets at fair value through OCI	–	100	(21)	–	–	79	1	80
Cash flow hedges	–	–	–	(14)	–	(14)	(1)	(15)
Currency translation of foreign operations	–	–	1	0	(344)	(343)	53	(290)
Remeasurements of defined benefit plans	–	142	–	–	–	142	(8)	134
Total comprehensive income	**–**	**10,742**	**(20)**	**(14)**	**(344)**	**10,364**	**410**	**10,774**
Dividends	–	(7,094)	–	–	–	(7,094)	(136)	(7,230)
Equity compensation plans, net of transactions in own equity	–	51	–	–	–	51	10	61
Changes in ownership interest in subsidiaries [6]	–	(2,129)	–	–	–	(2,129)	(112)	(2,241)
Changes in non-controlling interests [24]	–	(6)	–	–	–	(6)	6	–
Equity contribution by non-controlling interests [24]	–	–	–	–	–	–	0	0
At 31 December 2018	**160**	**34,935**	**28**	**47**	**(7,548)**	**27,622**	**2,744**	**30,366**
Year ended 31 December 2019								
At 1 January 2019	160	34,935	28	47	(7,548)	27,622	2,744	30,366
Implementation of IFRS 16 'Leases' [28]	–	(4)	–	–	–	(4)	0	(4)
At 1 January 2019 (revised)	**160**	**34,931**	**28**	**47**	**(7,548)**	**27,618**	**2,744**	**30,362**
Net income recognised in income statement	–	13,497	–	–	–	13,497	611	14,108
Net change in fair value – financial assets at fair value through OCI	–	23	(13)	–	–	10	(1)	9
Cash flow hedges	–	–	–	(34)	–	(34)	(5)	(39)
Currency translation of foreign operations	–	–	0	0	(417)	(417)	(25)	(442)
Remeasurements of defined benefit plans	–	(415)	–	–	–	(415)	1	(414)
Total comprehensive income	**–**	**13,105**	**(13)**	**(34)**	**(417)**	**12,641**	**581**	**13,222**
Dividends	–	(7,449)	–	–	–	(7,449)	(213)	(7,662)
Equity compensation plans, net of transactions in own equity	–	(52)	–	–	–	(52)	5	(47)
Changes in ownership interest in subsidiaries	–	(9)	–	–	–	(9)	(12)	(21)
Changes in non-controlling interests [24]	–	(2)	–	–	–	(2)	2	–
Equity contribution by non-controlling interests [24]	–	–	–	–	–	–	13	13
At 31 December 2019	**160**	**40,524**	**15**	**13**	**(7,965)**	**32,747**	**3,120**	**35,867**

As disclosed in Note 28 and in Note 34, the Group has changed its accounting policies for leases following the implementation of IFRS 16 'Leases', effective 1 January 2019. The Group has applied the cumulative catch-up method for the transition, meaning that the comparative statement of changes in equity for the year ended 31 December 2018 has not been restated. Details of the additional assets and liabilities reported effective 1 January 2019 are provided in Note 28. Equity as at 1 January 2018 was revised following the implementation of IFRS 9 'Financial Instruments'.

Notes to the Roche Group Consolidated Financial Statements

1. General accounting principles

Basis of preparation

The consolidated financial statements (hereafter 'the Annual Financial Statements') of the Roche Group have been prepared in accordance with International Financial Reporting Standards (IFRS) and comply with Swiss law. They have been prepared using the historical cost convention except for items that are required to be accounted for at fair value. They were approved for issue by the Board of Directors on 27 January 2020 and are subject to approval by the Annual General Meeting of shareholders on 17 March 2020.

These financial statements are the Annual Financial Statements of Roche Holding Ltd, a company registered in Switzerland, and its subsidiaries ('the Group').

The Group's significant accounting policies and changes in accounting policies are disclosed in Note 34.

Key accounting judgements, estimates and assumptions

The preparation of the Annual Financial Statements requires management to make judgements, estimates and assumptions that affect the reported amounts of revenues, expenses, assets, liabilities and contingent amounts. Actual outcomes could differ from those management estimates. The estimates and underlying assumptions are reviewed on an ongoing basis and are based on historical experience and various other factors. Revisions to estimates are recognised in the period in which the estimate is revised. The following are considered to be the key accounting judgements, estimates and assumptions made and are believed to be appropriate based upon currently available information.

Revenue. The nature of the Group's business is such that many sales transactions do not have a simple structure and may consist of various performance obligations that are satisfied at different times. Contracts entered into in the Diagnostics Division typically include performance obligations for instruments (including those provided under leasing arrangements), reagents and other consumables, and services. Instruments may be sold in cash sales transactions at discounted prices. Where instruments are provided under operating lease arrangements, some or the entire lease revenue may be variable and subject to subsequent reagents sales. Sales, net of discounts, are based on estimates regarding the related obligations, including their stand-alone selling prices or fair values. It requires judgement to determine when different obligations are satisfied, including whether enforceable purchase commitments for further obligations exist and when they arise. Out-licensing agreements may be entered into with no further obligation or may include commitments to conduct research, late-stage development, regulatory approval, co-marketing or manufacturing. These may be settled by a combination of upfront payments, milestone payments, other licensing fees, and reimbursements for services provided. Whether to consider these commitments as a single performance obligation or separate ones, or even being in scope of IFRS 15 'Revenues from Contracts with Customers', is not straightforward and requires some judgement. Depending on the conclusion, this may result in all revenue being calculated at inception and either being recognised at once or spread over the term of a longer performance obligation.

Sales are recorded net of allowances for estimated rebates, chargebacks, cash discounts and estimates of product returns, all of which are established at the time of sale. All product sales allowances are based on estimates of the amounts earned or to be claimed on the related sales. At 31 December 2019 the Group had CHF 4,157 million in provisions and accruals for expected sales returns, chargebacks and other rebates, including Medicaid in the US and similar rebates in other countries. The provisions and accruals relating to the US Pharmaceuticals business amounted to CHF 2,021 million, of which CHF 562 million were associated with expected sales returns. These estimates take into consideration historical experience, current contractual and statutory requirements, specific known market events and trends such as competitive pricing and new product introductions, estimated inventory levels, and the shelf life of products. If actual future results vary, these estimates need to be adjusted, with an effect on sales and earnings in the period of the adjustment.

Business combinations. The Group initially recognises the fair value of identifiable assets acquired, the liabilities assumed, any non-controlling interest and the consideration transferred in a business combination. Management judgement is particularly involved in the assessment of whether or not the net assets acquired constitute a business and in the recognition and fair value measurement of intellectual property, inventories, contingent liabilities and contingent consideration. In making this assessment, management considers the underlying economic substance of the items concerned in addition to the contractual terms. Management also applies as it considers appropriate the optional 'concentration test' as set out in the amendments to IFRS 3 'Business Combinations' published in October 2018 to aid the assessment of whether a transaction represents a business combination or is simply in substance the purchase of a single asset or group of similar assets.

Impairment of property, plant and equipment, right-of-use assets, goodwill and intangible assets. At 31 December 2019 the Group had CHF 22,173 million in property, plant and equipment (see Note 8), CHF 1,145 million in right-of-use assets (see Note 28), CHF 12,456 million in goodwill (see Note 9) and CHF 8,358 million in intangible assets (see Note 10). Goodwill and intangible assets not yet available for use are reviewed annually for impairment. Property, plant and equipment, right-of-use assets and intangible assets in use are assessed for impairment when there is a triggering event that provides evidence that an asset may be impaired. To assess whether any impairment exists, estimates of expected future cash flows are used. Actual outcomes could vary significantly from such estimates. Factors such as changes in discount rates, the planned use of buildings, machinery or equipment or closure of facilities, the presence of competition, technical obsolescence and lower-than-anticipated product sales could lead to shorter useful lives or impairment.

Impairment of financial assets. At 31 December 2019 the Group had CHF 532 million in allowance for doubtful accounts for trade and lease receivables (see Note 12). The allowance for doubtful accounts is based on assumptions about risk of default and expected loss rates. The Group uses judgement in making these assumptions and selecting the inputs to the calculation of the allowance for doubtful accounts, based on the company's past experience, existing market conditions as well as forward-looking estimates at the end of each reporting period.

Pensions and other post-employment benefits. The Group operates a number of defined benefit plans and the fair values of the recognised plan assets and liabilities are based upon statistical and actuarial calculations. The measurement of the net defined benefit obligation is particularly sensitive to changes in the discount rate, inflation rate, expected mortality and medical cost trend rate assumptions. At 31 December 2019 the present value of the Group's defined benefit obligation is CHF 23,855 million (see Note 26). The actuarial assumptions used may differ materially from actual results due to changes in market and economic conditions, longer or shorter lifespans of participants, and other changes in the factors being assessed. These differences could impact the defined benefit plan assets and liabilities recognised in the balance sheet in future periods.

Legal provisions. The Group provides for anticipated legal settlement costs when there is a probable outflow of resources that can be reliably estimated. Where no reliable estimate can be made, no provision is recorded and contingent liabilities are disclosed where material. At 31 December 2019 the Group had CHF 882 million in legal provisions. The status of significant legal cases is disclosed in Note 20. These estimates consider the specific circumstances of each legal case, relevant legal advice and are inherently judgemental due to the highly complex nature of legal cases. The estimates could change substantially over time as new facts emerge and each legal case progresses.

Environmental provisions. The Group provides for anticipated environmental remediation costs when there is a probable outflow of resources that can be reasonably estimated. At 31 December 2019 the Group had CHF 503 million in environmental provisions (see Note 20). Environmental provisions consist primarily of costs to fully clean and refurbish contaminated sites, including landfills, and to treat and contain contamination at certain other sites. These estimates are inherently judgemental due to uncertainties related to the detection of previously unknown contamination, the method and extent of remediation, the percentage of the problematic materials attributable to the Group at the remediation sites, and the financial capabilities of other potentially responsible parties. The estimates could change substantially over time as new facts emerge and each environmental remediation progresses.

Contingent consideration provisions. The Group makes provision for the estimated fair value of contingent consideration arrangements arising from business combinations. At 31 December 2019 the Group had CHF 205 million in contingent consideration provisions (see Note 20) and the total potential payments under contingent consideration arrangements from business combinations could be up to CHF 532 million (see Note 31). The estimated amounts provided are the expected payments, determined by considering the possible scenarios of forecast sales and other performance criteria, the amount to be paid under each scenario, and the probability of each scenario, which is then discounted to a net present value. The estimates could change substantially over time as new facts emerge and each scenario develops.

Income taxes. At 31 December 2019 the Group had a current income tax net liability of CHF 3,601 million and a deferred tax net asset of CHF 4,913 million (see Note 5). Significant estimates are required to determine the current and deferred tax assets and liabilities. Some of these estimates are based on interpretations of existing tax laws or regulations. Where tax positions are uncertain, accruals are recorded within income tax liabilities for management's best estimate of the ultimate liability that is expected to arise based on the specific circumstances and the Group's historical experience. Factors that may have an impact on current and deferred taxes include changes in tax laws, regulations or rates, changing interpretations of existing tax laws or regulations, future levels of research and development spending and changes in pre-tax earnings.

Leases. Where the Group is the lessee, key judgements include assessing whether arrangements contain a lease and determining the lease term. To assess whether a contract contains a lease requires judgement about whether it depends on a specified asset, whether the Group obtains substantially all the economic benefits from the use of that asset, and whether the Group has a right to direct the use of the asset. In order to determine the lease term judgement is required as extension and termination options have to be assessed along with all facts and circumstances that may create an economic incentive to exercise an extension option, or not exercise a termination option. Estimates include calculating the discount rate which is based on the incremental borrowing rate. At 31 December 2019 the Group has CHF 1,145 million in right-of-use assets and CHF 1,219 million in lease liabilities (see Note 28).

Where the Group is the lessor, the treatment of leasing transactions is mainly determined by whether the lease is considered to be an operating or finance lease. In making this assessment, management looks at the substance of the lease, as well as the legal form, and makes a judgement about whether substantially all of the risks and rewards of ownership are transferred. Arrangements which do not take the legal form of a lease but that nevertheless convey the right to use an asset are also covered by such assessments.

Consolidation. The Group periodically undertakes transactions that may involve obtaining control or significant influence over other companies. These transactions include equity acquisitions, asset purchases and alliance agreements. In all such cases management makes an assessment as to whether the Group has control or significant influence over the other company, and whether it should be consolidated as a subsidiary or accounted for as an associated company. In making this assessment, management considers the underlying economic substance of the transaction in addition to the contractual terms.

2. Operating segment information

The Group has two divisions, Pharmaceuticals and Diagnostics. Revenues are primarily generated from the sale of prescription pharmaceutical products and diagnostic instruments, reagents and consumables, respectively. Both divisions also derive revenues from the sale or licensing of products or technology to third parties. Residual operating activities from divested businesses and certain global activities are reported as 'Corporate'. These include the Corporate Executive Committee and global group functions for communications, human resources, finance (including treasury and taxes), legal, safety and environmental services. Subdivisional information is also presented for the Roche Pharmaceuticals and Chugai operating segments within the Pharmaceuticals Division.

Divisional information in millions of CHF

	Pharmaceuticals		Diagnostics		Corporate		Group	
	2019	2018	2019	2018	2019	2018	2019	2018
Revenues from external customers								
Sales	48,516	43,967	12,950	12,879	–	–	61,466	56,846
Royalties and other operating income	2,198	2,553	87	98	–	–	2,285	2,651
Total	**50,714**	**46,520**	**13,037**	**12,977**	**–**	**–**	**63,751**	**59,497**
Revenues from other operating segments								
Sales	–	–	14	12	–	–	14	12
Royalties and other operating income	–	–	–	–	–	–	–	–
Elimination of interdivisional revenue							(14)	(12)
Total	**–**	**–**	**14**	**12**	**–**	**–**	**–**	**–**
Segment results								
Operating profit	17,946	14,788	242	617	(640)	(636)	17,548	14,769
Capital expenditure								
Business combinations	4,638	1,826	–	–	–	–	4,638	1,826
Asset acquisitions	–	1,725	–	–	–	–	–	1,725
Additions to property, plant and equipment	1,864	2,340	1,552	1,376	63	80	3,479	3,796
Additions to right-of-use assets	264	–	134	–	10	–	408	–
Additions to intangible assets	1,358	802	258	18	–	–	1,616	820
Total	**8,124**	**6,693**	**1,944**	**1,394**	**73**	**80**	**10,141**	**8,167**
Research and development								
Research and development costs	11,221	10,299	1,553	1,793	–	–	12,774	12,092
Other segment information								
Depreciation of property, plant and equipment	1,227	1,129	1,109	1,097	73	66	2,409	2,292
Depreciation of right-of-use assets	229	–	112	–	10	–	351	–
Amortisation of intangible assets	1,406	1,131	126	163	–	–	1,532	1,294
Impairment of property, plant and equipment	246	137	13	1	2	3	261	141
Impairment (reversal) of right-of-use assets	(12)	–	0	–	0	–	(12)	–
Impairment of goodwill	0	2,147	779	107	–	–	779	2,254
Impairment of intangible assets	633	233	344	849	–	–	977	1,082
Equity compensation plan expenses	464	392	92	78	41	38	597	508

Pharmaceuticals subdivisional information in millions of CHF

	Roche Pharmaceuticals			Chugai	Pharmaceuticals Division	
	2019	2018	2019	2018	2019	2018
Revenues from external customers						
Sales	44,373	40,266	4,143	3,701	48,516	43,967
Royalties and other operating income	2,069	2,239	129	314	2,198	2,553
Total	**46,442**	**42,505**	**4,272**	**4,015**	**50,714**	**46,520**
Revenues from other operating segments						
Sales	1,646	1,340	1,224	974	2,870	2,314
Royalties and other operating income	65	104	756	215	821	319
Elimination of income within division					(3,691)	(2,633)
Total	**1,711**	**1,444**	**1,980**	**1,189**	**–**	**–**
Segment results						
Operating profit	16,264	13,702	1,940	1,136	18,204	14,838
Elimination of results within division					(258)	(50)
Operating profit	**16,264**	**13,702**	**1,940**	**1,136**	**17,946**	**14,788**
Capital expenditure						
Business combinations	4,638	1,826	–	–	4,638	1,826
Asset acquisitions	–	1,725	–	–	–	1,725
Additions to property, plant and equipment	1,372	1,704	492	636	1,864	2,340
Additions to right-of-use assets	190	–	74	–	264	–
Additions to intangible assets	1,320	777	38	25	1,358	802
Total	**7,520**	**6,032**	**604**	**661**	**8,124**	**6,693**
Research and development						
Research and development costs	10,327	9,434	973	919	11,300	10,353
Elimination of costs within division					(79)	(54)
Total	**10,327**	**9,434**	**973**	**919**	**11,221**	**10,299**
Other segment information						
Depreciation of property, plant and equipment	1,070	1,001	157	128	1,227	1,129
Depreciation of right-of-use assets	174	–	55	–	229	–
Amortisation of intangible assets	1,387	1,118	19	13	1,406	1,131
Impairment of property, plant and equipment	235	136	11	1	246	137
Impairment (reversal) of right-of-use assets	(12)	–	0	–	(12)	–
Impairment of goodwill	0	2,147	0	0	0	2,147
Impairment of intangible assets	632	196	1	37	633	233
Equity compensation plan expenses	461	389	3	3	464	392

Net assets in millions of CHF

At 31 December	Assets			Liabilities			Net assets		
	2019	2018	2017	2019	2018	2017	2019	2018	2017
Net operating assets									
Pharmaceuticals	44,983	40,246	39,174	(14,426)	(12,559)	(12,215)	30,557	27,687	26,959
Diagnostics	18,287	18,898	19,833	(4,509)	(4,576)	(4,390)	13,778	14,322	15,443
Corporate	362	322	133	(607)	(580)	(430)	(245)	(258)	(297)
Total	**63,632**	**59,466**	**59,140**	**(19,542)**	**(17,715)**	**(17,035)**	**44,090**	**41,751**	**42,105**
Current income tax net assets (liabilities)							(3,601)	(3,600)	(3,060)
Deferred tax net assets (liabilities)							4,913	3,511	3,081
Defined benefit plan net assets (liabilities)							(6,535)	(6,140)	(6,620)
Lease liabilities							(1,219)	–	–
Marketable securities							5,783	6,437	7,278
Cash and cash equivalents							6,075	6,681	4,719
Debt							(14,363)	(18,770)	(18,960)
Other net assets (liabilities)							724	496	464
Total net assets							**35,867**	**30,366**	**29,007**

Net operating assets – Pharmaceuticals subdivisional information in millions of CHF

At 31 December	Assets			Liabilities			Net assets		
	2019	2018	2017	2019	2018	2017	2019	2018	2017
Roche Pharmaceuticals	41,101	36,421	35,690	(14,462)	(12,524)	(11,930)	26,639	23,897	23,760
Chugai	6,098	5,627	4,900	(1,133)	(1,042)	(974)	4,965	4,585	3,926
Elimination within division	(2,216)	(1,802)	(1,416)	1,169	1,007	689	(1,047)	(795)	(727)
Pharmaceuticals Division	**44,983**	**40,246**	**39,174**	**(14,426)**	**(12,559)**	**(12,215)**	**30,557**	**27,687**	**26,959**

Information by geographical area in millions of CHF

	Revenues from external customers		Non-current assets		
	Sales	Royalties and other operating income	Property, plant and equipment	Right-of-use assets	Goodwill and intangible assets
2019					
Switzerland	590	647	5,909	144	1,731
Germany	3,050	34	3,918	43	957
Rest of Europe	9,654	18	972	179	423
Europe	**13,294**	**699**	**10,799**	**366**	**3,111**
United States	29,724	1,440	6,819	416	17,471
Rest of North America	985	1	108	25	21
North America	**30,709**	**1,441**	**6,927**	**441**	**17,492**
Latin America	2,858	0	315	43	7
Japan	4,545	129	2,405	104	203
Rest of Asia	8,701	16	1,627	147	0
Asia	**13,246**	**145**	**4,032**	**251**	**203**
Africa, Australia and Oceania	1,359	0	100	44	1
Total	**61,466**	**2,285**	**22,173**	**1,145**	**20,814**
2018					
Switzerland	627	297	5,658	–	2,485
Germany	3,147	32	4,030	–	995
Rest of Europe	9,828	14	962	–	434
Europe	**13,602**	**343**	**10,650**	**–**	**3,914**
United States	26,105	1,976	6,953	–	13,808
Rest of North America	931	1	68	–	373
North America	**27,036**	**1,977**	**7,021**	**–**	**14,181**
Latin America	2,870	0	308	–	8
Japan	4,175	315	2,114	–	189
Rest of Asia	7,689	16	1,628	–	1
Asia	**11,864**	**331**	**3,742**	**–**	**190**
Africa, Australia and Oceania	1,474	0	97	–	1
Total	**56,846**	**2,651**	**21,818**	**–**	**18,294**

Sales are allocated to geographical areas by destination according to the location of the customer. Royalties and other operating income are allocated according to the location of the Group company that receives the revenue.

Following the implementation of IFRS 16 'Leases' (see Note 28), the Group has changed its accounting policies with respect to leases. The Group has applied the cumulative catch-up method for the transition, meaning that the comparative 2018 results have not been restated.

For the operating segment disclosures the main impact of the new standard is to include right-of-use assets for leases where the Group is the lessee and which were previously reported as operating leases, as part of segment operating assets, effective 1 January 2019. Details of the additional segment net operating assets reported, which total to CHF 1,186 million, are given below.

Transition impact of IFRS 16 on segment net operating assets in millions of CHF

	Assets	Liabilities	1 January 2019 Net assets
Roche Pharmaceuticals	647	53	700
Chugai	127	1	128
Pharmaceuticals Division	**774**	**54**	**828**
Diagnostics Division	319	(3)	316
Corporate	42	0	42
Total operating	**1,135**	**51**	**1,186**
Lease liabilities	–	(1,190)	(1,190)
Group	**1,135**	**(1,139)**	**(4)**

A consequence of the application of the new standard is that the interest element of leases previously reported as operating lease (and reported as part of operating lease costs within the segment results) is recorded as interest expenses, effective 1 January 2019. Given the leases involved and the prevailing low interest rate environment the Group does not currently expect this effect to be material, with the amount in 2019 being CHF 18 million.

Major customers

In total three US national wholesale distributors represent approximately a third of the Group's revenues in 2019. The three US national wholesale distributors are McKesson Corp. with CHF 10 billion (2018: CHF 9 billion), AmerisourceBergen Corp. with CHF 8 billion (2018: CHF 7 billion) and Cardinal Health, Inc. with CHF 6 billion (2018: CHF 5 billion). Approximately 96% of these revenues were in the Roche Pharmaceuticals operating segment, with the residual in the Diagnostics operating segment.

3. Revenue

Disaggregated revenue information

Disaggregation of revenue in millions of CHF

	2019			2018		
	Revenue from contracts with customers	Revenue from other sources	Total	Revenue from contracts with customers	Revenue from other sources	Total
Pharmaceuticals Division						
Sales by therapeutic area						
Oncology	27,571	–	27,571	26,183	–	26,183
Immunology	8,514	–	8,514	8,160	–	8,160
Neuroscience	4,358	–	4,358	3,005	–	3,005
Ophthalmology	1,826	–	1,826	1,659	–	1,659
Haemophilia A	1,380	–	1,380	224	–	224
Infectious diseases	1,089	–	1,089	1,084	–	1,084
Other therapeutic areas	3,778	–	3,778	3,652	–	3,652
Sales	**48,516**	**–**	**48,516**	**43,967**	**–**	**43,967**
Royalty income	1,039	–	1,039	1,670	–	1,670
Income from out-licensing agreements	198	–	198	267	–	267
Income from disposal of products and other	504	457	961	333	283	616
Royalties and other operating income	**1,741**	**457**	**2,198**	**2,270**	**283**	**2,553**
Diagnostics Division						
Sales by business area						
Centralised and Point of Care Solutions	7,176	643	7,819	7,099	669	7,768
Molecular Diagnostics	1,998	111	2,109	1,912	107	2,019
Diabetes Care	1,915	3	1,918	1,977	3	1,980
Tissue Diagnostics	1,053	51	1,104	1,047	65	1,112
Sales	**12,142**	**808**	**12,950**	**12,035**	**844**	**12,879**
Royalty income	65	–	65	58	–	58
Income from out-licensing agreements	0	–	0	2	–	2
Income from disposal of products and other	0	22	22	15	23	38
Royalties and other operating income	**65**	**22**	**87**	**75**	**23**	**98**
Total	**62,464**	**1,287**	**63,751**	**58,347**	**1,150**	**59,497**

Revenue from other sources primarily relates to lease revenue and collaboration income for which the counterparty is not considered a customer, such as income from profit-sharing arrangements.

Gross-to-net sales reconciliation for the Pharmaceuticals Division

The gross-to-net sales reconciliation for the Pharmaceuticals Division is shown in the table below. The companies in the Diagnostics Division have similar reconciling items, but at much lower amounts.

Pharmaceuticals Division sales gross-to-net reconciliation in millions of CHF

	2019	2018
Gross sales	59,209	53,334
Government and regulatory mandatory price reductions	(6,640)	(6,064)
Contractual price reductions	(3,046)	(2,423)
Cash discounts	(353)	(476)
Customer returns reserves	(283)	(326)
Others	(371)	(78)
Net sales	**48,516**	**43,967**

Government and regulatory mandatory price reductions. These consist of mandatory price reductions. The major elements are 340B Drug Discount Program, Medicaid, and other plans in the US, which totalled USD 5.7 billion, equivalent to CHF 5.7 billion (2018: USD 5.5 billion, equivalent to CHF 5.4 billion).

Contractual price reductions. These include rebates and chargebacks that are the result of contractual agreements that are primarily volume based and performance based.

Cash discounts. These include credits offered to wholesalers for remitting payment on their purchases within contractually defined incentive periods.

Customer returns reserves. These are allowances established for expected product returns.

Sales reductions that are expected to be withheld by the customer upon settlement, such as contractual price reductions and cash discounts, are recorded in the balance sheet as a deduction from trade receivables (see Note 12). Sales reductions that are separately payable to customers, governmental health authorities or healthcare regulatory authorities are recorded in the balance sheet as accrued liabilities (see Note 19). Provisions for sales returns are recorded in the balance sheet as other provisions (see Note 20).

Contract balances

Receivables in millions of CHF

	2019	2018	2017
Accounts receivable [12]	10,440	9,776	9,577
Other current receivables – contracts with customers [16]	541	604	628
Other non-current receivables – contracts with customers [15]	38	25	38
Total receivables	**11,019**	**10,405**	**10,243**

Other current receivables mainly include royalty and licensing receivables. At 31 December 2019 total receivables include lease receivables of 2% (2018: 2%) which are not considered receivables from contracts with customers.

Contract assets in millions of CHF

	2019	2018	2017
Accrued income	114	73	25
Total contract assets	**114**	**73**	**25**

Contract liabilities in millions of CHF

	2019	2018	2017
Deferred income – non-current	162	21	77
Deferred income – current	487	290	372
Total contract liabilities	**649**	**311**	**449**

Movement in contract liabilities in millions of CHF

	2019	2018
At 1 January	311	449
Business combinations	142	22
Revenue recognised that was included in the contract liability balance at the beginning of the year	(332)	(314)
Increases due to cash received or receivable, excluding amounts recognised as revenue during the year	540	162
Divestment of subsidiaries	0	(1)
Currency translation effects	(12)	(7)
At 31 December	**649**	**311**

Revenue recognised in relation to performance obligations satisfied in previous years

In 2019 there was an increase in revenue recognised of CHF 199 million (2018: increase of CHF 30 million) relating to performance obligations that were satisfied in previous periods, mainly due to adjustments of sales deduction provisions and accruals for expected sales returns, chargebacks and other allowances in respect of previous years.

Remaining performance obligations in (partially) unsatisfied long-term contracts

Remaining performance obligations in (partially) unsatisfied long-term contracts are either included in deferred income or are related to amounts the Group expects to receive for goods and services that have not yet been transferred to customers under existing, non-cancellable or otherwise enforceable contracts. These are mainly associated with contracts in the Diagnostics Division that have minimum purchase commitments related to reagents and consumables for previously sold instruments as well as monitoring and maintenance services. For contracts that have an original duration of one year or less, the Group has elected the practical expedient to not disclose the transaction price for remaining performance obligations at the end of each reporting period and at which point in time the Group expects to recognise these sales.

Transaction price allocated to contracts with (partially) unsatisfied performance obligations in millions of CHF

	2019	2018
No contract liability held	2,451	2,730
Contract liability held	649	311
Total	**3,100**	**3,041**
Thereof expected to be recognised as revenue		
– Within one year	1,534	1,130
– Between one and five years	1,468	1,804
– More than five years	98	107
Total	**3,100**	**3,041**

4. Net financial expense

Financing costs in millions of CHF

	2019	2018
Interest expense	(590)	(594)
Amortisation of debt discount [21]	(12)	(11)
Net gains (losses) on redemption and repurchase of bonds and notes	(202)	0
Discount unwind [20]	(31)	(26)
Net interest cost of defined benefit plans [26]	(140)	(139)
Interest expense on lease liabilities [28]	(18)	–
Total financing costs	**(993)**	**(770)**

Other financial income (expense) in millions of CHF

	2019	2018
Net gains (losses) on equity investments / securities at fair value through profit or loss	184	310
Dividend income from equity investments / securities at fair value through profit or loss	0	0
Dividend income from equity investments / securities at fair value through OCI	1	1
Net income from equity investments / securities	**185**	**311**
Interest income from debt securities at fair value through OCI and at amortised cost	99	30
Net gains (losses) on sale of debt securities at fair value through OCI	5	6
Net interest income and income from debt securities	**104**	**36**
Net foreign exchange gains (losses)	(193)	(208)
Net gains (losses) on foreign currency derivatives	(12)	48
Foreign exchange gains (losses)	**(205)**	**(160)**
Gains (losses) on net monetary position in hyperinflationary economies	(17)	(18)
Net other financial income (expense)	7	(26)
Associates	(15)	6
Total other financial income (expense)	**59**	**149**

Net financial expense in millions of CHF

	2019	2018
Financing costs	(993)	(770)
Other financial income (expense)	59	149
Net financial expense	**(934)**	**(621)**
Financial result from Treasury management	(779)	(488)
Financial result from Pension management	(140)	(139)
Associates	(15)	6
Net financial expense	**(934)**	**(621)**

As disclosed in Note 28 and in Note 34, following the implementation of IFRS 16, the Group has changed its accounting policies with respect to leases. The Group has applied the cumulative catch-up method for the transition, meaning that the comparative 2018 results have not been restated. The application of the new standard resulted in part of what has been previously reported as operating lease costs being recorded as interest expenses. Given the leases involved and the prevailing low interest rate environment, the Group does not expect this effect to be material, with the amount in 2019 being CHF 18 million.

Hyperinflationary economies

Since 1 July 2018 the Group has considered Argentina to be a hyperinflationary economy, in the context of IAS 29 'Financial Reporting in Hyperinflationary Economies'. The cumulative inflation index over the last three years exceeds 100%, as measured by the National Wholesaler Price Index (Sistema de Índices de Precios Mayoristas).

Accordingly the Group has reviewed the reporting from its affiliates in Argentina, and where necessary restated them in line with IAS 29. The potential adjustments resulting from the application of IAS 29 do not have a significant impact on the Group's operating results and balance sheet. An adjustment is recorded for the gains (losses) on the net monetary position, which is a loss of CHF 17 million resulting from the loss in purchasing power of the positive net monetary position during 2019 of the Group's Argentinian affiliates (2018: loss of CHF 18 million).

5. Income taxes

Income tax expenses in millions of CHF

	2019	2018
Current income taxes	(3,685)	(3,881)
Deferred taxes	1,179	598
Total income tax (expense)	**(2,506)**	**(3,283)**

Since the Group operates internationally, it is subject to income taxes in many different tax jurisdictions. The Group calculates its average expected tax rate as a weighted average of the tax rates in the tax jurisdictions in which the Group operates. This rate changes from year to year due to changes in the mix of the Group's taxable income and changes in local tax rates.

The Group's average expected tax rate increased to 18.9% in 2019 (2018: 17.8%). This was largely due to the higher proportion of the Group's profits coming from tax jurisdictions with higher local tax rates than the average Group tax rate.

The Group's effective tax rate decreased to 15.1% in 2019 (2018: 23.2%). The main drivers for the decrease were the resolution of several tax disputes, which resulted in a positive income statement impact of CHF 454 million, the lower goodwill impairments, the impacts from the Swiss tax reform and the deferred tax impact from equity compensation plans, which varies according to the price of the underlying equities.

In Switzerland changes to the Swiss federal and canton Basel-Stadt tax laws were enacted during the first half of 2019. The relevant changes for the Group include a decrease in the Basel-Stadt tax rate, effective from 1 January 2019, and new limitations. These changes do not reduce the Group's average expected tax rate in Basel-Stadt. Changes in the tax laws in other Swiss cantons where the Group operates were enacted during the second half of 2019. The Group has carried out a remeasurement of its deferred tax positions and the impacted net deferred tax liability positions on the balance sheet were reduced by CHF 208 million. The deferred tax remeasurement, which does not have an impact on tax payments, resulted in a transitional deferred tax income of CHF 236 million during 2019. The remaining adjustments of CHF 28 million were recorded to other comprehensive income, in so far as they relate to temporary differences arising on items that were themselves recorded to other comprehensive income, such as actuarial gains/losses on Swiss pension plans.

The Group's effective tax rate can be reconciled to the Group's average expected tax rate as follows:

Reconciliation of the Group's effective tax rate

	2019	2018
Average expected tax rate	18.9%	17.8%
Tax effect of		
– Non-taxable income/non-deductible expenses	+0.5%	+4.5%
– Equity compensation plans	–0.6%	+0.1%
– Research and development tax credits and other deductions	–2.4%	–2.0%
– US state tax impacts	+0.4%	+0.4%
– Tax on unremitted earnings	+1.9%	+1.2%
– Transitional effect of changes in US tax rates	–	–0.2%
– Transitional effect of Swiss tax reform	–1.4%	–
– Resolution of several tax disputes	–2.7%	–
– Prior year and other differences	+0.5%	+1.4%
Group's effective tax rate	**15.1%**	**23.2%**

The income tax benefit recorded in respect of equity compensation plans, which varies according to the price of the underlying equity, was CHF 193 million (2018: CHF 59 million). Had the income tax benefits been recorded solely on the basis of the IFRS 2 expense multiplied by the applicable tax rate, then a benefit of approximately CHF 99 million (2018: CHF 78 million) would have been recorded.

Tax effects of other comprehensive income in millions of CHF

	2019			2018		
	Pre-tax amount	Tax	After-tax amount	Pre-tax amount	Tax	After-tax amount
Remeasurements of defined benefit plans	(516)	102	(414)	197	(63)	134
Equity investments at fair value through OCI	(5)	2	(3)	89	(2)	87
Debt securities at fair value through OCI	12	0	12	(8)	1	(7)
Cash flow hedges	(52)	13	(39)	(19)	4	(15)
Currency translation of foreign operations	(442)	–	(442)	(290)	–	(290)
Other comprehensive income	**(1,003)**	**117**	**(886)**	**(31)**	**(60)**	**(91)**

Income tax assets (liabilities) in millions of CHF

	2019	2018	2017
Current income taxes			
– Assets	237	208	348
– Liabilities	(3,838)	(3,808)	(3,408)
Net current income tax assets (liabilities)	**(3,601)**	**(3,600)**	**(3,060)**
Deferred taxes			
– Assets	5,211	3,895	3,576
– Liabilities	(298)	(384)	(495)
Net deferred tax assets (liabilities)	**4,913**	**3,511**	**3,081**

Current income tax liabilities include accruals for uncertain tax positions.

Current income taxes: movements in recognised net assets (liabilities) in millions of CHF

	2019	2018
Net current income tax asset (liability) at 1 January	(3,600)	(3,060)
Income taxes paid	3,543	3,288
Business combinations	0	6
(Charged) credited to the income statement	(3,685)	(3,881)
(Charged) credited to equity from equity compensation plans and other transactions with shareholders	96	53
Currency translation effects and other movements	45	(6)
Net current income tax asset (liability) at 31 December	**(3,601)**	**(3,600)**

Deferred taxes: movements in recognised net assets (liabilities) in millions of CHF

	Property, plant and equipment and right-of-use assets	Intangible assets	Defined benefit plans	Other temporary differences	Total
Year ended 31 December 2018					
At 1 January 2018 (revised)	(658)	(745)	1,181	3,304	3,082
Business combinations [6]	0	(160)	0	33	(127)
Asset acquisitions [6]	0	0	0	112	112
(Charged) credited to the income statement	(38)	332	9	295	598
(Charged) credited to other comprehensive income [22]	–	–	(63)	3	(60)
(Charged) credited to equity from equity compensation plans and other transactions with shareholders	–	21	–	(28)	(7)
Currency translation effects and other movements	(1)	(38)	(26)	(22)	(87)
At 31 December 2018	**(697)**	**(590)**	**1,101**	**3,697**	**3,511**
Year ended 31 December 2019					
At 1 January 2019	(697)	(590)	1,101	3,697	3,511
Implementation of IFRS 16 'Leases'	(257)	–	–	257	0
At 1 January 2019 (revised)	**(954)**	**(590)**	**1,101**	**3,954**	**3,511**
Business combinations [6]	0	0	0	0	0
Asset acquisitions	–	–	–	–	–
(Charged) credited to the income statement	91	363	(36)	761	1,179
(Charged) credited to other comprehensive income [22]	–	–	102	15	117
(Charged) credited to equity from equity compensation plans and other transactions with shareholders	–	0	–	208	208
Currency translation effects and other movements	9	0	(31)	(80)	(102)
At 31 December 2019	**(854)**	**(227)**	**1,136**	**4,858**	**4,913**

As disclosed in Note 28 and in Note 34, the Group has changed its accounting policies for leases following the implementation of IFRS 16 'Leases', effective 1 January 2019. The Group has applied the cumulative catch-up method for the transition, meaning that the comparative balance sheets as at 31 December 2018 and 31 December 2017 have not been restated. Deferred tax assets as at 1 January 2018 were revised following the implementation of IFRS 9 'Financial Instruments'.

The deferred tax net assets for other temporary differences mainly relate to accrued and other liabilities, including lease liabilities, provisions and unrealised profit in inventory.

Deferred tax assets are recognised for tax losses carried forward only to the extent that realisation of the related tax benefit is probable. The Group has unrecognised tax losses, including valuation allowances, as follows:

Unrecognised tax losses: expiry

	2019 Amount (CHF m)	2019 Applicable tax rate	2018 Amount (CHF m)	2018 Applicable tax rate
Within one year	1,654	12%	183	12%
Between one and five years	1,227	12%	2,150	12%
More than five years	14,781	7%	10,893	5%
Total unrecognised tax losses	**17,662**	**8%**	**13,226**	**6%**

The 'More than five years' category includes losses that cannot be used for US state income tax purposes in those states which only permit tax reporting on a separate entity basis.

Deferred tax liabilities have not been established for the withholding tax and other taxes that would be payable on the remittance of earnings of foreign subsidiaries, where such amounts are currently regarded as permanently reinvested for the purpose of these financial statements. The total unremitted earnings of the Group, regarded as permanently reinvested for the purpose of these financial statements, were CHF 38.1 billion at 31 December 2019 (2018: CHF 33.9 billion).

6. Mergers and acquisitions

In 2018 the Group implemented the amendments to IFRS 3 'Business Combinations' issued in October 2018. The amendments further clarify the definition of a business. The effect of the amendments is particularly applicable for many of the acquisitions carried out by the Group, since the value in the acquired companies often largely consists of the rights to a single product or technology. From 2018 such transactions are accounted for as asset acquisitions rather than business combinations.

This note includes both transactions accounted for as business combinations and asset acquisitions. Asset acquisitions are acquisitions of legal entities that do not qualify as business combinations under IFRS 3. Cash consideration paid for asset acquisitions at the transaction date and subsequent additional contingent payments made upon the achievement of performance-related development milestones are now presented in the line 'Asset acquisitions' as disclosed separately below. Subsequent consideration for performance-related development milestones for transactions treated as asset acquisitions is recognised as intangible assets when the specific milestones have been achieved.

Business combinations – 2019

Spark Therapeutics, Inc. On 17 December 2019 the Group acquired a 100% controlling interest in Spark Therapeutics, Inc. ('Spark Therapeutics'), a publicly owned US company based in Philadelphia, Pennsylvania, that had been listed on Nasdaq. Spark Therapeutics is a fully integrated commercial company committed to discovering, developing and delivering gene therapies. Spark Therapeutics is reported in the Pharmaceuticals Division. The total consideration was USD 4,772 million, which was paid in cash.

The identifiable assets acquired and liabilities assumed are set out in the table below. The amounts are provisional based on preliminary information because the transaction closed shortly before the end of the reporting period. Identification and valuation of intangible assets, other assets and liabilities will be adjusted during 2020.

Business combinations – 2019: net assets acquired in millions of CHF

	Spark Therapeutics
Property, plant and equipment [8]	77
Right-of-use assets [28]	65
Intangible assets [10]	0
Cash and cash equivalents	157
Marketable securities	133
Other non-current liabilities	
– Deferred income	(133)
– Lease liabilities	(77)
– Other long-term liabilities	(2)
Other net assets (liabilities)	(28)
Net identifiable assets	**192**
Goodwill [9]	4,496
Total consideration	**4,688**
Cash	4,688
Total consideration	**4,688**

Due to the provisional accounting, apart from goodwill, no intangible assets have yet been recognised. The provisional goodwill computed in the table above also represents rights to Spark Therapeutics' clinical and pre-clinical assets. This includes Spark Therapeutics' lead clinical asset SPK-8011, a novel gene therapy for the treatment of haemophilia A, and Luxturna, Spark Therapeutics' marketed gene therapy for the treatment of patients with confirmed biallelic RPE65 mutation-associated retinal dystrophy (an inherited retinal disease). Luxturna was the first gene therapy to receive an FDA approval in 2017. The European Commission granted marketing authorisation for Luxturna in 2018. In addition, goodwill represents Spark Therapeutics' technological capabilities in gene therapy. Any remaining goodwill will include a control premium, the acquired work force and the expected synergies. None of the goodwill is expected to be deductible for income tax purposes.

The Spark Therapeutics accounts receivable is comprised of gross contractual amounts due of CHF 12 million which were all expected to be collectable at the date of the acquisition.

Directly attributable transaction costs of CHF 25 million were reported in the Roche Pharmaceuticals operating segment within general and administration expenses.

The impact of the acquisition on the 2019 results for the Pharmaceuticals Division and the Group were not material. If the acquisition had occurred on 1 January 2019 management estimates that Spark Therapeutics would have contributed revenue of approximately CHF 80 million and a net loss (after tax) of approximately CHF 450 million in 2019. This information is provided for illustrative purposes only and is not necessarily indicative of the results of the combined Group that would have occurred had Spark Therapeutics actually been acquired at the beginning of the year, or indicative of the future results of the combined Group.

Business combinations – 2018

Flatiron Health, Inc. On 5 April 2018 the Group acquired a 100% controlling interest in Flatiron Health, Inc. ('Flatiron Health'), a privately owned US company based in New York City. Flatiron Health is reported in the Pharmaceuticals Division. The total consideration was USD 1,616 million, which was paid in cash.

The identifiable assets acquired and liabilities assumed are set out in the table below.

Business combinations – 2018: net assets acquired in millions of CHF

	Flatiron Health
Intangible assets	
– Product intangibles: in use [10]	608
– Marketing intangibles: in use [10]	87
Deferred tax assets [5]	33
Cash and cash equivalents	21
Deferred tax liabilities [5]	(160)
Other net assets (liabilities)	76
Net identifiable assets	**665**
Fair value of previously held interest	(240)
Goodwill [9]	1,128
Total consideration	**1,553**
Cash	1,553
Total consideration	**1,553**

The fair value of Flatiron Health's technology platform was determined using an excess earning method that is based on management forecasts and observable market data for discount rates, tax rates and foreign exchange rates. The present value was calculated using a risk-adjusted discount rate of 10.4% for Flatiron Health. The valuation was performed by an independent valuer.

Goodwill represents the value of accelerating progress towards data-driven personalised healthcare in cancer and to advance the use of real-world evidence to set new industry standards for oncology research and development. It also represents a control premium, the acquired work force and expected synergies. None of the goodwill is expected to be deductible for income tax purposes.

The Group recognised a financial gain of CHF 78 million for fair valuing the 12% interest in Flatiron Health held by the Group prior to the transaction. This gain is included in the statement of changes in equity within the line item 'Net change in fair value – financial assets at fair value through OCI' in 2018 and has been transferred to 'Retained earnings' upon obtaining control.

Directly attributable transaction costs of CHF 3 million were reported in the Roche Pharmaceuticals operating segment within general and administration expenses.

In the nine months to 31 December 2018 Flatiron Health contributed revenue of CHF 56 million and a net loss (after tax) of CHF 175 million to the results reported for the Pharmaceuticals Division and the Group. If the acquisition had occurred on 1 January 2018 management estimates that Flatiron Health would have contributed revenue of CHF 78 million and a net loss (after tax) of CHF 187 million in 2018. This information is provided for illustrative purposes only and is not necessarily indicative of the results of the combined Group that would have occurred had Flatiron Health actually been acquired at the beginning of the year, or indicative of the future results of the combined Group.

Cash flows from business combinations

Business combinations: net cash outflow in millions of CHF

	2019			2018		
	Pharmaceuticals	Diagnostics	Total	Pharmaceuticals	Diagnostics	Total
Cash consideration paid	(4,688)	0	(4,688)	(1,553)	0	(1,553)
Deferred consideration paid	0	(3)	(3)	0	(4)	(4)
Contingent consideration paid [20]	(30)	(142)	(172)	(9)	(5)	(14)
Cash in acquired company	157	0	157	21	0	21
Total net cash outflow	**(4,561)**	**(145)**	**(4,706)**	**(1,541)**	**(9)**	**(1,550)**

In 2019 directly attributable transaction costs for business combinations amounted to CHF 25 million (2018: CHF 3 million) and are included in the cash flow from operating activities.

Future asset acquisitions

Promedior, Inc. On 14 November 2019 the Group entered into a definitive merger agreement to fully acquire Promedior, Inc. ('Promedior'), a privately owned US company based in Lexington, Massachusetts. With the acquisition, the Group will obtain rights to Promedior's entire portfolio including phase III-ready asset PRM-151, a first-in-class recombinant human pentraxin-2 molecule for the treatment of idiopathic pulmonary fibrosis. The closing of the transaction is currently expected to take place in the first quarter of 2020 and will be subject to the expiration or termination of the waiting period under the Hart-Scott-Rodino Antitrust Improvements Act of 1976 and other closing conditions. Promedior will be reported in the Pharmaceuticals Division. The cash consideration to be paid at the acquisition date will be USD 390 million. Additional contingent payments may be made based upon the achievement of performance-related milestones.

Asset acquisitions – 2019

The Group did not complete any asset acquisitions in 2019.

Asset acquisitions – 2018

Ignyta, Inc. On 8 February 2018 the Group acquired a 100% controlling interest in Ignyta, Inc. ('Ignyta'), a publicly owned US company based in San Diego, California, that had been listed on Nasdaq. Ignyta is reported in the Pharmaceuticals Division. The total consideration was USD 1,949 million, which was paid in cash.

Other acquisitions. On 27 September 2018 the Group acquired a 100% controlling interest in Tusk Therapeutics Ltd ('Tusk'), a private company based in Stevenage, United Kingdom. Tusk is reported in the Pharmaceuticals Division.

On 20 November 2018 the Group acquired a 100% controlling interest in Jecure Therapeutics, Inc. ('Jecure'), a privately owned US company based in San Diego, California. Jecure is reported in the Pharmaceuticals Division.

The total cash consideration paid at the acquisition date for both acquisitions was CHF 150 million. Additional contingent payments may be made based upon the achievement of performance-related milestones.

Asset acquisitions – 2018: net assets acquired in millions of CHF

	Ignyta	Other acquisitions	Total
Intangible assets			
– Product intangibles: not available for use [10]	1,581	144	1,725
Deferred tax assets [5]	112	0	112
Cash and cash equivalents	164	1	165
Other net assets (liabilities)	(18)	5	(13)
Net identifiable assets	**1,839**	**150**	**1,989**
Cash	1,839	150	1,989
Total cash consideration	**1,839**	**150**	**1,989**

Cash flows from asset acquisitions

Asset acquisitions: net cash outflow in millions of CHF

	Pharmaceuticals	Diagnostics	2019 Total	Pharmaceuticals	Diagnostics	2018 Total
Cash consideration paid	–	–	–	(1,989)	0	(1,989)
Cash in acquired company	–	–	–	165	0	165
Total net cash outflow	**–**	**–**	**–**	**(1,824)**	**0**	**(1,824)**

Foundation Medicine transaction

On 7 April 2015 the Group acquired a 61.3% controlling interest in Foundation Medicine, Inc. ('FMI'), which has been treated as a fully consolidated subsidiary of the Group since that date. The common stock of FMI was publicly traded and was listed on the Nasdaq under the stock code 'FMI'. At 31 December 2017 the Group's interest in FMI was 57.5%.

On 18 June 2018 the Group entered into a merger agreement with FMI to acquire the outstanding shares of FMI's common stock not already owned by the Group at a price of USD 137.00 per share in cash. The merger agreement was approved by the Board of Roche and a special committee of the independent directors of FMI and by its full board of directors. A tender offer was launched on 2 July 2018. On 31 July 2018 the transaction closed and FMI became a 100% owned subsidiary of the Group. It was accounted for in full as an equity transaction. The cash consideration for the purchase of all public shares, including shares issuable on FMI's outstanding stock incentive plans and payment of related fees and expenses, amounted to USD 2.3 billion, as set out in the table below. These amounts were recorded to equity as a change in ownership interest in subsidiaries.

Foundation Medicine transaction

	USD million	CHF million
Purchase of publicly held shares	2,222	2,196
Settlement of outstanding stock options and vested restricted stock awards	51	50
Directly attributable transaction costs	41	41
Total cash consideration	**2,314**	**2,287**
Income tax effects	(46)	(46)
Change in ownership interest in subsidiaries	**2,268**	**2,241**

7. Global restructuring plans

During 2019 the Group continued with the implementation of various global restructuring plans initiated in prior years.

Global restructuring plans: costs incurred in millions of CHF

	Diagnostics[1]	Site consolidation[2]	Other plans[3]	Total
Year ended 31 December 2019				
Global restructuring costs				
– Employee-related costs	176	171	526	873
– Site closure costs	38	69	28	135
– Divestment of products and businesses	(16)	1	0	(15)
– Other reorganisation expenses	143	15	55	213
Total global restructuring costs	**341**	**256**	**609**	**1,206**
Additional costs				
– Impairment of goodwill	0	0	0	0
– Impairment of intangible assets	0	0	0	0
– Legal and environmental cases	(1)	43	0	42
Total costs	**340**	**299**	**609**	**1,248**
Year ended 31 December 2018				
Global restructuring costs				
– Employee-related costs	105	153	202	460
– Site closure costs	49	173	5	227
– Divestment of products and businesses	8	0	0	8
– Other reorganisation expenses	73	1	138	212
Total global restructuring costs	**235**	**327**	**345**	**907**
Additional costs				
– Impairment of goodwill	0	0	0	0
– Impairment of intangible assets	0	0	0	0
– Legal and environmental cases	7	12	0	19
Total costs	**242**	**339**	**345**	**926**

1) Includes strategy plans in the Diagnostics Division.
2) Includes the Pharmaceuticals Division's strategic realignment of its manufacturing network and resourcing flexibility in biologics manufacturing network.
3) Includes plans for outsourcing of IT and other functions to shared service centres and external providers and for resourcing flexibility in the Pharmaceuticals Division's commercial operations and global product development/strategy organisations.

Diagnostics Division

In 2019 strategy plans in the Diagnostics Division incurred costs of CHF 228 million mainly for employee-related matters (2018: CHF 87 million). Expenses for IT process optimisation plans were CHF 71 million (2018: CHF 35 million).

In 2018 additional costs of CHF 36 million were included for the divestment of a subsidiary in Germany and costs related to a reorganisation in the Molecular Diagnostics business were CHF 27 million.

Site consolidation

In 2019 costs from the Pharmaceuticals Division's strategic realignment of its manufacturing network were CHF 132 million (2018: CHF 117 million) and mainly related to the exit from the manufacturing site at Clarecastle, Ireland. The expected costs of the environmental remediation at the Clarecastle site were reassessed and resulted in an increase in the provisions by CHF 43 million. Employee-related costs of CHF 91 million were recorded for the redesign of manufacturing at the South San Francisco site. Costs for the resourcing flexibility plan in the biologics manufacturing network were CHF 84 million (2018: CHF 215 million), which included the closure of the manufacturing plant in Rio de Janeiro in Brazil.

Other global restructuring plans

In 2019 initiatives in the Pharmaceuticals Division incurred costs of CHF 272 million (2018: CHF 146 million), mainly employee-related. Other major items were CHF 90 million for plans for outsourcing of IT and other functions to shared service centres and external providers (2018: CHF 111 million) and CHF 72 million at Chugai.

Global restructuring plans: summary of costs incurred in millions of CHF

	2019	2018
Employee-related costs		
– Termination costs	724	401
– Defined benefit plans	10	(14)
– Other employee-related costs	139	73
Total employee-related costs	**873**	**460**
Site closure costs		
– Impairment (reversal) of property, plant and equipment and right-of-use assets	(4)	74
– Accelerated depreciation of property, plant and equipment and right-of-use assets	73	39
– (Gains) losses on disposal of property, plant and equipment and right-of-use assets	14	(18)
– Other site closure costs	52	132
Total site closure costs	**135**	**227**
Divestment of products and businesses		
– (Gains) losses on divestment of subsidiaries	(15)	24
– Other (gains) losses on divestment of products and businesses	0	(16)
Total costs on divestment of products and businesses	**(15)**	**8**
Other reorganisation expenses	213	212
Total global restructuring costs	**1,206**	**907**
Additional costs		
– Impairment of goodwill	0	0
– Impairment of intangible assets	0	0
– Legal and environmental cases	42	19
Total costs	**1,248**	**926**

Global restructuring plans: classification of costs in millions of CHF

	2019			2018		
	Depreciation, amortisation and impairment	Other costs	Total	Depreciation, amortisation and impairment	Other costs	Total
Royalties and other operating income						
– Pharmaceuticals	–	0	0	–	0	0
– Diagnostics	–	0	0	–	(16)	(16)
Cost of sales						
– Pharmaceuticals	41	219	260	107	185	292
– Diagnostics	9	111	120	8	100	108
Marketing and distribution						
– Pharmaceuticals	5	262	267	0	97	97
– Diagnostics	1	137	138	0	71	71
Research and development						
– Pharmaceuticals	18	123	141	1	75	76
– Diagnostics	6	72	78	(4)	38	34
General and administration						
– Pharmaceuticals	(12)	123	111	0	70	70
– Diagnostics	1	3	4	1	44	45
– Corporate	0	129	129	0	149	149
Total	**69**	**1,179**	**1,248**	**113**	**813**	**926**
Total by operating segment						
– Roche Pharmaceuticals	29	678	707	108	427	535
– Chugai	23	49	72	–	–	–
– Diagnostics	17	323	340	5	237	242
– Corporate	0	129	129	0	149	149
Total	**69**	**1,179**	**1,248**	**113**	**813**	**926**

8. Property, plant and equipment

Property, plant and equipment: movements in carrying value of assets in millions of CHF

	Land	Buildings and land improvements	Machinery and equipment	Construction in progress	Total
At 1 January 2018					
Cost	980	15,602	19,982	3,445	40,009
Accumulated depreciation and impairment	0	(6,193)	(12,889)	(15)	(19,097)
Net book value	**980**	**9,409**	**7,093**	**3,430**	**20,912**
Year ended 31 December 2018					
At 1 January 2018	980	9,409	7,093	3,430	20,912
Business combinations	0	0	3	0	3
Additions	358	91	1,072	2,275	3,796
Disposals	(2)	(14)	(118)	(2)	(136)
Divestment of subsidiaries	0	0	0	0	0
Transfers	44	1,298	1,018	(2,360)	–
Depreciation charge	–	(697)	(1,595)	–	(2,292)
Impairment charge	0	(12)	(115)	(14)	(141)
Other	0	0	(92)	(11)	(103)
Currency translation effects	4	(62)	(132)	(31)	(221)
At 31 December 2018	**1,384**	**10,013**	**7,134**	**3,287**	**21,818**
Cost	1,384	16,707	20,437	3,294	41,822
Accumulated depreciation and impairment	0	(6,694)	(13,303)	(7)	(20,004)
Net book value	**1,384**	**10,013**	**7,134**	**3,287**	**21,818**
Year ended 31 December 2019					
At 1 January 2019	1,384	10,013	7,134	3,287	21,818
Reclassification to right-of-use assets of previously reported finance leases on implementation of IFRS 16 'Leases' [28]	–	–	(3)	–	(3)
At 1 January 2019 (revised)	**1,384**	**10,013**	**7,131**	**3,287**	**21,815**
Business combinations [6]	0	43	18	16	77
Additions	57	114	1,079	2,229	3,479
Disposals	(1)	(13)	(87)	(5)	(106)
Divestment of subsidiaries	0	0	0	0	0
Transfers	0	831	1,031	(1,862)	–
Depreciation charge	–	(764)	(1,645)	–	(2,409)
Impairment charge	0	(10)	(24)	(227)	(261)
Other	0	(10)	(62)	(4)	(76)
Currency translation effects	(14)	(144)	(141)	(47)	(346)
At 31 December 2019	**1,426**	**10,060**	**7,300**	**3,387**	**22,173**
Cost	1,426	17,353	21,189	3,604	43,572
Accumulated depreciation and impairment	0	(7,293)	(13,889)	(217)	(21,399)
Net book value	**1,426**	**10,060**	**7,300**	**3,387**	**22,173**

Classification of impairment of property, plant and equipment in millions of CHF

	2019	2018
Cost of sales	(250)	(130)
Marketing and distribution	0	0
Research and development	(6)	1
General and administration	(5)	(12)
Total impairment charge	**(261)**	**(141)**

Impairment charges for property, plant and equipment were mainly related to an idle plant in 2019 and to global restructuring plans (see Note 7) in 2018.

In 2019 no reimbursements were received from insurance companies in respect of impairments to property, plant and equipment (2018: none). In 2019 no borrowing costs were capitalised as property, plant and equipment (2018: none).

At 31 December 2019 machinery and equipment with an original cost of CHF 5.5 billion (2018: CHF 5.2 billion) and a net book value of CHF 1.8 billion (2018: CHF 1.7 billion) was being leased to third parties (see Note 28).

Capital commitments

The Group has non-cancellable capital commitments for the purchase or construction of property, plant and equipment totalling CHF 2.3 billion (2018: CHF 1.3 billion).

9. Goodwill

Goodwill: movements in carrying value of assets in millions of CHF

	2019	2018
At 1 January		
Cost	12,836	12,461
Accumulated impairment	(3,888)	(2,384)
Net book value	**8,948**	**10,077**
Year ended 31 December		
At 1 January	8,948	10,077
Business combinations [6]	4,496	1,128
Divestment of subsidiaries	0	(5)
Impairment charge	(779)	(2,254)
Currency translation effects	(209)	2
At 31 December	**12,456**	**8,948**
Cost	16,943	12,836
Accumulated impairment	(4,487)	(3,888)
Net book value	**12,456**	**8,948**
Allocated to the following cash-generating units		
Roche Pharmaceuticals	7,802	3,421
Roche Pharmaceuticals product transactions	358	363
Chugai	98	99
Total Pharmaceuticals Division	**8,258**	**3,883**
Diabetes Care	93	876
Centralised and Point of Care Solutions	1,591	1,618
Molecular Diagnostics	376	381
Tissue Diagnostics	0	0
Sequencing	0	0
Divisional goodwill	2,138	2,190
Total Diagnostics Division	**4,198**	**5,065**

Cash-generating units used for allocating goodwill

Pharmaceuticals Division. During 2018 the Group made a comprehensive reassessment of the cash-generating units used for allocating goodwill in the Pharmaceuticals Division. The conclusions of this reassessment were as follows:

- Within the Roche Pharmaceuticals operating segment, goodwill arises from three broad types of transactions:
  - Strategic transactions that have a transformative effect across the whole division.
  - Technology transactions, where the acquired technologies can have a range of areas of applications.
  - Product transactions, where the acquired products typically have more limited synergistic benefits outside of the immediate product therapeutic area.
- The cash-generating unit for the goodwill arising from strategic transactions is the Roche Pharmaceuticals operating segment.
- The cash-generating unit for the goodwill arising from technology transactions is also the Roche Pharmaceuticals operating segment. However, if the acquired technologies permanently cease to operate then this will be treated as a disposal of the business; in such cases the goodwill will be deemed to have been disposed of and will be fully impaired.
- The cash-generating unit for the goodwill arising from product transactions is the smallest identifiable group of assets related to the revenues and related costs that arise from the development and commercialisation of the product(s) in question. Where there are synergistic benefits to other products in the same therapeutic area, then the revenues, costs and corresponding assets of these other products are also taken into account. If the acquired products permanently cease to generate economic benefits then this will be treated as a disposal of the business; in such cases the goodwill will be deemed to have been disposed of and will be fully impaired.
- Chugai is a separate operating segment in the Group's financial reporting and a separate cash-generating unit to which goodwill is allocated.

The Group allocated the goodwill in the Roche Pharmaceuticals operating segment as listed below. The basis for the allocation were the historical amounts of goodwill that arose from the individual transactions.

- Strategic transactions consist of Genentech (1990/1999), Foundation Medicine (2015), Flatiron Health (2018) and Spark Therapeutics (2019).
- Technology transactions consist of Therapeutic Human Polyclonals (2007), Dutalys (2014) and Santaris (2014).
- Product transactions consist of GlycArt (2005), Tanox (2007) and InterMune (2014).

Diagnostics Division. The division's business areas and the sequencing business are the cash-generating units used for the testing of goodwill. The goodwill arising from the Corange/Boehringer Mannheim acquisition and part of the goodwill from the Ventana acquisition is recorded and monitored at a divisional level as it relates to the strategic development of the whole division and cannot be meaningfully allocated to the division's business areas. Therefore the cash-generating unit for this goodwill is the entire division. The goodwill arising from the Viewics acquisition is monitored at the divisional level. The recoverable amount used in the impairment testing is based on value in use.

Impairment charge – 2019

A charge of CHF 779 million was recorded in the Diagnostics Division for the partial write-off of goodwill related to the Diabetes Care business. The impairment is a result of revised market assumptions related to the blood glucose monitoring area and a slower than expected growth in other parts of this business.

Impairment charge – 2018

Pharmaceuticals Division. The assessment for the potential impairment of goodwill in the Pharmaceuticals Division was carried out using the cash-generating units as set out above. During 2018 impairment charges totalling CHF 2,147 million were recorded in the Pharmaceuticals Division.

InterMune acquisition. A charge of CHF 2,040 million was recorded for the full write-off of goodwill from the InterMune acquisition made in 2014. The main product acquired in the original transaction was InterMune's medicine for idiopathic pulmonary fibrosis, Esbriet. Idiopathic pulmonary fibrosis is a progressive disease, which causes scarring of the lungs and has a survival rate of two to three years from diagnosis.

During 2017 the Group recorded an impairment charge of CHF 1,664 million for the partial impairment of the Esbriet product intangible in use. The main factor leading to this was a decrease in forecasted cash flows relative to the previous year's long-term forecast due to a reduction in sales expectations. During 2018 the Group reviewed the assets and liabilities that were acquired in 2014 from the InterMune transaction in detail including the initial valuations, the reports made for the purposes of the acquisition accounting and subsequent integration process. The conclusion of this review was that, apart from the intangible asset representing the acquired rights to Esbriet and the related deferred taxation liabilities, there were no other assets or liabilities recorded on the Group's balance sheet, no other revenue streams and no other parts of the acquired company that had any synergistic benefits for the continued operations of the Roche Group.

During 2018 the Group made the required assessment for the potential impairment of goodwill that arose from the InterMune acquisition using as the cash-generating unit the identifiable group of assets related to the revenues and related costs that arose from the development and commercialisation of Esbriet. As part of the Group's regular process the value in use of the intangible asset representing the acquired rights to Esbriet was first tested for impairment (see Note 10). As a second step the goodwill from the InterMune acquisition was then tested for impairment. The conclusion of these impairment tests were:

- In substance the remaining value to the Group from the InterMune acquisition is estimated at CHF 2,413 million. This solely relates to the acquired rights to Esbriet and should be reported in the Group's balance sheet as a product intangible asset in use.
- The previously recorded impairment on the Esbriet product intangible asset in use was therefore partially reversed and an income of CHF 274 million was recorded for this. The asset concerned was written up to its estimated recoverable value of CHF 2,413 million. The main factor leading to this was an increase in forecasted cash flows relative to the previous year's long-term forecast due to an improvement in sales expectations. The intangible asset continues to be amortised over its remaining estimated useful life of three years (see also Note 10).
- A full impairment of CHF 2,040 million was recorded for the goodwill from the InterMune acquisition. The revenues and related costs arising from the development and commercialisation of Esbriet are fully utilised in the impairment testing process to support the value in use of the Esbriet product intangible asset in use. There is no surplus from Esbriet revenues to support the carrying value of the goodwill, neither are there any synergistic benefits to other products in the same therapeutic area. Accordingly the separable recoverable value of this goodwill is estimated to be zero and it has been fully impaired.

Trophos acquisition. A charge of CHF 107 million was recorded for the full write-off of goodwill from the Trophos acquisition made in 2015. The main product acquired in the original transaction was Trophos' proprietary screening platform-generated olesoxime (TRO19622), which was being developed for spinal muscular atrophy (SMA), a rare and debilitating genetic neuromuscular disease that is most commonly diagnosed in children. During 2018 the Group decided to stop development of this compound. Therefore there are no potential future revenues to support the carrying value of the goodwill, neither are there any synergistic benefits to other products in the same franchise. Accordingly the intangible assets relating to this product were fully impaired (see Note 10) and the goodwill is deemed to have been disposed of and has also been fully impaired.

Diagnostics Division. A charge of CHF 107 million was recorded in the Centralised and Point of Care Solutions business area for the full write-off of goodwill from the CMI acquisition made in 2013. During 2018 the Group decided to change the commercialisation strategy for diagnostic instruments used in haematology testing. This led to a full impairment of the product intangibles in use acquired as part of the CMI acquisition (see Note 10). Therefore the goodwill is deemed to have been disposed of and has also been fully impaired.

Value in use

Value in use is calculated using a discounted expected cash flow approach, with a post-tax discount rate applied to the projected risk-adjusted post-tax cash flows and terminal value. The discount rate is the Group's weighted average cost of capital as the cash-generating units have integrated operations across large parts of the Group. It is derived from a capital asset pricing model using data from capital markets, including government twenty-year bonds. For assessing value in use, the cash flow projections are based on the most recent long-term forecasts approved by management. The long-term forecasts include management's latest estimates on sales volume and pricing, as well as production and other operating costs and assume no significant changes in the organisation. Other key assumptions used in the calculations are the period of cash flow projections included in the long-term forecasts, the terminal value growth rate and the discount rate.

Key assumptions used in value-in-use calculations

	2019			2018		
	Period of cash flow projections	Terminal value growth rate	Discount rate (after tax)	Period of cash flow projections	Terminal value growth rate	Discount rate (after tax)
Pharmaceuticals Division	5 years	n/a	7.4%	5 years	n/a	7.5%
Diagnostics Division	5 years	1.5%	7.4%	5 years	1.5%	7.5%

For cash-generating units with a terminal value growth, the respective rate does not exceed the long-term projected growth rate for the relevant market.

Fair value less costs of disposal

For goodwill arising from the Chugai acquisition, the fair value less costs of disposal is determined with reference to the publicly quoted price of Chugai shares.

Sensitivity analysis

Management has performed sensitivity analyses for Roche Pharmaceuticals and the Diagnostics Division, which increased the discount rate by 1% combined with decreasing the forecast cash flows by 5%, and for Chugai, which decreased the publicly quoted share prices by 5%. Except for Diabetes Care, the results of the sensitivity analyses demonstrated that the above changes in the key assumptions would not cause the carrying values of goodwill to exceed the recoverable amounts at 31 December 2019. The above key assumptions changes would result in a goodwill impairment of CHF 865 million for Diabetes Care at 31 December 2019.

10. Intangible assets

Intangible assets: movements in carrying value of assets in millions of CHF

	Product intangibles: in use	Product intangibles: not available for use	Marketing intangibles: in use	Technology intangibles: in use	Total
At 1 January 2018					
Cost	22,425	5,626	109	1,094	29,254
Accumulated amortisation and impairment	(17,006)	(2,954)	(39)	(887)	(20,886)
Net book value	**5,419**	**2,672**	**70**	**207**	**8,368**
Year ended 31 December 2018					
At 1 January 2018	5,419	2,672	70	207	8,368
Business combinations [6]	608	0	87	0	695
Asset acquisitions [6]	0	1,725	0	0	1,725
Additions	156	504	23	137	820
Disposals	0	0	0	0	0
Transfers	442	(442)	0	0	–
Amortisation charge	(1,174)	–	(36)	(84)	(1,294)
Impairment charge	(303)	(763)	0	(16)	(1,082)
Currency translation effects	32	80	2	0	114
At 31 December 2018	**5,180**	**3,776**	**146**	**244**	**9,346**
Cost	23,594	5,871	220	1,235	30,920
Accumulated amortisation and impairment	(18,414)	(2,095)	(74)	(991)	(21,574)
Net book value	**5,180**	**3,776**	**146**	**244**	**9,346**
Allocated by operating segment					
Roche Pharmaceuticals	4,449	3,482	67	209	8,207
Chugai	22	24	44	0	90
Diagnostics	709	270	35	35	1,049
Total Group	**5,180**	**3,776**	**146**	**244**	**9,346**
Year ended 31 December 2019					
At 1 January 2019	5,180	3,776	146	244	9,346
Business combinations [6]	0	0	0	0	0
Asset acquisitions	–	–	–	–	–
Additions	598	661	34	323	1,616
Disposals	(2)	0	0	0	(2)
Transfers	2,098	(2,098)	0	0	–
Amortisation charge	(1,367)	–	(41)	(124)	(1,532)
Impairment charge	(351)	(625)	(1)	0	(977)
Currency translation effects	(84)	0	(1)	(8)	(93)
At 31 December 2019	**6,072**	**1,714**	**137**	**435**	**8,358**
Cost	25,558	4,396	250	1,533	31,737
Accumulated amortisation and impairment	(19,486)	(2,682)	(113)	(1,098)	(23,379)
Net book value	**6,072**	**1,714**	**137**	**435**	**8,358**
Allocated by operating segment					
Roche Pharmaceuticals	5,293	1,676	46	406	7,421
Chugai	15	35	55	0	105
Diagnostics	764	3	36	29	832
Total Group	**6,072**	**1,714**	**137**	**435**	**8,358**

Significant intangible assets at 31 December 2019 in millions of CHF

	Operating segment	Net book value	Remaining amortisation period
Product intangibles in use			
Rozlytrek (Ignyta acquisition)	Roche Pharmaceuticals	1,615	12 years
Esbriet (InterMune acquisition)	Roche Pharmaceuticals	1,545	2 years
Shionogi licence transaction	Roche Pharmaceuticals	531	16 years
Flatiron Health acquisition	Roche Pharmaceuticals	527	13 years
Foundation Medicine acquisition	Roche Pharmaceuticals	277	5 years
Kapa acquisition	Diagnostics	221	11 years
Brahms licence transaction	Diagnostics	204	11 years
IQuum acquisition	Diagnostics	166	14 years
Product intangibles not available for use			
BioNTech licence transaction	Roche Pharmaceuticals	225	n/a
Dicerna licence transaction	Roche Pharmaceuticals	189	n/a
ForSight Vision transaction	Roche Pharmaceuticals	143	n/a
Technology intangibles in use			
Adaptive licence transaction	Roche Pharmaceuticals	276	19 years

Classification of intangible asset amortisation and impairment expenses in millions of CHF

	Amortisation		Impairment	
	2019	2018	2019	2018
Cost of sales				
– Pharmaceuticals	(1,153)	(969)	0	274
– Diagnostics	(111)	(142)	(344)	(568)
Marketing and distribution				
– Pharmaceuticals	(33)	(32)	(1)	0
– Diagnostics	(8)	(4)	0	0
Research and development				
– Pharmaceuticals	(220)	(130)	(632)	(507)
– Diagnostics	(7)	(17)	0	(281)
Total	**(1,532)**	**(1,294)**	**(977)**	**(1,082)**

Internally generated intangible assets

The Group currently has no internally generated intangible assets from development as the criteria for the recognition as an asset are not met.

Intangible assets with indefinite useful lives

The Group currently has no intangible assets with indefinite useful lives.

Intangible assets not available for use

These mostly represent in-process research and development assets acquired either through in-licensing arrangements, business combinations, asset acquisitions or separate purchases. At 31 December 2019 approximately 70% (2018: 71%) of the projects in the Pharmaceuticals Division have known decision points within the next twelve months which in certain circumstances could lead to impairment. Due to the inherent uncertainties in the research and development processes, intangible assets not available for use are particularly at risk of impairment if the project is not expected to result in a commercialised product.

Intangible asset impairment

Impairment charges arise from changes in the estimates of the future cash flows expected to result from the use of the asset and its eventual disposal. Factors such as the presence or absence of competition, technical obsolescence or lower-than-anticipated sales for products with capitalised rights could result in shortened useful lives or impairment.

Impairment charges – 2019

Pharmaceuticals Division. Impairment charges totalling CHF 633 million were recorded. The major items related to:

- A charge of CHF 168 million for the full impairment of a compound purchased separately, driven by a change in the development plan. The asset concerned, which was not yet being amortised, was fully written down.
- A charge of CHF 137 million following clinical data assessment of two compounds. The assets concerned, which were not yet being amortised, were fully written down.
- A charge of CHF 125 million due to the decision to stop the development of a compound with an alliance partner. The asset concerned, which was not yet being amortised, was fully written down.
- A charge of CHF 78 million for the partial impairment of a compound developed together with an alliance partner, mainly driven by reduced revenue forecasts. The asset concerned, which was not yet being amortised, was partially written down.
- A charge of CHF 60 million due to the decision to stop the development of a compound and the related collaboration activities with an alliance partner. The asset concerned, which was not yet being amortised, was fully written down.
- A charge of CHF 59 million due to the decision to stop the development of a compound purchased separately. The asset concerned, which was not yet being amortised, was fully written down.

Diagnostics Division. Impairment charges totalling CHF 344 million were recorded which related to:

- A charge of CHF 259 million for the impairment of Molecular Diagnostics product intangibles in use acquired as part of the GeneWeave acquisition. The main factors leading to this were updated assumptions on timelines, research and development expenses and production costs. The asset concerned, which was being amortised, was fully written down.
- A charge of CHF 85 million for the impairment of sequencing business product intangibles in use acquired as part of the Ariosa acquisition mainly due to a change in timelines for the launch of related sequencing products. The asset concerned, which was being amortised, was fully written down.

Impairment charges – 2018

Pharmaceuticals Division. Impairment charges totalling CHF 233 million, net of impairment reversals, were recorded which related to:

- A charge of CHF 197 million due to the decision to stop the development of five different compounds with five different alliance partners. The assets concerned, which were not yet being amortised, were fully written down.
- A charge of CHF 122 million due to the decision to stop the development of a compound purchased separately. The asset concerned, which was not yet being amortised, was fully written down.
- A charge of CHF 100 million due to the decision to stop the development of the compound acquired as part of the Trophos acquisition. The asset concerned, which was not yet being amortised, was fully written down.
- A charge of CHF 66 million for the partial impairment of a compound purchased separately due to a delayed timeline. The asset concerned, which was not yet being amortised, was partially written down.
- A charge of CHF 13 million following a clinical data assessment. The asset concerned, which was not yet being amortised, was fully written down.
- A charge of CHF 9 million for other impairments. The assets concerned, which were not yet being amortised, were fully written down.
- The previously recorded impairment on the Esbriet product intangible asset in use was partially reversed and an income of CHF 274 million was recorded for this. The asset concerned was written up to its estimated recoverable value of CHF 2,413 million. The main factor leading to this was an increase in forecasted cash flows relative to the previous year's long-term forecast due to an improvement in sales expectations. The intangible asset continues to be amortised over its remaining estimated useful life of three years. Goodwill impairment charges related to the InterMune acquisition are discussed in Note 9.

Diagnostics Division. Impairment charges totalling CHF 849 million were recorded which related to:

- A charge of CHF 400 million for the full impairment of intangibles both in use and not available for use related to the sequencing business mainly acquired as part of the Genia, CAPP and Signature acquisitions. The factors leading to this impairment were a change in the commercialisation strategy for related products and a change in timelines for future product development. The assets concerned, which were partly being amortised and partly not yet being amortised, were fully written down.
- A charge of CHF 206 million for the partial impairment of sequencing business product intangibles in use acquired as part of the Ariosa acquisition. The factor leading to this impairment was a decrease in forecasted cash flows following revised sales assumptions. The asset concerned, which was being amortised, was written down to its estimated recoverable value of CHF 89 million.
- A charge of CHF 243 million for the full impairment of Centralised and Point of Care Solutions' product intangibles in use acquired as part of the CMI acquisition as a result of a decision to change the commercialisation strategy for diagnostic instruments used in haematology testing. The asset concerned, which was being amortised, was fully written down.

Potential commitments from alliance collaborations and purchase agreements within the next three years

The Group is party to in-licensing and similar arrangements with its alliance partners and intangible asset purchase agreements with third parties, including asset acquisitions. These arrangements and purchase agreements may require the Group to make certain milestone or other similar payments dependent upon the achievement of agreed objectives or performance targets as defined in the collaboration and purchase agreements.

The Group's current estimate of future third-party commitments for such payments within the next three years is set out in the table below. These figures are undiscounted and are not risk-adjusted, meaning that they include all such potential payments that can arise assuming all projects currently in development are successful. The timing is based on the Group's current best estimate. These figures do not include any potential commitments within the Group, such as may arise between the Roche and Chugai businesses.

Potential future third-party collaboration and purchase payments at 31 December 2019 in millions of CHF

	Pharmaceuticals	Diagnostics	Group
Within one year	1,570	14	1,584
Between one and two years	472	21	493
Between two and three years	692	2	694
Total	**2,734**	**37**	**2,771**

11. Inventories

Inventories in millions of CHF

	2019	2018	2017
Raw materials and supplies	1,296	1,206	1,182
Work in process	105	117	101
Intermediates	3,960	4,269	4,660
Finished goods	1,426	1,651	2,052
Provision for slow-moving and obsolete inventory	(732)	(622)	(588)
Total inventories	**6,055**	**6,621**	**7,407**

Inventories expensed through cost of sales totalled CHF 12.5 billion (2018: CHF 12.1 billion). Inventory write-downs during the year resulted in an expense of CHF 558 million (2018: CHF 751 million).

12. Accounts receivable

Accounts receivable in millions of CHF

	2019	2018	2017
Trade receivables	11,349	10,663	10,371
Notes receivable	51	96	102
Other receivables	64	38	36
Allowances for doubtful accounts	(532)	(540)	(517)
Chargebacks and other allowances to be withheld upon settlement [3]	(492)	(481)	(415)
Total accounts receivable [3]	**10,440**	**9,776**	**9,577**

Allowances for doubtful accounts: movements in recognised allowance in millions of CHF

	2019	2018
At 1 January	(540)	(523)
Additional allowances created	(102)	(117)
Unused amounts reversed	78	60
Utilised during the year	18	21
Currency translation effects	14	19
At 31 December	**(532)**	**(540)**

The allowances for doubtful accounts as at 1 January 2018 were revised following the implementation of IFRS 9 'Financial Instruments'.

Bad debt expenses recorded as marketing and distribution costs totalled CHF 33 million (2018: expense of CHF 47 million).

13. Marketable securities

Upon transition to IFRS 9 in 2018 the Group elected not to restate comparative information. As a result the information provided below for 2019 and 2018 is on the IFRS 9 basis and the 2017 information is on the IAS 39 basis.

Marketable securities in millions of CHF

	2019 (IFRS 9)	2018 (IFRS 9)	2017 (IAS 39)
Equity securities (available-for-sale IAS 39)	n/a	n/a	10
Equity securities at fair value through profit or loss (IFRS 9)	13	9	n/a
Debt securities (available-for-sale IAS 39)	n/a	n/a	1,161
Debt securities at fair value through OCI (IFRS 9)	807	1,047	n/a
Money market instruments and time accounts over three months (available-for-sale IAS 39)	n/a	n/a	6,107
Money market instruments at fair value through OCI (IFRS 9)	1,491	3,198	n/a
Time accounts over three months at amortised costs (IFRS 9)	3,472	2,183	n/a
Total marketable securities	**5,783**	**6,437**	**7,278**

Marketable securities are held for fund management purposes and are primarily denominated in US dollars, euros and in Swiss francs. Money market instruments are contracted to mature within one year of 31 December 2019.

Debt securities – contracted maturity in millions of CHF

	2019 (IFRS 9)	2018 (IFRS 9)	2017 (IAS 39)
Within one year	276	170	217
Between one and five years	508	835	867
More than five years	23	42	77
Total debt securities	**807**	**1,047**	**1,161**

14. Cash and cash equivalents

Cash and cash equivalents in millions of CHF

	2019	2018	2017
Cash – cash in hand and in current or call accounts	4,769	4,139	3,419
Cash equivalents – time accounts with a maturity of three months or less	1,306	2,542	1,300
Total cash and cash equivalents	**6,075**	**6,681**	**4,719**

15. Other non-current assets

Upon transition to IFRS 9 in 2018 the Group elected not to restate comparative information. As a result the information provided below for 2019 and 2018 is on the IFRS 9 basis and the 2017 information is on the IAS 39 basis.

Other non-current assets in millions of CHF

	2019	2018	2017
Available-for-sale investments – held at fair value (IAS 39)	n/a	n/a	294
Available-for-sale investments – held at cost (IAS 39)	n/a	n/a	252
Equity investments at fair value through OCI (IFRS 9) [31]	41	102	n/a
Equity investments at fair value through profit or loss (IFRS 9) [31]	696	458	n/a
Loans receivable	8	8	8
Restricted cash	2	2	2
Other receivables – contracts with customers [3]	38	25	38
Other receivables	82	99	91
Total financial non-current assets	**867**	**694**	**685**
Long-term employee benefits	229	225	249
Other assets	451	428	400
Total non-financial non-current assets	**680**	**653**	**649**
Associates	2	42	36
Total other non-current assets	**1,549**	**1,389**	**1,370**

Equity investments designated at fair value through OCI are mainly investments in private companies from the pharmaceutical sector, which are held as part of the Group's strategic alliance efforts. Equity investments were classified as available-for-sale in 2017.

16. Other current assets

Other current assets in millions of CHF

	2019	2018	2017
Accrued interest income	18	45	45
Derivative financial instruments [31]	178	138	97
Restricted cash	0	10	0
Cash collateral receivables	186	86	50
Other receivables – contracts with customers [3]	541	604	628
Other receivables	198	196	173
Total financial current assets	**1,121**	**1,079**	**993**
Prepaid expenses and accrued income	795	683	559
Other taxes recoverable	530	572	516
Other assets	218	187	175
Total non-financial current assets	**1,543**	**1,442**	**1,250**
Total other current assets	**2,664**	**2,521**	**2,243**

17. Accounts payable

Accounts payable in millions of CHF

	2019	2018	2017
Trade payables	3,176	2,847	2,786
Other taxes payable	428	442	418
Dividends payable	3	2	2
Other payables	215	235	248
Total accounts payable	**3,822**	**3,526**	**3,454**

18. Other non-current liabilities

Other non-current liabilities in millions of CHF

	2019	2018	2017
Deferred income	172	31	86
Lease liabilities [28]	879	–	–
Other long-term liabilities	93	157	120
Total other non-current liabilities	**1,144**	**188**	**206**

Other long-term liabilities are mainly related to accrued employee benefits. Following the implementation of IFRS 16 'Leases' (see Note 28), non-current lease liabilities of CHF 865 million were recorded, mainly for leases formerly classified as operating leases where the Group is the lessee, effective 1 January 2019.

19. Other current liabilities

Other current liabilities in millions of CHF

	2019	2018	2017
Deferred income	487	290	372
Lease liabilities [28]	340	–	–
Accrued payroll and related items	3,316	3,085	2,853
Interest payable	176	221	218
Derivative financial instruments [31]	266	153	119
Cash collateral payables	38	80	11
Accrued chargebacks and other allowances separately payable [3]	3,049	2,807	2,242
Accrued royalties and commissions	1,106	1,135	1,148
Other accrued liabilities	3,101	2,906	3,172
Total other current liabilities	**11,879**	**10,677**	**10,135**

At 31 December 2017 other accrued liabilities included CHF 261 million for the short-term Genentech property purchase option exercise obligation, which was paid in June 2018. Following the implementation of IFRS 16 'Leases' (see Note 28), current lease liabilities of CHF 329 million were recorded, mainly for leases formerly classified as operating leases where the Group is the lessee, effective 1 January 2019.

20. Provisions and contingent liabilities

Provisions: movements in recognised liabilities in millions of CHF

	Legal provisions	Environmental provisions	Restructuring provisions	Contingent consideration provisions	Other provisions	Total
Year ended 31 December 2018						
At 1 January 2018	485	523	822	591	1,169	3,590
Additional provisions created	133	33	624	51	866	1,707
Unused amounts reversed	(15)	(3)	(111)	(130)	(336)	(595)
Utilised	(24)	(61)	(451)	(14)	(351)	(901)
Discount unwind [4]	0	9	0	15	2	26
Business combinations						
– Acquired companies	0	0	0	0	2	2
– Deferred consideration	–	–	–	–	0	0
– Contingent consideration	–	–	–	0	–	0
Asset acquisitions	1	0	0	0	0	1
Divestment of subsidiaries	(1)	0	0	0	(10)	(11)
Currency translation effects	(1)	(10)	(16)	(2)	(9)	(38)
At 31 December 2018	**578**	**491**	**868**	**511**	**1,333**	**3,781**
Current	570	83	535	180	961	2,329
Non-current	8	408	333	331	372	1,452
At 31 December 2018	**578**	**491**	**868**	**511**	**1,333**	**3,781**
Year ended 31 December 2019						
At 1 January 2019	578	491	868	511	1,333	3,781
Reclassification to lease liabilities on implementation of IFRS 16 'Leases' [28]	–	–	(22)	–	–	(22)
At 1 January 2019 (revised)	**578**	**491**	**846**	**511**	**1,333**	**3,759**
Additional provisions created	402	65	812	6	801	2,086
Unused amounts reversed	(33)	(5)	(91)	(152)	(111)	(392)
Utilised	(48)	(50)	(350)	(172)	(383)	(1,003)
Discount unwind [4]	0	17	0	14	0	31
Business combinations						
– Acquired companies	0	0	0	0	0	0
– Deferred consideration	–	–	–	–	0	0
– Contingent consideration	–	–	–	0	–	0
Asset acquisitions	–	–	–	–	–	–
Divestment of subsidiaries	0	0	0	0	0	0
Currency translation effects	(17)	(15)	(23)	(2)	(24)	(81)
At 31 December 2019	**882**	**503**	**1,194**	**205**	**1,616**	**4,400**
Current	858	99	668	18	1,242	2,885
Non-current	24	404	526	187	374	1,515
At 31 December 2019	**882**	**503**	**1,194**	**205**	**1,616**	**4,400**
Expected outflow of resources						
Within one year	858	99	668	18	1,242	2,885
Between one and two years	4	157	228	28	45	462
Between two and three years	1	104	199	37	75	416
More than three years	19	143	99	122	254	637
At 31 December 2019	**882**	**503**	**1,194**	**205**	**1,616**	**4,400**

Following the implementation of IFRS 16 'Leases' (see Note 28), provisions of CHF 22 million relating to onerous lease contracts were reclassified to lease liabilities, effective 1 January 2019.

In 2019 CHF 1,003 million of provisions were utilised (2018: CHF 901 million), of which CHF 828 million (2018: CHF 883 million) are included in the cash flows from operating activities and CHF 175 million (2018: CHF 18 million) are included in the cash flows from business combinations for payments made from deferred and contingent consideration arrangements (see Note 6).

Legal provisions

Legal provisions consist of a number of separate legal matters, including claims arising from trade, in various Group companies. By their nature the amounts and timings of any outflows are difficult to predict.

As part of the regular review of litigation matters, management has reassessed the provisions recorded for certain litigation matters. Based on the development of the various litigations, notably the Avastin/Lucentis investigations and the Meso case, there was a net increase in provisions of CHF 369 million. This was a major element of the 2019 expenses for legal cases of CHF 422 million (2018: net expense of CHF 128 million). Details of the major legal cases outstanding are disclosed below.

Environmental provisions

Provisions for environmental matters include various separate environmental issues in a number of countries. By their nature the amounts and timings of any outflows are difficult to predict. Significant provisions are discounted by between 1% and 3% where the time value of money is material. The significant provisions relate to the US site in Nutley, New Jersey, which was divested in September 2016, the estimated remediation costs for a landfill site near Grenzach, Germany, that was used by manufacturing operations that were closed some years ago and the estimated remediation costs for the manufacturing site at Clarecastle, Ireland. In 2019 the expected costs of environmental remediation at the Clarecastle site and other matters were reassessed. Accordingly, in 2019 environmental provisions increased by CHF 60 million, net. The net environmental expenses were CHF 59 million (2018: net expense of CHF 31 million).

The Group's procedures on environmental protection are included in the Annual Report on pages 76 to 85. These include the actions taken by the Group with regard to climate change, notably the Group's commitment to reduce greenhouse gas emissions.

Restructuring provisions

These arise from planned programmes that materially change the scope of business undertaken by the Group or the manner in which business is conducted. Such provisions include only the costs necessarily entailed by the restructuring which are not associated with the recurring activities of the Group. The timings of these cash outflows are reasonably certain. These provisions are not discounted as the time value of money is not material in these matters.

In the Pharmaceuticals Division the significant provisions relate to the strategic realignment of its manufacturing network and the resourcing flexibility plans. In the Diagnostics Division the significant provisions are associated with programmes to address long-term strategy, while in Corporate they relate to plans for outsourcing of IT and other functions to shared service centres and external providers. Further details are given in Note 7.

Contingent consideration provisions

The Group is party to certain contingent consideration arrangements arising from business combinations. Significant provisions are discounted using an average discount rate of 3.0% (2018: 3.6%) where the time value of money is material. Additional details on measurement, on main movements of the provisions and on the total potential payments under these arrangements are provided in Note 31.

Other provisions

Other provisions relate to the items shown in the table below. With the exception of employee provisions, the timing of cash outflows is by its nature uncertain.

Other provisions in millions of CHF

	2019	2018	2017
Sales returns	616	497	366
Employee provisions	389	398	362
Other items	611	438	441
Total other provisions	**1,616**	**1,333**	**1,169**

Contingent liabilities

The operations and earnings of the Group continue, from time to time and in varying degrees, to be affected by political, legislative, fiscal and regulatory developments, including those relating to environmental protection, in the countries in which it operates. The industries in which the Group operates are also subject to other risks of various kinds. The nature and frequency of these developments and events, not all of which are covered by insurance, as well as their effect on future operations and earnings, are not predictable.

The Group has entered into strategic alliances with various companies in order to gain access to potential new products or to utilise other companies to help develop the Group's own potential new products. Potential future payments may become due to certain collaboration partners achieving certain milestones as defined in the collaboration agreements. The Group's best estimates of future commitments for such payments are given in Note 10.

Legal cases

At 31 December 2019 provisions for legal cases were CHF 803 million (2018: CHF 483 million), mainly related to legal cases in the Pharmaceuticals Division of CHF 483 million (2018: CHF 371 million) and in the Diagnostics Division of CHF 314 million (2018: CHF 107 million). Provisions have been recorded, and in some cases settled, mainly relating to the Pharmaceuticals legal matters and to Meso, a Diagnostics legal case, listed below.

Accutane. Hoffmann-La Roche Inc. ('HLR') and various other Roche affiliates have been named as defendants in numerous legal actions in the US and elsewhere relating to the acne medication Accutane. The litigation alleges that Accutane caused certain serious conditions, including, but not limited to, inflammatory bowel disease ('IBD'), birth defects and psychiatric disorders. In 2009 HLR announced that, following a re-evaluation of the portfolio of medicines that are now available from generic manufacturers, rapidly declining brand sales in the US and high costs from personal-injury lawsuits that it continues to defend vigorously, it had decided to immediately discontinue the manufacture and distribution of the product in the US.

All of the actions pending in federal court alleging IBD were consolidated for pre-trial proceedings in a Multi-District Litigation ('MDL') in the US District Court for the Middle District of Florida, Tampa Division. In August 2015 the MDL was closed. During the pendency of the MDL the District Court granted summary judgment in favour of HLR for all of the federal IBD cases that had proceeded and all were affirmed by the US Court of Appeals for the Eleventh Circuit. All of the actions pending in state court in New Jersey alleging IBD were consolidated for pre-trial proceedings in the Superior Court of New Jersey, Law Division, Atlantic County.

In February 2015 the Superior Court of New Jersey, Law Division, Atlantic County, held an eight-day evidentiary hearing on whether plaintiffs' experts can testify that Accutane causes Crohn's disease. On 20 February 2015 the Superior Court barred plaintiffs' experts because their methods did not meet the requirements for scientific reliability. On 8 May 2015 the Superior Court entered an order dismissing with prejudice an agreed-upon list of 2,076 Crohn's disease cases that were subject to the Superior Court's February 2015 order. On 28 July 2017 the New Jersey Appellate Division reversed the order excluding plaintiffs' experts from testifying that Accutane causes Crohn's disease and reinstated the dismissed cases finding that the trial court wrongfully barred plaintiffs' expert witnesses. HLR filed a petition for review to the New Jersey Supreme Court, which was granted on 8 December 2017. On 1 August 2018 the Supreme Court issued its decision on whether plaintiffs' experts can testify that Accutane causes Crohn's disease. The Supreme Court reversed the judgment of the New Jersey Appellate Division and concluded that the trial court properly had excluded the experts thereby dismissing 2,174 cases alleging that Accutane caused plaintiffs' Crohn's disease. Plaintiffs cannot further appeal. All 2,174 Crohn's disease cases were permanently dismissed.

On 12 May 2015 the Superior Court entered an order granting summary judgment and dismissing 18 cases filed by New Jersey residents on the basis that the drug label was adequate as a matter of law since 2002. In July 2015 the Superior Court granted HLR's motion for summary judgment as to the adequacy of the label for post-2002 ingestion cases in 44 other jurisdictions. The Superior Court applied New Jersey law to all of the jurisdictions and granted HLR's motion dismissing approximately 511 cases. In the alternative, the Superior Court applied the home state law and granted summary judgment in 24 jurisdictions and denied it in 20 jurisdictions; this would have resulted in 389 cases being dismissed. On 25 July 2017 the New Jersey Appellate Division affirmed the dismissal of 197 cases and reinstated judgments in 335 cases based on the strength of HLR's warnings after 2002. HLR and the dismissed plaintiffs filed petitions for review to the New Jersey Supreme Court, which was granted on 8 December 2017. On 3 October 2018 the Supreme Court issued its decision on those cases and reversed the judgment of the New Jersey Appellate Division that had reinstated 335 cases on the basis that the drug label was adequate as a matter of law since 2002. Plaintiffs cannot further appeal. 532 cases were permanently dismissed.

In January and October 2016 the Superior Court entered orders granting summary judgment and dismissing 191 cases for failure to prove Accutane proximately caused their ulcerative colitis. The plaintiffs appealed all of these decisions. During February and March 2017 the Superior Court held an evidentiary hearing on whether plaintiffs' experts can testify that Accutane causes ulcerative colitis. In April 2017 the Superior Court barred plaintiffs' experts because their methods did not meet the requirements for scientific reliability. In May 2017 the Superior Court entered an order dismissing 3,231 ulcerative colitis cases that were subject to the Superior Court's April 2017 order. The plaintiffs appealed these decisions.

At 31 December 2019 HLR was defending no pending actions and there were approximately 3,422 cases on appeal. After a hearing on 7 January 2020, on 17 January 2020 the New Jersey Appellate Division issued its decision on whether plaintiffs' experts can testify that Accutane causes ulcerative colitis. The Court affirmed the trial court's ruling and concluded that the trial court properly had excluded the experts thereby dismissing cases alleging that Accutane caused plaintiffs' ulcerative colitis. Plaintiffs have until 6 February 2020 to seek review by the New Jersey Supreme Court.

If any cases survive the appeals, additional trials may be scheduled. Individual trial results depend on a variety of factors, including many that are unique to the particular case and therefore the trial results to date may not be predictive of future trial results. The Group continues to defend vigorously the remaining personal injury cases and claims.

Avastin/Lucentis investigations. On 14 February 2013 the Italian Antitrust Authority ('AGCM') announced an investigation to determine whether Roche, Genentech and Novartis had entered into an agreement to restrict competition in the Italian market for drugs, with reference in particular to Avastin (marketed by Roche) and Lucentis (marketed by Novartis). Avastin and Lucentis are two different drugs that were developed and approved for different therapeutic purposes and contain different active pharmaceutical ingredients. On 5 March 2014 the AGCM issued a verdict that alleges that Roche and Novartis colluded to artificially differentiate Avastin and Lucentis in order to foster the sales of Lucentis in Italy. The AGCM fined Roche EUR 90.5 million and Novartis EUR 92 million. Roche appealed the AGCM verdict to the Tribunale Amministrativo Regionale del Lazio ('TAR'). On 2 December 2014 the TAR upheld the decision by the AGCM. Roche appealed the verdict of the TAR to the Consiglio di Stato. In July 2014 Roche paid the EUR 90.5 million fine under protest to avoid additional penalty fees and recorded an expense within general and administration. On 23 January 2018 the European Court of Justice rendered its decision on five questions which were referred to the European Court of Justice by the Consiglio di Stato. On 15 July 2019 the Consiglio di Stato issued the final verdict on the case and upheld the verdicts of both the AGCM and the TAR. With respect to the fine of the AGCM, this matter is now concluded. The Italian Ministry of Health and some Italian regions notified the Group of their intention to seek damages related to this matter. On 24 January 2019 the French Competition Authority ('FCA') issued a Statement of Objections against Roche, Genentech and Novartis regarding anticompetitive practices concerning the commercialisation of Avastin and Lucentis in France. The FCA alleges that Roche, Genentech and Novartis abused their collective dominant position on the French market for the treatment of wet age-related macular degeneration between 2008 and 2013. The Group is vigorously defending itself in these matters. In addition the Group is challenging policies and regulations allowing off-label/unlicensed use and reimbursement for economic reasons in various countries. The outcome of these matters cannot be determined at this time.

PDL-1 inhibitor litigation. On 26 July 2017 Bristol-Myers Squibb Co. ('BMS') filed a lawsuit against Genentech, Inc. ('Genentech') in Delaware. BMS alleges that Genentech's sale of Tecentriq infringes their US Patent No. 9,402,899. BMS is seeking judgment in its favour, a finding of wilfulness and monetary damages. On 4 October 2017 Genentech filed its answer and counterclaims, seeking a declaratory judgment of invalidity of the 9,402,899 patent. In May 2019 BMS and Genentech agreed to drop the lawsuit without prejudice to the case being refiled at a later date. The outcome of this matter cannot be determined at this time.

Average Wholesale Prices litigation. HLR and Roche Laboratories Inc. ('RLI'), along with approximately 50 other brand and generic pharmaceutical companies, have been named as defendants in several legal actions in the US relating to the pricing of pharmaceutical drugs and State Medicaid reimbursement. The primary allegation in these litigations is that the pharmaceutical companies misrepresented or otherwise reported inaccurate Average Wholesale Prices ('AWP') and/or Wholesale Acquisition Costs ('WAC') for their drugs, which prices were allegedly relied upon by the states in calculating Medicaid reimbursements to entities such as retail pharmacies. The states, through their respective Attorney General, are seeking repayment of the amounts they claim were over-reimbursed. The time period associated with these cases is 1991 through 2005. At 31 December 2019 HLR and RLI are defending one AWP action filed in the state of New Jersey. HLR and RLI are vigorously defending themselves and no trial date has been set. The outcome of this matter cannot be determined at this time.

Boniva litigation. HLR, Genentech and various other Roche affiliates (collectively 'Roche') have been named as defendants in numerous legal actions in the US and one now dismissed case in Canada relating to the post-menopausal osteoporosis medication Boniva. In these litigations, the plaintiffs allege that Boniva caused either osteonecrosis of the jaw or atypical femoral fractures. At 31 December 2019 Roche is defending approximately 252 actions involving approximately 293 plaintiffs brought in federal and state courts throughout the US for personal injuries allegedly resulting from the use of Boniva. All of these cases are in the early discovery stages of litigation. Individual trial results depend on a variety of factors, including many that are unique to the particular case. Roche is vigorously defending itself in these matters. The outcome of these matters cannot be determined at this time.

Meso litigation. In February 2017 Roche Diagnostics Corporation ('Roche') filed a lawsuit in the US District Court for the District of Delaware against Meso Scale Diagnostics, LLC ('Meso'). This is a patent infringement case involving certain US patents owned by BioVeris Corporation ('BioVeris'), a company acquired by the Group in 2007. Meso holds a limited exclusive licence to use certain aspects of the electrochemiluminescence ('ECL') detection technology. Roche and Meso disagree on the scope of the licence. The lawsuit is seeking a declaratory judgment to get judicial clarification that Roche is not infringing Meso's licence. On 25 November 2019 the jury found that Roche's use of the patents infringed the scope of Meso's licence. There was no injunction granted and the jury awarded Meso USD 137 million in damages. Meso is expected to claim additional pre-judgment interest, reimbursement of attorney's fees and future royalties. The Group is currently evaluating this decision and its legal options.

In addition, the Pharmaceuticals legal cases listed below do not currently have provisions recorded, but there are potential future obligations which will be confirmed only by the occurrence or non-occurrence of uncertain future events or where the obligation cannot be measured with sufficient reliability.

Hemlibra litigation. On 4 May 2017 Baxalta Inc. and Baxalta GmbH (both together 'Baxalta'), subsidiaries of Takeda Pharmaceutical Company Limited, filed a patent infringement and declaratory judgment of patent infringement suit in the US District Court for the District of Delaware, alleging that Genentech and Chugai Pharmaceutical Co., Ltd. ('Chugai') currently or imminently would manufacture, use, sell, offer for sale, or import into the US Hemlibra, which would infringe Baxalta's US Patent No. 7,033,590. Baxalta is seeking a judgment of infringement, injunctive and monetary relief, attorneys' fees, costs and expenses. On 11 May 2017 Genentech was served with the complaint. Genentech's response and counterclaims to the complaint were filed on 30 June 2017. On 19 June 2017 Chugai waived service. On 13 September 2017 Chugai filed a motion to dismiss the complaint for lack of personal jurisdiction. On 14 December 2017 Baxalta filed a request for a preliminary injunction against Genentech only, in which some inhibitor patients would not be subject to any injunction. A hearing was held in the US District Court for the District of Delaware on 13 and 14 June 2018 and during that hearing Baxalta withdrew its request for a preliminary injunction as to the inhibitor patients. On 25 June 2018 Baxalta submitted a new proposed preliminary injunction order, in which Genentech would be permitted to sell Hemlibra to all inhibitor patients, all non-inhibitor patients currently on Hemlibra whether through clinical trials or not, and selected non-inhibitor patients who have an additional 'medically diagnosed condition' which rendered factor VIII therapies impracticable. On 7 August 2018 the US District Court ruled against Baxalta, denying their request for an injunction. On 19 September 2018 Chugai was dismissed from this case. On 1 February 2019 the US District Court issued a final judgment in favour of Genentech stating that Hemlibra does not infringe Baxalta's patent based on the Court's definition of key terms related to the patent. On 8 February 2019 Baxalta appealed this decision. The Group is vigorously defending itself in this matter. The outcome of this matter cannot be determined at this time.

On 28 March 2018, in the case brought by Baxalta against Chugai in Japan, the Tokyo District Court ruled in favour of Chugai, notably that Hemlibra does not infringe Baxalta's patent. On 10 May 2018 Baxalta appealed this decision. On 3 October 2019 the Japanese Intellectual Property High Court issued a ruling upholding the Tokyo District Court's decision. Baxalta has filed an appeal with the Japanese Supreme Court. The Group is vigorously defending itself in this matter. The outcome of this matter cannot be determined at this time.

Securities litigation. On 6 June 2017 a class action was filed in the US District Court for the District of New Jersey against Roche Holding Ltd and two of its current officers. The lawsuit brings claims under the federal securities laws in connection with the Group's public disclosures, in particular with respect to matters relating to two of Roche's drugs, Herceptin and Perjeta. On 24 September 2018 the District Court dismissed the case concluding that there was nothing misleading in those public disclosures. Subsequently plaintiffs filed a second and a third amended complaint. On 17 June 2019 the US District Court granted the Group's motion to dismiss the third amended complaint concluding that there was nothing misleading in the public disclosures. The matter is now concluded.

Iraqi Ministry of Health. In October 2017 F. Hoffmann-La Roche Ltd ('FHLR'), Hoffmann-La Roche Inc. ('HLR') and Genentech and certain other pharmaceutical and/or medical device companies were named as defendants in a complaint filed in the Federal District Court for the District of Columbia, US, on behalf of US service-members and their relatives who allege that they were killed or injured in Iraq between 2005 and 2009 (the 'Iraq lawsuit'). The complaint alleges that the defendants violated the US Anti-Terrorism Act and various state laws by providing funding for terrorist organisations through their sales practices pursuant to pharmaceutical and/or medical device contracts with the Iraqi Ministry of Health. In addition FHLR received an inquiry in July 2018 from the US Department of Justice in connection with an anti-corruption investigation relating to activities in Iraq, including interactions with the Iraqi government and certain of the same matters alleged in the Iraq lawsuit. On 29 October 2019 the US Department of Justice closed its inquiry against FHLR. The Group is vigorously defending itself in this matter. The outcome of this matter cannot be determined at this time.

Arbitration regarding Actemra/RoActemra against Chugai. In May 2017 Medical Research Council and LifeArc (formerly Medical Research Council Technology) requested arbitration against Chugai Pharmaceutical Co., Ltd. ('Chugai') with an arbitrator being appointed on 9 August 2017. In April 2018 United Kingdom Research and Innovation ('UKRI') was established and became the successor in title to the Medical Research Council, and the current claimants in the arbitration are LifeArc and UKRI (collectively the 'Claimants'). Sums are sought from Chugai for alleged breach of obligations under a collaboration agreement dated 15 August 1990 in connection with the development of the humanised anti-human IL-6 receptor monoclonal antibody Actemra/RoActemra. It is claimed that Chugai is obliged to pay royalties to the Claimants pursuant to the collaboration agreement. In January 2020 Chugai has executed a formal settlement agreement with the Claimants to end this arbitration. Under the settlement agreement Chugai will make a lump-sum payment to the Claimants as a sole settlement payment. The terms and conditions of this settlement agreement, including the amount of the settlement payment, are confidential. The matter is now concluded.

21. Debt

Debt: movements in carrying value of recognised liabilities in millions of CHF

	2019	2018
At 1 January	18,770	18,960
Reclassification to lease liabilities on implementation of IFRS 16 'Leases' [28]	(4)	n/a
At 1 January (revised)	**18,766**	**18,960**
Proceeds from issue of bonds and notes	0	2,252
Redemption and repurchase of bonds and notes	(5,414)	(2,152)
Increase (decrease) in commercial paper	858	(199)
Increase (decrease) in other debt	153	(23)
Changes from financing cash flows	**(4,403)**	**(122)**
Net (gains) losses on redemption and repurchase of bonds and notes	199	0
Amortisation of debt discount [4]	12	11
Financing costs	**211**	**11**
Business combinations	**1**	**0**
Net foreign currency transaction (gains) losses	(22)	(58)
Currency translation effects	(213)	(19)
Changes in foreign exchange rates	**(235)**	**(77)**
Changes in fair values of hedging instruments	23	(2)
Other changes	0	0
At 31 December	**14,363**	**18,770**
Bonds and notes	12,666	18,041
Commercial paper	1,406	578
Amounts due to banks and other financial institutions	288	144
Finance lease obligations	n/a	4
Other borrowings	3	3
Total debt	**14,363**	**18,770**
Long-term debt	12,668	16,077
Short-term debt	1,695	2,693
Total debt	**14,363**	**18,770**

There are no pledges on the Group's assets in connection with debt.

Bonds and notes

Recognised liabilities and effective interest rates of bonds and notes in millions of CHF

	Effective interest rate				
	Underlying instrument	Including hedging	2019	2018	2017
US dollar notes – fixed rate					
2.25% notes due 30 September 2019, principal USD 1.5 billion (ISIN: US771196BA98)	2.34%	1.66%	–	1,467	1,466
2.875% notes due 29 September 2021, principal USD 1.3 billion, outstanding USD 0.64 billion (ISIN: US771196BB71)	2.98%	2.91%	625	1,278	1,269
1.75% notes due 28 January 2022, principal USD 0.65 billion (ISIN: US771196BM37)	1.87%	1.87%	629	634	630
3.25% notes due 17 September 2023, principal USD 0.75 billion, outstanding USD 0.39 billion (ISIN: US771196BN10)	3.32%	n/a	378	737	–
3.35% notes due 30 September 2024, principal USD 1.65 billion, outstanding USD 0.59 billion (ISIN: US771196BE11)	3.40%	n/a	571	1,622	1,612
3.0% notes due 10 November 2025, principal USD 1.0 billion, outstanding USD 0.51 billion (ISIN: US771196BJ08)	3.14%	n/a	488	978	971
2.625% notes due 15 May 2026, principal USD 1.0 billion (ISIN: US771196BK70)	2.78%	n/a	962	975	969
2.375% notes due 28 January 2027, principal USD 0.85 billion (ISIN: US771196BL53)	2.54%	n/a	816	828	822
3.625% notes due 17 September 2028, principal USD 0.65 billion (ISIN: US771196BP67)	3.69%	n/a	628	638	–
7.0% notes due 1 March 2039, principal USD 2.5 billion, outstanding USD 1.12 billion (ISIN: USU75000AN65 and US771196AU61)	7.43%	7.39%	1,048	1,129	1,120
4.0% notes due 28 November 2044, principal USD 0.65 billion (ISIN: US771196BH42)	4.16%	n/a	619	628	624
US dollar notes – floating rate					
Notes due 30 September 2019, principal USD 0.5 billion (ISIN: US771196AZ58)	1.65%	n/a	–	492	489
Euro Medium Term Note programme – fixed rate					
2.0% notes due 25 June 2018, principal EUR 1.0 billion (ISIN: XS0760139773)	2.07%	n/a	–	–	1,168
2.0% notes due 13 March 2020, principal USD 0.6 billion (ISIN: XS1197832089)	2.12%	1.74%	–	583	581
6.5% notes due 4 March 2021, principal EUR 1.75 billion, outstanding EUR 1.14 billion (ISIN: XS0415624716)	6.66%	6.96%	1,236	1,282	1,328
0.5% notes due 27 February 2023, principal EUR 0.65 billion (ISIN: XS1371715118)	0.63%	n/a	703	728	755
5.375% notes due 29 August 2023, principal GBP 0.25 billion, outstanding GBP 0.08 billion (ISIN: XS0175478873)	5.46%	n/a	97	96	100
0.875% notes due 25 February 2025, principal EUR 1.0 billion (ISIN: XS1195056079)	0.93%	n/a	1,083	1,122	1,165
Swiss franc bonds – fixed rate					
1.0% bonds due 21 September 2018, principal CHF 0.6 billion (ISIN: CH0180513068)	1.04%	0.88%	–	–	598
0.0% bonds due 23 September 2018, principal CHF 0.4 billion (ISIN: CH0358654967)	–0.45%	n/a	–	–	401
1.625% bonds due 23 September 2022, principal CHF 0.5 billion (ISIN: CH0180513183)	1.64%	1.40%	504	504	502
0.1% bonds due 23 September 2024, principal CHF 0.75 billion (ISIN: CH0358654975)	0.11%	0.05%	750	750	748
0.25% bonds due 24 September 2025, principal CHF 0.5 billion (ISIN: CH0433761308)	0.25%	n/a	500	500	–
0.45% bonds due 23 March 2029, principal CHF 0.35 billion (ISIN: CH0359915409)	0.46%	n/a	350	350	350
0.75% bonds due 24 September 2030, principal CHF 0.4 billion (ISIN: CH0433761316)	0.74%	n/a	400	400	–
Genentech Senior Notes					
5.25% Senior Notes due 15 July 2035, principal USD 0.5 billion, outstanding USD 0.29 billion (ISIN: US368710AC32)	5.39%	n/a	279	320	318
Total bonds and notes			**12,666**	**18,041**	**17,986**

Bonds and notes maturity in millions of CHF

	2019	2018	2017
Within one year	0	1,959	2,167
Between one and two years	1,861	583	1,955
Between two and three years	1,132	2,560	581
Between three and four years	1,178	1,138	2,597
Between four and five years	1,320	1,560	1,132
More than five years	7,175	10,241	9,554
Total bonds and notes	**12,666**	**18,041**	**17,986**

Unamortised discount included in carrying value of bonds and notes in millions of CHF

	2019	2018	2017
US dollar notes	67	83	88
Euro notes	7	10	14
Swiss franc bonds	0	0	0
Pound sterling notes	0	1	1
Total unamortised discount	**74**	**94**	**103**

Issuance of bonds and notes – 2019

In 2019 the Group did not issue any bonds or notes.

Issuance of bonds and notes – 2018

On 24 September 2018 the Group completed an offering of CHF 0.5 billion and CHF 0.4 billion fixed rate bonds with a coupon of 0.25% and 0.75%, respectively. The bonds will mature on 24 September 2025 and 24 September 2030, respectively. These bonds are listed at the SIX Swiss Exchange. The Group received CHF 901 million aggregate net proceeds from the issuance and sale of these fixed rate bonds.

On 17 September 2018 the Group completed an offering of USD 0.75 billion and USD 0.65 billion fixed rate notes with a coupon of 3.25% and 3.625%, respectively. The notes will mature on 17 September 2023 and 17 September 2028, respectively. The Group received CHF 1,351 million aggregate net proceeds from the issuance and sale of these fixed rate notes.

Redemption and repurchase of bonds and notes – 2019

Redemption of US dollar notes. On the due date of 30 September 2019 the Group repaid the 2.25% fixed rate notes with a principal amount of USD 1.5 billion. The cash outflow was CHF 1,486 million, plus accrued interest. The effective interest rate of these notes was 2.34%.

On the due date of 30 September 2019 the Group repaid the floating rate notes with a principal amount of USD 0.5 billion. The cash outflow was CHF 496 million, plus accrued interest. The effective interest rate of these notes was 1.65%.

On 13 December 2019 the Group resolved to exercise its option to call for early redemption of the 2.0% fixed rate notes with a principal amount of USD 0.6 billion at par three months before the scheduled due date of 13 March 2020. The cash outflow was CHF 591 million, plus accrued interest. The effective interest rate of these notes was 2.12%.

On 5 December 2019 the Group completed a tender offer to redeem the following instruments:
- USD 656 million 2.875% fixed rate notes due 29 September 2021; effective interest rate 2.98%
- USD 360 million 3.25% fixed rate notes due 17 September 2023; effective interest rate 3.32%
- USD 1,061 million 3.35% fixed rate notes due 30 September 2024; effective interest rate 3.40%
- USD 494 million 3.0% fixed rate notes due 10 November 2025; effective interest rate 3.14%
- USD 37 million 5.25% fixed rate notes due 15 July 2035; effective interest rate 5.39%
- USD 73 million 7.0% fixed rate notes due 1 March 2039; effective interest rate 7.43%

The cash outflow was CHF 2,841 million, plus accrued interest and there was a loss on redemption of CHF 202 million, which included CHF 3 million paid for bank fees.

Redemption and repurchase of bonds and notes – 2018

Redemption of euro notes. On the due date of 25 June 2018 the Group repaid the 2.00% fixed rate notes with a principal amount of EUR 1.0 billion. The cash outflow was CHF 1,152 million, plus accrued interest. The effective interest rate of these bonds was 2.07%.

Redemption of Swiss franc bonds. On the due date of 21 September 2018 the Group repaid the 1.0% fixed rate bonds with a principal amount of CHF 0.6 billion. The cash outflow was CHF 600 million, plus accrued interest. The effective interest rate of these bonds was 1.04%.

On the due date of 23 September 2018 the Group repaid the bonds with a zero coupon and a principal amount of CHF 0.4 billion. The cash outflow was CHF 400 million, plus accrued interest. The effective interest rate of these bonds was –0.45%.

Cash flows from issuance, redemption and repurchase of bonds and notes

Cash inflows from issuance of bonds and notes in millions of CHF

	2019	2018
US dollar notes	0	1,351
Swiss franc bonds	0	901
Total cash inflows from issuance of bonds and notes	**0**	**2,252**

Cash outflows from redemption and repurchase of bonds and notes in millions of CHF

	2019	2018
Euro Medium Term Note programme – Euro notes	0	(1,152)
Euro Medium Term Note programme – US dollar notes	(591)	0
US dollar notes	(4,823)	0
Swiss franc bonds	0	(1,000)
Total cash outflows from redemption and repurchase of bonds and notes	**(5,414)**	**(2,152)**

Commercial paper

Roche Holdings, Inc. commercial paper program. Roche Holdings, Inc. has an established commercial paper program under which it can issue up to USD 7.5 billion of unsecured commercial paper notes guaranteed by Roche Holding Ltd. The committed credit line that is available as a back-stop supporting the commercial paper program is USD 7.5 billion at 31 December 2019. On 3 July 2019 the previously existing committed credit lines were refinanced by one new committed credit line with an initial maturity of five years. The maturity of the notes under the program cannot exceed 365 days from the date of issuance. At 31 December 2019 unsecured commercial paper notes with a principal amount of USD 1.4 billion and an average interest rate of 1.61% were outstanding.

Movements in commercial paper obligations in millions of CHF

	2019	2018
At 1 January	578	774
Net cash proceeds (payments)	858	(199)
Currency translation effects	(30)	3
At 31 December	**1,406**	**578**

Amounts due to banks and other financial institutions

These amounts are denominated in various currencies and the average interest rate was 5.96% (2018: 6.3%). At 31 December 2019 the amounts outstanding of CHF 288 million (2018: CHF 144 million) are due within one year.

22. Equity attributable to Roche shareholders

Changes in equity attributable to Roche shareholders in millions of CHF

			Reserves			
	Share capital	Retained earnings	Fair value	Hedging	Translation	Total
Year ended 31 December 2018						
At 1 January 2018 (revised)	160	33,371	48	61	(7,204)	26,436
Net income recognised in income statement	–	10,500	–	–	–	10,500
Financial assets at fair value through OCI						
– Fair value gains (losses) – equity investments at fair value through OCI	–	–	89	–	–	89
– Fair value gains (losses) taken to retained earnings on disposal of equity investments at fair value through OCI	–	115	(115)	–	–	–
– Fair value gains (losses) – debt securities at fair value through OCI	–	–	(3)	–	–	(3)
– Fair value gains (losses) transferred to income statement – debt securities at fair value through OCI	–	–	(5)	–	–	(5)
– Income taxes [5]	–	(10)	9	–	–	(1)
– Non-controlling interests	–	(5)	4	–	–	(1)
Cash flow hedges						
– Gains (losses) taken to equity	–	–	–	(61)	–	(61)
– Transferred to income statement [a)]	–	–	–	42	–	42
– Income taxes [5]	–	–	–	4	–	4
– Non-controlling interests	–	–	–	1	–	1
Currency translation of foreign operations						
– Exchange differences	–	–	1	0	(295)	(294)
– Accumulated differences transferred to income statement on divestment of subsidiaries	–	–	–	–	4	4
– Non-controlling interests	–	–	–	–	(53)	(53)
Defined benefit plans						
– Remeasurement gains (losses) [26]	–	199	–	–	–	199
– Limit on asset recognition [26]	–	(2)	–	–	–	(2)
– Income taxes [5]	–	(63)	–	–	–	(63)
– Non-controlling interests	–	8	–	–	–	8
Other comprehensive income, net of tax	**–**	**242**	**(20)**	**(14)**	**(344)**	**(136)**
Total comprehensive income	**–**	**10,742**	**(20)**	**(14)**	**(344)**	**10,364**
Dividends	–	(7,094)	–	–	–	(7,094)
Equity compensation plans, net of transactions in own equity	–	51	–	–	–	51
Changes in ownership interest in subsidiaries [6]	–	(2,129)	–	–	–	(2,129)
Changes in non-controlling interests	–	(6)	–	–	–	(6)
At 31 December 2018	**160**	**34,935**	**28**	**47 [b)]**	**(7,548)**	**27,622**

a) The entire amount transferred to the income statement was reported in other financial income (expense).
b) Cost of hedging reserve related to the EUR/USD cross-currency swap is included in the hedging reserve and amounted to CHF 8 million, net of tax.

Equity as at 1 January 2018 was revised following the implementation of IFRS 9 'Financial Instruments'.

Changes in equity attributable to Roche shareholders in millions of CHF

	Share capital	Retained earnings	Reserves Fair value	Reserves Hedging	Reserves Translation	Total
Year ended 31 December 2019						
At 1 January 2019	160	34,935	28	47	(7,548)	27,622
Implementation of IFRS 16 'Leases' [28]	–	(4)	–	–	–	(4)
At 1 January 2019 (revised)	**160**	**34,931**	**28**	**47**	**(7,548)**	**27,618**
Net income recognised in income statement	–	13,497	–	–	–	13,497
Financial assets at fair value through OCI						
– Fair value gains (losses) – equity investments at fair value through OCI	–	–	(5)	–	–	(5)
– Fair value gains (losses) taken to retained earnings on disposal of equity investments at fair value through OCI	–	53	(53)	–	–	–
– Fair value gains (losses) – debt securities at fair value through OCI	–	–	12	–	–	12
– Fair value gains (losses) transferred to income statement – debt securities at fair value through OCI	–	–	0	–	–	0
– Income taxes [5]	–	(15)	17	–	–	2
– Non-controlling interests	–	(15)	16	–	–	1
Cash flow hedges						
– Gains (losses) taken to equity	–	–	–	(72)	–	(72)
– Transferred to income statement [a)]	–	–	–	20	–	20
– Income taxes [5]	–	–	–	13	–	13
– Non-controlling interests	–	–	–	5	–	5
Currency translation of foreign operations						
– Exchange differences	–	–	0	0	(428)	(428)
– Accumulated differences transferred to income statement on divestment of subsidiaries	–	–	–	–	(14)	(14)
– Non-controlling interests	–	–	–	–	25	25
Defined benefit plans						
– Remeasurement gains (losses) [26]	–	(518)	–	–	–	(518)
– Limit on asset recognition [26]	–	2	–	–	–	2
– Income taxes [5]	–	102	–	–	–	102
– Non-controlling interests	–	(1)	–	–	–	(1)
Other comprehensive income, net of tax	**–**	**(392)**	**(13)**	**(34)**	**(417)**	**(856)**
Total comprehensive income	**–**	**13,105**	**(13)**	**(34)**	**(417)**	**12,641**
Dividends	–	(7,449)	–	–	–	(7,449)
Equity compensation plans, net of transactions in own equity	–	(52)	–	–	–	(52)
Changes in ownership interest in subsidiaries	–	(9)	–	–	–	(9)
Changes in non-controlling interests	–	(2)	–	–	–	(2)
At 31 December 2019	**160**	**40,524**	**15**	**13 [b)]**	**(7,965)**	**32,747**

a) The entire amount transferred to the income statement was reported in other financial income (expense).
b) Cost of hedging reserve related to the EUR/USD cross-currency swap is included in the hedging reserve and amounted to CHF 5 million, net of tax.

As disclosed in Note 28 and in Note 34, the Group has changed its accounting policies for leases following the implementation of IFRS 16 'Leases', effective 1 January 2019. The Group has applied the cumulative catch-up method for the transition, meaning that the equity attributable to Roche shareholders at 31 December 2018 has not been restated.

Genentech transaction

The Group completed the purchase of the non-controlling interests in Genentech effective 26 March 2009. Based on the International Accounting Standard 27 'Separate Financial Statements' (IAS 27) and consistent with the International Financial Reporting Standard 10 'Consolidated Financial Statements' (IFRS 10), which was adopted by the Group in 2013, this transaction was accounted for in full as an equity transaction. As a consequence, the carrying amount of the consolidated equity of the Group at that time was reduced by CHF 52.2 billion, of which CHF 8.5 billion was allocated to eliminate the book value of Genentech non-controlling interests. This accounting effect significantly impacted the Group's net equity, but has no effect on the Group's business or its dividend policy.

Share capital

At 31 December 2019 the authorised and issued share capital of Roche Holding Ltd, which is the Group's parent company, consisted of 160 million shares with a nominal value of CHF 1.00 each, as in the preceding year. The shares are bearer shares and the Group does not maintain a register of shareholders. Based on information supplied to the Group, a shareholder group with pooled voting rights owns 45.01% (2018: 45.01%) of the issued shares. On 5 December 2019 the shareholder group announced that it would continue the shareholder pooling agreement existing since 1948 with a modified shareholder composition. The duration of the pool was extended for an indefinite period in 2009. The shareholder group with pooled voting rights holds 72,018,000 shares, corresponding to 45.01% of the shares issued. This figure does not include any shares without pooled voting rights that are held outside this group by individual members of the group. Ms Maja Oeri, formerly a member of the pool, holds 8,091,900 shares representing 5.057% of the voting rights independently of the pool. This is further described in Note 32. Based on information supplied to the Group, Novartis Holding AG, Basel, owns 33.333% (participation below 33⅓%) of the issued shares (2018: 33.333%).

Non-voting equity securities *(Genussscheine)*

At 31 December 2019 702,562,700 non-voting equity securities have been authorised and were in issue as in the preceding year. Under Swiss company law these non-voting equity securities have no nominal value, are not part of the share capital and cannot be issued against a contribution which would be shown as an asset in the balance sheet of Roche Holding Ltd. Each non-voting equity security confers the same rights as any of the shares to participate in the net profit and any remaining proceeds from liquidation following repayment of the nominal value of the shares and, if any, participation certificates. In accordance with the law and the Articles of Incorporation of Roche Holding Ltd, the Company is entitled at all times to exchange all or some of the non-voting equity securities into shares or participation certificates.

Dividends

On 5 March 2019 the shareholders approved the distribution of a dividend of CHF 8.70 per share and non-voting equity security (2018: CHF 8.30) in respect of the 2018 business year. The distribution to holders of outstanding shares and non-voting equity securities totalled CHF 7,449 million (2018: CHF 7,094 million) and has been recorded against retained earnings in 2019. The Board of Directors has proposed dividends for the 2019 business year of CHF 9.00 per share and non-voting equity security which, if approved, would result in a total distribution to shareholders of CHF 7,763 million. This is subject to approval at the Annual General Meeting on 17 March 2020.

Own equity instruments

Holdings of own equity instruments in equivalent number of non-voting equity securities

	2019 (millions)	2018 (millions)
Shares	0	0
Non-voting equity securities	6.8	8.1
Total	**6.8**	**8.1**

Own equity instruments are recorded within equity at original purchase cost. At 31 December 2019 the fair value of shares was CHF 4.7 million and the fair value of non-voting equity securities was CHF 2.1 billion. Own equity instruments are held for the Group's potential conversion obligations that may arise from the Group's equity compensation plans (see Note 27).

Reserves

Fair value reserve. At 31 December 2019 the fair value reserve represents the cumulative net change in the fair value of financial assets at fair value through OCI until the asset is sold, impaired or otherwise disposed of.

Hedging reserve. The hedging reserve represents the effective portion of the cumulative net change in the fair value of cash flow hedging instruments related to hedged transactions that have not yet occurred.

Translation reserve. The translation reserve represents the cumulative currency translation differences relating to the consolidation of Group companies that use functional currencies other than Swiss francs.

23. Subsidiaries

Chugai

Effective 1 October 2002 the Roche Group and Chugai completed an alliance to create a leading research-driven Japanese pharmaceutical company, which was formed by the merger of Chugai and Roche's Japanese pharmaceuticals subsidiary, Nippon Roche. The merged company is known as Chugai.

Consolidated subsidiary. Chugai is a fully consolidated subsidiary of the Group. This is based on the Group's interest in Chugai at 31 December 2019 of 61.2% (2018: 61.3%) and the Roche relationship with Chugai that is founded on the Basic Alliance, Licensing and Research Collaboration Agreements.

The common stock of Chugai is publicly traded and is listed on the Tokyo Stock Exchange under the stock code 'TSE:4519'. On 21 January 2020 Chugai has announced a split of its common stock. Effective 1 July 2020 the number of issued shares will increase from 559,685,889 to 1,679,057,667 (three-for-one split). Chugai prepares financial statements in accordance with International Financial Reporting Standards (IFRS) that are filed on a quarterly basis with the Tokyo Stock Exchange. Due to certain consolidation entries there are minor differences between Chugai's stand-alone IFRS results and the results of Chugai as consolidated by the Roche Group in accordance with IFRS.

Chugai summarised financial information in millions of CHF

	2019	2018
Income statement		
Sales [2]	5,367	4,675
Royalties and other operating income [2]	885	529
Total revenues	**6,252**	**5,204**
Operating profit [2]	1,940	1,136
Balance sheet		
Non-current assets	3,210	2,791
Current assets	6,337	5,522
Non-current liabilities	(255)	(275)
Current liabilities	(1,591)	(1,202)
Total net assets	**7,701**	**6,836**
Cash flows		
Cash flows from operating activities	1,883	1,054
Cash flows from investing activities	(745)	(656)
Cash flows from financing activities	(609)	(310)

Dividends. The dividends distributed to third parties holding Chugai shares during 2019 totalled CHF 199 million (2018: CHF 120 million) and have been recorded against non-controlling interests (see Note 24). Dividends paid by Chugai to Roche are eliminated on consolidation as intercompany items.

Roche's relationship with Chugai. Chugai has entered into certain agreements with Roche, which are discussed below:

(1) Basic Alliance Agreement – As part of the Basic Alliance Agreement signed in December 2001, Roche and Chugai entered into certain arrangements covering the future operation and governance of Chugai. Amongst other matters these cover the following areas:
- The structuring of the alliance.
- Roche's rights as a shareholder.
- Roche's rights to nominate members of Chugai's Board of Directors.
- Certain limitations to Roche's ability to buy or sell Chugai's common stock.

Chugai issues additional shares of common stock in connection with its convertible debt and equity compensation plans, and may issue additional shares for other purposes, which affects Roche's percentage ownership interest. The Basic Alliance Agreement provides, amongst other matters, that Chugai will guarantee Roche's right to maintain its shareholding percentage in Chugai at not less than 50.1%.

(2) Licensing Agreements – Under the Japan Umbrella Rights Agreement signed in December 2001, Chugai has exclusive rights to market Roche's pharmaceutical products in Japan. Chugai has the right of first refusal on the development and marketing in Japan of all development compounds advanced by Roche.

The Rest of the World Umbrella Rights Agreement (excluding Japan and South Korea) signed in May 2002 was revised and the Amended and Restated Rest of the World Umbrella Rights Agreement (excluding Japan, South Korea and Taiwan) was signed in August 2014. Under this Agreement Chugai shall offer and Roche has the right of first refusal on the development and marketing of Chugai's development compounds in markets outside Japan, excluding South Korea and Taiwan.

Further to these agreements, Roche and Chugai have signed a series of separate agreements for certain specific products. Depending on the specific circumstances and the terms of the agreement, this may result in payments on an arm's length basis between Roche and Chugai, for any or all of the following matters:
- Upfront payments, if a right of first refusal to license a product is exercised.
- Milestone payments, dependent upon the achievement of agreed performance targets.
- Royalties on future product sales.

These specific product agreements may also cover the manufacture and supply of the respective products to meet the other party's clinical and/or commercial requirements on an arm's length basis.

(3) Research Collaboration Agreements – Roche and Chugai have entered into research collaboration agreements in the areas of small-molecule synthetic drug research and biotechnology-based drug discovery.

Foundation Medicine

On 7 April 2015 the Group acquired a 61.3% controlling interest in Foundation Medicine, Inc. ('FMI'), a publicly owned US company based in Cambridge, Massachusetts, and entered into an Investor Rights Agreement, a Research and Development Collaboration Agreement and several Commercial Collaboration Agreements. FMI has been treated as a fully consolidated subsidiary of the Group since that date. At 31 December 2017 the Group's interest in FMI was 57.5%. The common stock of FMI was publicly traded and was listed on the Nasdaq under the stock code 'FMI'. FMI prepared financial statements in accordance with US GAAP that were filed on a quarterly basis with the SEC. Due to certain consolidation entries there have been differences between FMI's stand-alone US GAAP results and the results of FMI as consolidated by the Roche Group in accordance with IFRS.

On 18 June 2018 the Group entered into a merger agreement with FMI to acquire the outstanding shares of FMI's common stock not already owned by the Group at a price of USD 137.00 per share in cash. A tender offer was launched on 2 July 2018. On 31 July 2018 the transaction closed and FMI became a 100% owned subsidiary of the Group. It was accounted for in full as an equity transaction (see Note 6).

Dividends. There were no dividends distributed to third parties holding FMI shares during 2018.

Divestment of subsidiaries

Divestment of subsidiaries – 2018. On 30 November 2018 the Group sold its wholly owned subsidiary Roche Diagnostics IT Solutions GmbH in Berlin, Germany, to a third party. The total consideration was EUR 2 million, all of which was deferred consideration that will become due on 30 November 2021. A total loss on divestment of CHF 24 million was reported as global restructuring costs in the Diagnostics operating segment and included in general and administration.

The Group received deferred consideration of EUR 3 million and EUR 4 million in 2019 and 2018, respectively, from the sale of the former subsidiary at the Segrate site, Italy, to a third party.

Cash flow from divestment of subsidiaries in millions of CHF

	2019			2018		
	Pharmaceuticals	Diagnostics	Total	Pharmaceuticals	Diagnostics	Total
Cash consideration received	0	0	0	0	0	0
Deferred consideration received	3	0	3	4	0	4
Cash in divested company	0	0	0	0	(3)	(3)
Total net cash inflow	**3**	**0**	**3**	**4**	**(3)**	**1**

24. Non-controlling interests

Changes in equity attributable to non-controlling interests in millions of CHF

	2019	2018
At 1 January	2,744	2,566
Implementation of IFRS 16 'Leases' [28]	0	–
At 1 January (revised)	**2,744**	**2,566**
Net income recognised in income statement		
– Chugai	562	343
– Other non-controlling interests	49	22
Total net income recognised in income statement	**611**	**365**
Equity investments at fair value through OCI	(1)	1
Debt securities at fair value through OCI	0	0
Cash flow hedges	(5)	(1)
Currency translation of foreign operations	(25)	53
Remeasurements of defined benefit plans	1	(8)
Other comprehensive income, net of tax	**(30)**	**45**
Total comprehensive income	**581**	**410**
Business combinations	0	0
Dividends to non-controlling shareholders		
– Chugai [23]	(199)	(120)
– Other non-controlling interests	(14)	(16)
Equity compensation plans, net of transactions in own equity	5	10
Changes in ownership interest in subsidiaries	(12)	(112)
Changes in non-controlling interests	2	6
Equity contribution by non-controlling interests	13	0
At 31 December	**3,120**	**2,744**
Chugai	2,924	2,585
Other non-controlling interests	196	159
Total non-controlling interests	**3,120**	**2,744**

25. Employee benefits

Employee remuneration in millions of CHF

	2019	2018
Wages and salaries	11,631	11,173
Social security costs	1,138	1,102
Defined contribution plans [26]	410	419
Operating expenses for defined benefit plans [26]	598	518
Equity compensation plans [27]	597	508
Termination costs [7]	724	401
Other employee benefits	1,162	1,175
Employee remuneration included in operating results	**16,260**	**15,296**
Net interest cost of defined benefit plans [26]	140	139
Total employee remuneration	**16,400**	**15,435**

Other employee benefits consist mainly of life insurance schemes and certain other insurance schemes providing medical coverage and other long-term and short-term disability benefits.

26. Pensions and other post-employment benefits

The Group's objective is to provide attractive and competitive post-employment benefits to employees, while at the same time ensuring that the various plans are appropriately financed and managing any potential impacts on the Group's long-term financial position. Most employees are covered by pension plans sponsored by Group companies. The nature of such plans varies according to legal regulations, fiscal requirements and market practice in the countries in which the employees are employed. Post-employment benefit plans are classified for IFRS as 'defined contribution plans' if the Group pays fixed contributions into a separate fund or to a third-party financial institution and will have no further legal or constructive obligation to pay further contributions. All other plans are classified as 'defined benefit plans'.

Defined contribution plans

Defined contribution plans are funded through payments by employees and by the Group to funds administered by third parties. The Group's expenses for these plans were CHF 410 million (2018: CHF 419 million). No assets or liabilities are recognised in the Group's balance sheet in respect of such plans, apart from regular prepayments and accruals of the contributions withheld from employees' wages and salaries and of the Group's contributions. The Group's major defined contribution plan is the US Roche 401(k) Savings Plan.

Defined benefit plans

Plans are usually established as trusts independent of the Group and are funded by payments from Group companies and by employees. In some cases, notably for the major defined benefit plans in Germany, the plans are unfunded and the Group pays pensions to retired employees directly from its own financial resources. Plans are usually governed by a senior governing body, such as a Board of Trustees, which is typically composed of both employee and employer representatives. Funding of these plans is determined by local regulations using independent actuarial valuations. Separate independent actuarial valuations are prepared in accordance with the requirements of IAS 19 for use in the Group's financial statements. The Group's major pension plans are located in Switzerland, the US and Germany, which in total account for 84% of the Group's defined benefit obligation (2018: 84%).

Pension plans in Switzerland. Current pension arrangements for employees in Switzerland are made through plans governed by the Swiss Federal Occupational Old Age, Survivors and Disability Pension Act ('BVG'). The Group's pension plans are administered by separate legal foundations, which are funded by regular employee and company contributions. The final benefit is contribution based with certain minimum guarantees. Due to these minimum guarantees, the Swiss plans are treated as defined benefit plans for the purposes of these IFRS financial statements, although they have many of the characteristics of defined contribution plans. Where there is an under-funding, this may be remedied by various measures such as increasing employee and company contributions, lowering the interest rate on retirement account balances, reducing prospective benefits and a suspension of the early withdrawal facility.

Following a plan change in 2018 the Employee Profit-Sharing Plan ('Mitarbeiter-Gewinnbeteiligung') no longer qualifies as a defined contribution plan but as a defined benefit plan. This resulted in additions to plan assets and defined benefit obligation of approximately CHF 1.1 billion. In 2018 operating income of CHF 43 million was recorded for past service cost from this plan change in Switzerland. Of this amount, CHF 31 million was recorded in the Pharmaceuticals Division, CHF 7 million in the Diagnostics Division and CHF 5 million in Corporate. The past service income was recorded within general and administration.

Pension plans in the US. The Group's major defined benefit plans in the US have been closed to new members since 2007. New employees in the US now join the defined contribution plan. The largest of the remaining defined benefit plans are funded pension plans together with smaller unfunded supplementary retirement plans. The benefits are based on the highest average annual rate of earnings during a specified period and length of employment. The plans are non-contributory for employees, with the Group making periodic payments to the plans. Where there is an under-funding, this would normally be remedied by additional company contributions. In 2019 no payments were made by the Group (2018: USD 186 million). The payments in the comparative period included accelerated contributions to benefit from a higher tax deduction.

Pension plans in Germany. The Group's major pension arrangements in Germany are governed by the Occupational Pensions Act ('BetrAVG'). These plans are unfunded and the Group pays pensions to retired employees directly from its own financial resources. These plans are non-contributory for employees. The benefits are based on final salary and length of employment. These plans have been closed to new members since 2007. They have been replaced by a new plan which is funded by regular employee and company contributions and administered through a contractual trust agreement. The final benefit is contribution based with a minimum guarantee. Due to this minimum guarantee, this plan is treated as a defined benefit plan for the purposes of these IFRS financial statements, although it has many of the characteristics of a defined contribution plan.

Pension plans in the Rest of the World. These represent approximately 11% of the Group's defined benefit obligation (2018: 11%) and consist of a number of smaller plans in various countries. Of these the largest are the pension plans at Chugai, which are independently managed by Chugai, and the main pension plan in the United Kingdom. In 2019 Chugai has made additional voluntary contributions of JPY 9.0 billion to its pension plans (2018: none). The Chugai plans are fully described in Chugai's own IFRS financial statements. The UK pension plan is funded by regular employee and company contributions, with benefits based on final salary and length of employment. This plan has been closed to new members since 2003 and has been replaced with a defined contribution plan.

Other post-employment benefit ('OPEB') plans. These represent approximately 5% of the Group's defined benefit obligation (2018: 5%) and consist of post-employment healthcare and life insurance schemes, mainly in the US. These plans are mainly unfunded and/or are contributory for employees, with the Group reimbursing retired employees directly from its own financial resources. The Group's major OPEB plans in the US have been closed to new members since 2011. Part of the costs of these plans is reimbursable under the Medicare Prescription Drug, Improvement, and Modernization Act of 2003. There is no statutory funding requirement for these plans. The Group is funding these plans to the extent that it is tax efficient. In 2019 no payments were made by the Group to these plans (2018: payments of USD 40 million). At 31 December 2019 the IFRS funding status was 50% (2018: 47%), including reimbursement rights, for the funded OPEB plans in the US.

Defined benefit plans: income statement in millions of CHF

	2019			2018		
	Pension plans	Other post-employment benefit plans	Total expense	Pension plans	Other post-employment benefit plans	Total expense
Current service cost	567	11	578	567	15	582
Past service (income) cost	21	0	21	(69)	0	(69)
Settlement (gain) loss	(1)	0	(1)	5	0	5
Total operating expenses	**587**	**11**	**598**	**503**	**15**	**518**
Net interest cost of defined benefit plans	109	31	140	107	32	139
Total expense recognised in income statement	**696**	**42**	**738**	**610**	**47**	**657**

Funding status

The funding of the Group's various defined benefit plans is the responsibility of the respective senior governing body, such as a Board of Trustees, and the sponsoring employer, and is managed based on local statutory valuations, which follow the legislation and requirements of the respective jurisdiction in which the plan is established. Qualified independent actuaries carry out statutory actuarial valuations on a regular basis. The actuarial assumptions determining the funding status on the statutory basis are regularly assessed by the local senior governing body. The funding status is closely monitored at a corporate level. The unfunded plans are mainly those in the Group's German affiliates, where the fully reserved pension obligations are used for self-financing of the local affiliate's operations.

The IFRS funding status of the funded defined benefit plans decreased to 92% (2018: 93%).

Reimbursement rights are linked to the post-employment medical plans in the US and represent the expected reimbursement of the medical expenditure provided under the Medicare Prescription Drug, Improvement, and Modernization Act of 2003.

Defined benefit plans: funding status in millions of CHF

	2019			2018		
	Pension plans	Other post-employment benefit plans	Total	Pension plans	Other post-employment benefit plans	Total
Funded plans						
– Fair value of plan assets	16,835	352	17,187	14,962	302	15,264
– Defined benefit obligation	(17,610)	(976)	(18,586)	(15,611)	(889)	(16,500)
Over (under) funding	**(775)**	**(624)**	**(1,399)**	**(649)**	**(587)**	**(1,236)**
Unfunded plans						
– Defined benefit obligation	(4,971)	(298)	(5,269)	(4,757)	(263)	(5,020)
Total funding status	**(5,746)**	**(922)**	**(6,668)**	**(5,406)**	**(850)**	**(6,256)**
Limit on asset recognition	0	0	0	(2)	0	(2)
Reimbursement rights	–	133	133	–	118	118
Net recognised asset (liability)	**(5,746)**	**(789)**	**(6,535)**	**(5,408)**	**(732)**	**(6,140)**
Reported in balance sheet						
– Defined benefit plan assets	812	133	945	759	118	877
– Defined benefit plan liabilities	(6,558)	(922)	(7,480)	(6,167)	(850)	(7,017)

Plan assets

The responsibility for the investment strategies of funded plans is with the respective senior governance body, such as the Board of Trustees. Asset-liability studies are performed regularly for all major pension plans. These studies examine the obligations from post-employment benefit plans, and evaluate various investment strategies with respect to key financial measures such as expected returns, expected risks, expected contributions, and expected funded status of the plan in an interdependent way. The goal of an asset-liability study is to select an appropriate asset allocation for the funds held within the plan. The investment strategy is developed to optimise expected returns, to manage risks and to contain fluctuations in the statutory funded status. Asset-liability studies include strategies to match the cash flows of the assets with the plan obligations. The Group currently does not use longevity swaps to manage longevity risk.

Plan assets are managed using internal and external asset managers. The actual performance is continually monitored by the pension fund governance bodies as well as being closely monitored at a corporate level. In these financial statements the difference between the interest income and actual return on plan assets is a remeasurement that is recorded directly to other comprehensive income. In 2019 the actual return on plan assets was a gain of CHF 2,083 million (2018: loss of CHF 413 million), which excludes the actual return on reimbursement rights.

The recognition of plan assets is limited to the present value of any economic benefits available from refunds from the plans or reductions in future contributions to the plans.

Defined benefit plans: fair value of plan assets and reimbursement rights in millions of CHF

	2019			2018		
	Pension plans	Other post-employment benefit plans	Total	Pension plans	Other post-employment benefit plans	Total
At 1 January	14,962	420	15,382	14,040	456	14,496
Additions	0	0	0	1,238	0	1,238
Interest income on plan assets and reimbursement rights	258	18	276	219	16	235
Remeasurements on plan assets and reimbursement rights	1,728	108	1,836	(611)	(60)	(671)
Currency translation effects	(54)	(15)	(69)	(48)	11	(37)
Employer contributions	493	0	493	576	37	613
Employee contributions	149	11	160	147	7	154
Benefits paid – funded plans	(696)	(55)	(751)	(590)	(44)	(634)
Benefits paid – settlements	0	0	0	(5)	0	(5)
Administration costs	(5)	(2)	(7)	(4)	(3)	(7)
At 31 December	**16,835**	**485**	**17,320**	**14,962**	**420**	**15,382**

Defined benefit plans: composition of plan assets in millions of CHF

	2019	2018
Equity securities	4,639	4,287
Debt securities	7,439	6,136
Property	2,376	2,120
Cash and money market instruments	367	525
Other investments	2,366	2,196
At 31 December	**17,187**	**15,264**

Assets are invested in a variety of different classes in order to maintain a balance between risk and return as follows:
- Equity and debt securities which mainly have quoted market prices (Level 1 fair value hierarchy).
- Property which is primarily in private and commercial property funds which mainly have other observable inputs (Level 2 fair value hierarchy).
- Cash and money market instruments which are mainly invested with financial institutions with a credit rating no lower than A.
- Other investments which mainly consist of alternatives, mortgages, commodities and insurance contracts. These are used for risk management purposes and mainly have other observable inputs (Level 2 fair value hierarchy) and unobservable inputs (Level 3 fair value hierarchy).

Included within the fair value of plan assets are the Group's shares and non-voting securities with a fair value of CHF 177 million (2018: CHF 136 million) and debt instruments issued by the Group with a fair value of CHF 5 million (2018: CHF 5 million).

Defined benefit obligation

The defined benefit obligation is calculated using the projected unit credit method. This reflects service rendered by employees to the dates of valuation and incorporates actuarial assumptions primarily regarding discount rates used in determining the present value of benefits, projected rates of remuneration growth and mortality rates. The present value of the defined benefit obligation is determined by discounting the estimated future cash outflows using interest rates of high-quality corporate bonds or government bonds in countries where there is not a deep market in corporate bonds. The corporate or government bonds are denominated in the currency in which the benefits will be paid, and have maturity terms approximating to the terms of the related pension obligation.

The Group's final salary-based defined benefit pension plans in the US, Germany and the United Kingdom have been closed to new participants. Active employees that had been members of these pension plans at the time these were closed to new participants continue to accrue benefits in the final salary-based defined benefit pension plans. New employees in the US and UK now join the Group's defined contribution plans, while new employees in Germany join the contribution based plan with a minimum guarantee. As a result, the proportion of the defined benefit obligation which relates to these closed plans is expected to decrease in the future. The defined benefit pension plans in Switzerland, where the final benefit is contribution based with a minimum guarantee, remain open to new employees.

Defined benefit plans: defined benefit obligation in millions of CHF

	2019			2018		
	Pension plans	Other post-employment benefit plans	Total	Pension plans	Other post-employment benefit plans	Total
At 1 January	20,368	1,152	21,520	19,761	1,355	21,116
Additions	0	0	0	1,239	0	1,239
Current service cost	567	11	578	567	15	582
Interest cost	367	49	416	326	48	374
Remeasurements:						
– demographic assumptions	(8)	(6)	(14)	(130)	(42)	(172)
– financial assumptions	2,144	143	2,287	(766)	(150)	(916)
– experience adjustments	80	(1)	79	252	(32)	220
Currency translation effects	(239)	(18)	(257)	(206)	4	(202)
Employee contributions	149	11	160	147	7	154
Benefits paid – funded plans	(696)	(55)	(751)	(590)	(44)	(634)
Benefits paid – unfunded plans	(171)	(12)	(183)	(163)	(9)	(172)
Benefits paid – settlements	0	0	0	(5)	0	(5)
Past service (income) cost	21	0	21	(69)	0	(69)
Settlement (gain) loss	(1)	0	(1)	5	0	5
At 31 December	**22,581**	**1,274**	**23,855**	**20,368**	**1,152**	**21,520**
Composition of plan						
Active members	11,784	328	12,112	10,454	290	10,744
Deferred vested members	1,862	8	1,870	1,593	10	1,603
Retired members	8,935	938	9,873	8,321	852	9,173
At 31 December	**22,581**	**1,274**	**23,855**	**20,368**	**1,152**	**21,520**
Plans by geography						
Switzerland	11,129	–	11,129	9,873	–	9,873
United States	4,307	1,225	5,532	3,805	1,116	4,921
Germany	4,561	–	4,561	4,331	–	4,331
Rest of the World	2,584	49	2,633	2,359	36	2,395
At 31 December	**22,581**	**1,274**	**23,855**	**20,368**	**1,152**	**21,520**
Duration in years	16.0	12.8	15.8	14.6	12.2	14.5

Actuarial assumptions

The actuarial assumptions used in these financial statements are based on the requirements set out in IAS 19 'Employee Benefits'. They are unbiased and mutually compatible estimates of variables that determine the ultimate cost of providing post-employment benefits. They are set on an annual basis by local management, based on advice from actuaries, and are subject to approval by corporate management and the Group's actuaries. Actuarial assumptions consist of demographic assumptions on matters such as mortality and employee turnover, and financial assumptions on matters such as interest rates, salary and benefit levels, inflation rates and costs of medical benefits. The actuarial assumptions vary based upon local economic and social conditions. The actuarial assumptions used in the various statutory valuations may differ from these based on local legal and regulatory requirements.

Demographic assumptions. The most significant demographic assumptions relate to mortality rates. The Group's actuaries use mortality tables which take into account historic patterns and expected changes, such as further increases in longevity. Rates of employee turnover, disability and early retirement are based on historical behaviour. The average life expectancy assumed now for an individual at the age of 65 is as follows:

Defined benefit plans: average life expectancy at the age of 65 for major schemes in years

Country	Mortality table	Male 2019	Male 2018	Female 2019	Female 2018
Switzerland	BVG 2015 projected with CMI model	21.6	21.6	23.6	23.6
United States	RP-2014 projected with MP-2018	22.2	22.2	23.7	23.7
Germany	Heubeck tables 2018G projected with CMI model	19.4	19.4	22.7	22.7

The mortality assumptions used for the pension plans in Switzerland were based on BVG 2015 applying the Continuous Mortality Investigation ('CMI') model. A long-term rate of 1.25% (2018: 1.25%) was used for longevity improvements.

The Group used as mortality assumptions for the pension plans in Germany Heubeck tables 2018G applying the CMI model with a long-term rate of 1.25% for longevity improvements (2018: 1.25%).

Financial assumptions. These are based on market expectations for the period over which the obligations are to be settled. The assumptions used in the actuarial valuations are shown below.

Defined benefit plans: financial actuarial assumptions

	2019 Weighted average	2019 Range	2018 Weighted average	2018 Range
Discount rates	1.20%	0.01% – 6.90%	1.98%	0.69% – 8.10%
Expected rates of salary increases	2.44%	0.00% – 4.50%	2.59%	0.00% – 4.50%
Expected rates of pension increases	0.49%	0.00% – 3.00%	0.58%	0.00% – 3.00%
Expected inflation rates	2.00%	1.25% – 3.50%	2.13%	1.75% – 3.50%
Immediate medical cost trend rate	6.09%	5.67% – 6.10%	6.13%	5.90% – 6.30%
Ultimate medical cost trend rate (in 2038)	4.49%	4.00% – 4.50%	4.37%	4.00% – 4.50%

Discount rates are determined with reference to interest rates on high-quality corporate bonds or government bonds in countries where there is not a deep market in corporate bonds. Expected rates of salary increases are based on expected inflation rates with an adjustment to reflect the Group's latest expectation of long-term real salary increases taking into account expected inflation rates, amongst other factors. Expected rates of pension increases are generally linked to the expected inflation rate or the funding status of the plan. Expected inflation rates are derived by looking at the level of inflation implied by the financial markets in conjunction with the economists' price inflation forecasts, historic price inflation as well as other economic variables and circumstances. Medical cost trend rates take into account the benefits set out in the plan terms and expected future changes in medical costs. Since the Group's major post-employment medical plans are for US employees, these rates are driven by developments in the US.

Sensitivity analysis. The measurement of the net defined benefit obligation is particularly sensitive to changes in the discount rate, inflation rate, expected mortality and medical cost trend rate assumptions. The following table summarises the impact of a change in those assumptions on the present value of the defined benefit obligation.

Defined benefit plans: sensitivity of defined benefit obligation to actuarial assumptions in millions of CHF

	2019	2018
Increase (decrease) in defined benefit obligation		
Life expectancy		
– 1 year increase	733	735
Discount rates		
– 0.25% increase	(894)	(731)
– 0.25% decrease	953	777
Expected inflation rates		
– 0.25% increase	251	220
– 0.25% decrease	(231)	(209)
Immediate medical cost trend rate		
– 1.00% increase	146	139
– 1.00% decrease	(120)	(97)

Each sensitivity analysis considers the change in one assumption at a time leaving the other assumptions unchanged. This approach shows the isolated effect of changing one individual assumption but does not take into account that some assumptions are related. The method used to carry out the sensitivity analysis is the same as in the prior year.

Cash flows

The Group incurred cash flows from its defined benefit plans as shown in the table below.

Defined benefit plans: cash flows in millions of CHF

	2019	2018
Employer contributions, net of reimbursements – funded plans	(493)	(613)
Benefits paid – unfunded plans	(183)	(172)
Total cash inflow (outflow)	**(676)**	**(785)**

Based on the most recent actuarial valuations, the Group expects that employer contributions for funded plans in 2020 will be approximately CHF 413 million, which includes an estimated CHF 20 million of additional voluntary contributions related to the Chugai benefit plans. Benefits paid for unfunded plans in 2020 are estimated to be approximately CHF 188 million, which mostly relate to the German defined benefit plans.

27. Equity compensation plans

The Group operates several equity compensation plans, including separate plans at Chugai. IFRS 2 'Share-based Payment' requires that the fair value of all equity compensation plan awards granted to employees be estimated at grant date and recorded as an expense over the vesting period.

Expenses for equity compensation plans in millions of CHF

	2019	2018
Cost of sales	103	90
Marketing and distribution	136	114
Research and development	233	185
General and administration	125	119
Total operating expenses	**597**	**508**
Equity compensation plans		
Roche Stock-settled Stock Appreciation Rights	119	175
Roche Restricted Stock Unit Plan	438	281
Roche Performance Share Plan	3	8
Roche Connect	26	24
Roche Option Plan	2	3
Bonus Stock Awards	6	6
Chugai and Foundation Medicine plans	3	11
Total operating expenses	**597**	**508**
of which		
– Equity-settled	597	508
– Cash-settled	–	–

Cash inflow (outflow) from equity compensation plans in millions of CHF

	2019	2018
Roche Option Plan exercises	78	19
Chugai and Foundation Medicine plans' exercises	9	18
Roche Connect costs	(26)	(24)
Transactions in own equity	(1,008)	(461)
Total cash inflow (outflow) from equity-settled equity compensation plans, net of transactions in own equity	**(947)**	**(448)**

The net cash outflow from transactions in own equity mainly arises from sales and purchases of equity instruments which are held for the Group's potential conversion obligations that may arise from the Group's equity compensation plans (see Note 22).

Equity compensation plans

Roche Stock-settled Stock Appreciation Rights. The Group issues Stock-settled Stock Appreciation Rights (S-SARs) to certain directors, management and employees selected at the discretion of the Group. The S-SARs give employees the right to receive non-voting equity securities reflecting the value of any appreciation in the market price of the non-voting equity securities between the grant date and the exercise date. Under the Roche S-SAR Plan 180 million S-SARs will be available for issuance over a ten-year period, starting from 2013. The rights, which are non-tradable equity-settled awards, have a ten-year duration and vest on a phased basis over four years. Rights granted before 2019 have a seven-year duration and vest on a phased basis over three years.

Roche S-SARs – movement in number of rights outstanding

	2019		2018	
	Number of rights (thousands)	Weighted average exercise price (CHF)	Number of rights (thousands)	Weighted average exercise price (CHF)
Outstanding at 1 January	47,223	238.12	43,545	235.31
Granted	7,339	272.30	13,068	221.40
Forfeited	(1,701)	245.65	(3,808)	247.83
Exercised	(20,762)	235.58	(5,565)	170.56
Expired	(19)	158.15	(17)	140.29
Outstanding at 31 December	**32,080**	**247.23**	**47,223**	**238.12**
– of which exercisable	14,898	247.77	25,285	241.12

Roche S-SARs – terms of rights outstanding at 31 December 2019

	Rights outstanding			Rights exercisable	
Year of grant	Number outstanding (thousands)	Weighted average years remaining contractual life	Weighted average exercise price (CHF)	Number exercisable (thousands)	Weighted average exercise price (CHF)
2013	858	0.27	215.34	858	215.34
2014	2,001	1.26	263.60	2,001	263.60
2015	2,697	2.26	256.71	2,697	256.71
2016	4,163	3.27	250.87	4,163	250.87
2017	6,170	4.27	251.39	3,140	251.36
2018	9,403	5.26	221.44	2,012	221.52
2019	6,788	9.28	272.36	27	271.65
Total	**32,080**	**5.03**	**247.23**	**14,898**	**247.77**

Roche Restricted Stock Unit Plan. The Group issues Restricted Stock Units (RSUs) awards to certain directors, management and employees selected at the discretion of the Group. The RSUs, which are non-tradable, represent the right to receive non-voting equity securities. RSUs vest on a phased basis over four years, subject to performance conditions, if any. RSUs granted before 2019 vest after a three-year-period. There are currently no performance conditions on outstanding RSUs at 31 December 2019. Under the Roche RSU Plan 20 million non-voting equity securities will be available for issuance over a ten-year period, starting from 2013. The Roche RSU Plan also includes a value adjustment which will be an amount equivalent to the sum of shareholder distributions made by the Group during the vesting period attributable to the number of non-voting equity securities for which an individual award has been granted.

Roche RSUs – movement in number of awards outstanding

	2019 Number of awards (thousands)	2018 Number of awards (thousands)
Outstanding at 1 January	3,503	2,813
Granted	2,287	1,766
Forfeited	(386)	(331)
Transferred to participants	(1,242)	(745)
Outstanding at 31 December	**4,162**	**3,503**
– of which vested and transferable	1	1

Roche Performance Share Plan. Before 2019 the Group offered future share and non-voting equity security awards (or, at the discretion of the Board of Directors, their cash equivalent) to certain directors and key senior managers. These are non-tradable equity-settled awards. Under this programme there remain two annual three-year cycles. The Roche Performance Share Plan (PSP) includes a value adjustment which is an amount equivalent to the sum of shareholder distributions made by the Group during the vesting period attributable to the number of shares or non-voting equity securities for which an individual award has been granted. The amount of shares or non-voting equity securities allocated depends upon the individual's salary level, the achievement of performance targets linked to the Group's Total Shareholder Return (shares and non-voting equity securities combined) relative to the Group's peers during the three-year period from the date of the grant, and the discretion of the Board of Directors. Each award granted will result in between zero and two shares or non-voting equity securities (before value adjustment), depending upon the achievement of the performance targets. In 2019 no new PSP awards were granted.

Roche Performance Share Plan – terms of outstanding awards at 31 December 2019

	2017–2019	2018–2020
Number of awards outstanding (thousands)	32	30
Vesting period	3 years	3 years
Allocated to recipients in	Feb. 2020	Feb. 2021
Fair value per unit at grant (CHF)	226.66	238.35
Total fair value at grant (CHF millions)	**11**	**10**

Roche Connect. This programme enables all employees worldwide, except for those in the US and certain other countries, to make regular deductions from their salaries to purchase non-voting equity securities. It is administered by independent third parties. The Group contributes to the programme, which allows the employees to purchase non-voting equity securities at a discount (usually 20%). The administrator purchases the necessary non-voting equity securities directly from the market. At 31 December 2019 the administrator held 3.1 million non-voting equity securities (2018: 3.1 million). In 2019 the cost of the plan was CHF 26 million (2018: CHF 24 million).

Roche Option Plan. This programme is used in countries where S-SARs are not used. Awards under this plan give employees the right to purchase non-voting equity securities at an exercise price specified at the grant date. The options, which are non-tradable equity-settled awards, have a ten-year duration and vest on a phased basis over four years. Options granted before 2019 have a seven-year duration and vest on a phased basis over three years.

Roche Option Plan – movement in number of options outstanding

	Number of options (thousands)	2019 Weighted average exercise price (CHF)	Number of options (thousands)	2018 Weighted average exercise price (CHF)
Outstanding at 1 January	794	236.63	754	231.82
Granted	99	271.65	207	221.94
Forfeited	(15)	241.68	(53)	246.54
Exercised	(337)	231.03	(114)	173.23
Expired	(1)	157.50	0	–
Outstanding at 31 December	**540**	**246.52**	**794**	**236.63**
– of which exercisable	286	247.58	474	238.66

Roche Option Plan – terms of options outstanding at 31 December 2019

Year of grant	Number outstanding (thousands)	Weighted average years remaining contractual life	Options outstanding Weighted average exercise price (CHF)	Number exercisable (thousands)	Options exercisable Weighted average exercise price (CHF)
2013	19	0.25	214.00	19	214.00
2014	44	1.25	263.20	44	263.20
2015	64	2.27	257.42	64	257.42
2016	68	3.26	250.32	68	250.32
2017	91	4.29	250.78	51	250.79
2018	158	5.27	222.22	40	222.47
2019	96	9.25	271.65	0	271.65
Total	**540**	**4.70**	**246.52**	**286**	**247.58**

The weighted average share price of Roche non-voting equity securities during the year was CHF 276.84 (2018: CHF 232.20).

Bonus Stock Awards. The Chairman of the Board of Directors and the Chief Executive Officer will be granted Bonus Stock Awards in lieu of their cash-settled bonus for the financial year 2019. These are subject to approval by the 2020 Annual General Meeting in March 2020 and will be issued in March 2020. The number of awards and fair value per award will be calculated at the grant date.

Fair value measurement

The inputs used in the measurement of the fair values at grant date of the equity compensation plans were as follows:

Fair value measurement in 2019

	Roche Stock-settled Stock Appreciation Rights	Roche Restricted Stock Unit Plan	Roche Option Plan
Vesting period	Progressively over 4 years	Progressively over 4 years	Progressively over 4 years
Contractual life	10 years	n/a	10 years
Number granted during year (thousands)	7,339	2,287	99
Weighted average fair value (CHF)	15	272	15
Model used	Binomial	Market price [a]	Binomial
Inputs to option pricing model			
– Share price at grant date (CHF)	272	272	272
– Exercise price (CHF)	272	–	272
– Expected volatility [b]	18.9%	n/a	18.9%
– Expected dividend yield	7.6%	n/a	7.6%
– Early exercise factor [c]	1.28	n/a	1.28
– Expected exit rate	10.0%	n/a	10.0%

a) The fair value of the Roche RSUs is equivalent to the share price on the date of grant.
b) Volatility was determined primarily by reference to historically observed prices of the underlying equity. Risk-free interest rates are derived from zero coupon swap rates at the grant date taken from Datastream.
c) The early exercise factor describes the ratio between the expected market price at the exercise date and the exercise price at which early exercises can be expected, based on historically observed behaviour.

28. Leases

Implementation of IFRS 16 'Leases'

Effective 1 January 2019 the Group has implemented IFRS 16 'Leases'. IFRS 16 replaces existing leases guidance, including IAS 17 'Leases', and sets out the principles for recognition and measurement of leases. The new standard resulted in an increased volume of disclosure information in the Annual Financial Statements.

The main effect on the Group as a lessee is that IFRS 16 introduces a single, on-balance sheet lease accounting model. It requires a lessee to recognise assets and liabilities for its leases. The lease liability reflects the present value of the remaining lease payments, and the right-of-use asset corresponds to the lease liability, adjusted for payments made before the lease commencement date, lease incentives and other items related to the lease agreement. As a result right-of-use assets totalling CHF 1,162 million and lease liabilities totalling CHF 1,194 million were recorded on the balance sheet, effective 1 January 2019.

All transition impacts on the balance sheet are shown in the table below.

Transition impact of IFRS 16 on Roche Group consolidated balance sheet (selected items) in millions of CHF

	As originally published for 31 December 2018	Application of IFRS 16	Revised for 1 January 2019
Property, plant and equipment [8]	21,818	(3)	21,815
Right-of-use assets	–	1,162	1,162
Other current assets	2,521	(24)	2,497
Long-term debt [21]	(16,077)	2	(16,075)
Non-current provisions [20]	(1,452)	16	(1,436)
Other non-current liabilities	(188)	(839)	(1,027)
Short-term debt [21]	(2,693)	2	(2,691)
Current provisions [20]	(2,329)	6	(2,323)
Other current liabilities	(10,677)	(326)	(11,003)
Total net assets	**30,366**	**(4)**	**30,362**
Capital and reserves attributable to Roche shareholders [22]	27,622	(4)	27,618
Equity attributable to non-controlling interests [24]	2,744	0	2,744
Total equity	**30,366**	**(4)**	**30,362**

The weighted average incremental borrowing rate applied to lease liabilities recognised on transition was 1.49%.

The operating lease commitments and finance lease liabilities reported in the 2018 Annual Financial Statements, applying the previous leasing standard IAS 17, can be reconciled to the lease liabilities recognised on transition to IFRS 16 as shown in the table below.

Reconciliation of lease liabilities recognised on transition on 1 January 2019 in millions of CHF

Operating lease commitments (undiscounted) as reported at 31 December 2018 applying IAS 17	1,330
Finance lease liabilities as reported at 31 December 2018 applying IAS 17	4
Recognition exemption for short-term leases and leases of low-value assets	(57)
Lease arrangements with commencement date after 31 December 2018	(89)
Discounting	(56)
Other	62
Lease liabilities recognised on transition on 1 January 2019 applying IFRS 16	**1,194**
Thereof	
– Other non-current liabilities [18]	865
– Other current liabilities [19]	329
Total	**1,194**

The application of the new standard resulted in part of what has been previously reported as operating lease costs being recorded as interest expenses. Given the leases involved and the prevailing low interest rate environment, the Group does not currently expect this effect to be material, with the amount in 2019 being CHF 18 million.

The main impact of the new standard on the statement of cash flows is that cash flows in respect of leases previously reported as operating leases are reported as part of cash flows from financing activities from 1 January 2019. Previously these were included within cash flows from operating activities.

The impact of the new standard on operating segment information is given in Note 2.

Key judgements made in calculating the initial application impact of the new standard include assessing whether arrangements contain a lease and determining the lease term. For determining the lease term, extension and termination options have to be considered along with all facts and circumstances that may create an economic incentive to exercise an extension option, or not exercise a termination option. Estimates include calculating the discount rate which is based on the incremental borrowing rate.

For the Group as a lessor the application of the new standard does not have any material effects.

Transition approach and use of practical expedients. The Group has applied the cumulative catch-up method for the transition. The cumulative effect of adopting IFRS 16 has been recognised as an adjustment to the opening balance of retained earnings at 1 January 2019, with no restatement of comparative information. Right-of-use assets are generally measured at an amount equal to the lease liability, adjusted for payments made before the lease commencement date, lease incentives and other items related to the lease agreement that were recognised on the balance sheet immediately before the date of initial application. Some right-of-use assets are measured at their carrying amount as if IFRS 16 had been applied since the lease commencement date, but discounted using the Group's incremental borrowing rate at 1 January 2019. Some practical expedients permitted by the standard are used, notably:

- To not reassess upon transition whether an existing contract contains a lease. The definition of a lease under IFRS 16 has been applied only to contracts entered into or changed on or after 1 January 2019.
- The recognition exemptions for short-term leases and leases of low-value assets.
- For motor vehicles to not separate non-lease components and instead to account for the lease and non-lease components as a single lease component.
- To apply IAS 37 for onerous leases instead of performing an impairment review.

Presentational changes. As a result of implementing IFRS 16, the Group made a number of presentational changes in 2019, notably to present 'Right-of-use assets' as a separate line item in the balance sheet and to include lease liabilities in other current and non-current liabilities.

The Group as a lessee

The Group enters into leasing transaction as a lessee mainly for reasons of convenience and flexibility. The Group has good cash generation ability and it enjoys strong long-term investment grade credit ratings. Therefore it typically does not enter into leasing arrangements for financing considerations. The main areas of leases that the Group has entered into are for:

- Property – offices and apartments. These are a small number of leases, but represent most of the value.
- Cars – mostly for sales representatives.
- Office equipment – photocopiers and similar.

The right-of-use assets reported for the Group's leases are shown in the table below.

Right-of-use assets: movements in carrying value of assets in millions of CHF

	Land	Buildings and land improvements	Machinery and equipment	Total
Year ended 31 December 2019				
At 1 January 2019	–	–	–	–
Cumulative catch-up for previously reported operating leases on implementation of IFRS 16	45	928	186	1,159
Reclassification from property, plant and equipment of previously reported finance leases on implementation of IFRS 16 [8]	–	–	3	3
At 1 January 2019 (revised)	**45**	**928**	**189**	**1,162**
Business combinations [6]	0	65	0	65
Additions	5	292	111	408
Disposals	0	(43)	(22)	(65)
Depreciation charge	(3)	(255)	(93)	(351)
Impairment reversal	0	12	0	12
Other	0	(56)	(14)	(70)
Currency translation effects	(1)	(13)	(2)	(16)
At 31 December 2019	**46**	**930**	**169**	**1,145**
Cost	49	1,168	252	1,469
Accumulated depreciation and impairment	(3)	(238)	(83)	(324)
Net book value	**46**	**930**	**169**	**1,145**

In 2019 there were no impairment charges recorded for right-of-use assets. An income of CHF 12 million was recognised within general and administration which related to an impairment reversal of right-of-use assets from a lease arrangement assessed to be an onerous contract in 2018.

Liabilities reported for the Group's leases are shown in the table below.

Leases: movements in carrying value of recognised liabilities in millions of CHF

	2019
At 1 January	–
Cumulative catch-up for previously reported operating leases on implementation of IFRS 16	1,190
Reclassification from debt of previously reported finance lease obligations on implementation of IFRS 16 [21]	4
At 1 January (revised)	**1,194**
Increase from new lease arrangements	399
Repayment of lease liabilities	(388)
Business combinations	86
Disposals	(71)
Interest expense on lease liabilities [4]	18
Other	(1)
Currency translation effects	(18)
At 31 December	**1,219**
Non-current lease liabilities [18]	879
Current lease liabilities [19]	340
Total lease liabilities	**1,219**

The maturity analysis of lease liabilities is given in Note 31 in the 'Liquidity risk' section.

Short-term leases and leases of low-value assets are accounted for using the recognition exemption permitted by IFRS 16. Expenses for short-term leases are recognised on a straight-line basis. These mainly include short-term property leases for employee apartments. The amount reported in 2019 was CHF 55 million. Expenses for leases of low-value assets are recognised on a straight-line basis. These mainly include certain office equipment. The amount reported in 2019 was CHF 22 million.

Expenses for variable lease payments not included in the measurement of lease liabilities was CHF 45 million in 2019. Income from subleasing right-of-use assets was CHF 10 million in 2019. The Group did not enter into any sale and leaseback transactions.

The major cash flows in respect of leases where the Group is the lessee are shown in the table below.

Leases: cash flows in millions of CHF

	2019
Included in cash flows from operating activities	(122)
Included in cash flows from financing activities	(390)
Total lease payments	**(512)**

Cash flows from operating activities include cash flows from short-term lease, leases of low-value assets and variable lease payments. Cash flows from financing activities include the payment of interest and the principal portion of lease liabilities as well as prepayments made before the lease commencement date.

Leases committed and not yet commenced. In May 2019 Flatiron Health, Inc. entered into a binding lease agreement with a third party for the lease of additional office space in New York City, US. According to the agreement the leased space will be made available at different points in time between 2020 and 2024 with a lease term until February 2031. The initial right-of-use asset and lease liability related to this agreement are estimated to be approximately USD 103 million based on current assumptions.

In July 2019 Foundation Medicine, Inc. ('FMI') entered into a binding lease agreement with a third party for the lease of laboratory and office space in a building in Boston, US, which is to be constructed by the landlord at the location currently known as 'Boston Seaport'. According to the agreement FMI is committed to lease the building for 15 years. The commencement date of the lease is currently expected to be in 2022. The initial right-of-use asset and lease liability related to this agreement are estimated to be approximately USD 627 million based on current assumptions.

The Group as a lessor

In the Diagnostics Division the Group enters into certain contracts which include placement of diagnostics instruments, supply of reagents and other consumables, and servicing arrangements. Depending upon the term of the agreement, the instrument placement may result in either a finance lease or an operating lease. The Group performs a thorough customer assessment before new leasing agreements are signed. Usually the Group also retains rights to terminate or modify contracts if certain conditions are not met.

Finance leases. Certain assets, mainly diagnostics instruments, are leased to third parties through finance lease arrangements. Such assets are reported as receivables at an amount equal to the net investment in the lease. Income from finance leases is recognised as revenue at amounts that represent the fair value of the instrument, which approximates the present value of the minimum lease payments under the arrangement. Finance income for finance lease arrangements longer than twelve months is deferred and subsequently recognised based on a pattern that approximates the use of the effective interest method and recorded in royalty and other operating income.

The following amounts were recorded as income in respect of finance leases.

Finance leases: selected items of income in millions of CHF

	2019	2018
Selling profit as the difference between sales and cost of sales	3	8
Finance income on the net investment in the lease	6	6

Currently the Group does not have any income from the variable lease payments of finance leases. The carrying amount of the net investment in finance leases reported as receivables was CHF 146 million (2018: CHF 136 million).

Finance leases: future minimum lease receipts under non-cancellable leases in millions of CHF

	Gross investment in lease		Present value of minimum lease receipts	
	2019	2018	2019	2018
Within one year	71	45	64	38
Between one and two years	45	62	42	58
Between two and three years	19	22	17	20
Between three and four years	13	11	12	11
Between four and five years	7	6	6	6
More than five years	4	3	4	3
Total	**159**	**149**	**145**	**136**
Unearned finance income	(13)	(13)	n/a	n/a
Unguaranteed residual value	n/a	n/a	1	0
Net investment in lease	**146**	**136**	**146**	**136**

Operating leases. Certain assets, mainly diagnostics instruments, are leased to third parties through operating lease arrangements. Income from operating leases is recognised as revenue on a straight-line basis over the lease term or, when lease revenue is entirely based on variable lease payments and subject to subsequent reagent sales, as the performance obligation for reagents are satisfied.

Lease income in 2019 was CHF 782 million (2018: CHF 790 million) and included in sales. Of this CHF 583 million (2018: CHF 581 million) relates to variable lease payments not depending upon an index or rate.

Leased assets are reported within property, plant and equipment, as shown in the table below.

Machinery and equipment subject to operating leases: movements in carrying value of assets in millions of CHF

	Leased out	Own use	2019 Total
At 1 January			
Cost	5,161	15,276	20,437
Accumulated depreciation and impairment	(3,463)	(9,840)	(13,303)
Net book value	**1,698**	**5,436**	**7,134**
Year ended 31 December			
At 1 January	1,698	5,436	7,134
Reclassification to right-of-use assets on implementation of IFRS 16 'Leases' [8]	0	(3)	(3)
At 1 January (revised)	**1,698**	**5,433**	**7,131**
Business combinations	0	18	18
Additions	836	243	1,079
Disposals	(47)	(40)	(87)
Transfers	0	1,031	1,031
Depreciation charge	(673)	(972)	(1,645)
Impairment charge	(1)	(23)	(24)
Other	1	(63)	(62)
Currency translation effects	(53)	(88)	(141)
At 31 December	**1,761**	**5,539**	**7,300**
Cost	5,458	15,731	21,189
Accumulated depreciation and impairment	(3,697)	(10,192)	(13,889)
Net book value	**1,761**	**5,539**	**7,300**

The undiscounted amounts expected to be received from non-cancellable operating leases are shown in the table below.

Operating leases: future minimum lease receipts under non-cancellable leases in millions of CHF

	2019	2018
Within one year	173	127
Between one and two years	116	151
Between two and three years	82	43
Between three and four years	50	30
Between four and five years	25	15
More than five years	14	11
Total minimum receipts	**460**	**377**

29. Earnings per share and non-voting equity security

Basic earnings per share and non-voting equity security

	2019	2018
Net income attributable to Roche shareholders (CHF millions)	**13,497**	**10,500**
Number of shares (millions) [22]	160	160
Number of non-voting equity securities (millions) [22]	703	703
Weighted average number of own shares and non-voting equity securities held (millions)	(7)	(9)
Weighted average number of shares and non-voting equity securities in issue used to calculate basic earnings per share (millions)	**856**	**854**
Basic earnings per share and non-voting equity security (CHF)	**15.77**	**12.29**

Diluted earnings per share and non-voting equity security

	2019	2018
Net income attributable to Roche shareholders (CHF millions)	13,497	10,500
Increase in non-controlling interests' share of Group net income, assuming all outstanding Chugai stock options exercised (CHF millions)	(2)	(1)
Net income used to calculate diluted earnings per share (CHF millions)	**13,495**	**10,499**
Weighted average number of shares and non-voting equity securities in issue (millions)	856	854
Adjustment for assumed exercise of equity compensation plans, where dilutive (millions)	8	6
Weighted average number of shares and non-voting equity securities in issue used to calculate diluted earnings per share (millions)	**864**	**860**
Diluted earnings per share and non-voting equity security (CHF)	**15.62**	**12.21**

30. Statement of cash flows

Cash flows from operating activities

Cash flows from operating activities arise from the Group's primary activities in the Pharmaceuticals and Diagnostics Divisions. These are calculated using the indirect method by adjusting the Group's operating profit for any operating income and expenses that are not cash flows (for example depreciation, amortisation and impairment) in order to derive the cash generated from operations. This and other operating cash flows are shown in the statement of cash flows. Operating cash flows also include income taxes paid on all activities.

Cash generated from operations in millions of CHF

	2019	2018
Net income	14,108	10,865
Add back non-operating (income) expense		
– Financing costs [4]	993	770
– Other financial (income) expense [4]	(59)	(149)
– Income taxes [5]	2,506	3,283
Operating profit	**17,548**	**14,769**
Depreciation of property, plant and equipment [8]	2,409	2,292
Depreciation of right-of-use assets [28]	351	–
Amortisation of intangible assets [10]	1,532	1,294
Impairment of goodwill [9]	779	2,254
Impairment of intangible assets [10]	977	1,082
Impairment (reversal) of property, plant and equipment [8]	261	141
Impairment (reversal) of right-of-use assets [28]	(12)	–
Operating (income) expense for defined benefit plans [26]	598	518
Operating expense for equity-settled equity compensation plans [27]	597	508
Net (income) expense for provisions [20]	1,685	1,104
Bad debt (reversal) expense	33	47
Inventory write-downs	558	751
Net (gain) loss on disposal of products	(490)	(335)
Other adjustments	(33)	(1)
Cash generated from operations	**26,793**	**24,424**

As disclosed in Note 28 and in Note 34, the Group has changed its accounting policies for leases following the implementation of IFRS 16 'Leases', effective 1 January 2019. The Group has applied the cumulative catch-up method for the transition, meaning that the comparative statement of cash flows for the year ended 31 December 2018 has not been restated. The main impact of the new standard on the statement of cash flows is that cash flows in respect of leases where the Group is the lessee, which were previously reported as operating leases, are reported as part of cash flows from financing activities from 1 January 2019. Previously these were included within cash flows from operating activities.

Cash flows from investing activities

Cash flows from investing activities are principally those arising from the Group's investments in property, plant and equipment and intangible assets, and from the acquisition and divestment of subsidiaries, associates and businesses. Cash flows connected with the Group's portfolio of marketable securities and other investments are also included, as are any interest and dividend payments received in respect of these securities and investments. These cash flows indicate the Group's net reinvestment in its operating assets and the cash flow effects of business combinations and divestments, as well as the cash generated by the Group's other investments.

Interest and dividends received in millions of CHF

	2019	2018
Interest received	68	23
Dividends received	1	1
Total	**69**	**24**

Cash flows from financing activities

Cash flows from financing activities are primarily the proceeds from the issue and repayment of the Group's equity and debt instruments. They also include interest payments and dividend payments on these instruments. Cash flows from short-term financing are also included. These cash flows indicate the Group's transactions with the providers of its equity and debt financing. Cash flows from lease payments are also included within financing activities. Following the implementation of IFRS 16 'Leases' (see above), cash flows in respect of leases where the Group is the lessee, which were previously reported as operating leases, are reported as part of cash flows from financing activities, effective 1 January 2019. Cash flows from short-term borrowings are shown as a net movement, as these consist of a large number of transactions with short maturity.

Dividends paid in millions of CHF

	2019	2018
Dividends to Roche Group shareholders	(7,449)	(7,094)
Dividends to non-controlling shareholders		
– Chugai	(199)	(120)
– Other non-controlling interests	(14)	(16)
Dividend withholding tax	(20)	(23)
Total	**(7,682)**	**(7,253)**

Liabilities arising from financing activities

Movements in carrying value of recognised assets (liabilities) in millions of CHF

	Debt [21]	Interest payable [19]	Principal portion of lease liabilities	Derivative financial instruments, net [16, 19, 31]	Cash collateral receivables (payables), net [16, 19, 31]	Total
Year ended 31 December 2018						
At 1 January 2018	(18,960)	(218)	–	(22)	39	(19,161)
Cash flows						
– Outflow (inflow)	122	593	–	21	(33)	703
Non-cash changes						
– Financing costs	(11)	(594)	–	0	0	(605)
– Business combinations	0	0	–	0	0	0
– Fair value and other	2	(2)	–	(14)	0	(14)
– Foreign exchange rates	77	0	–	0	0	77
At 31 December 2018	**(18,770)**	**(221)**	**–**	**(15)**	**6**	**(19,000)**
Year ended 31 December 2019						
At 1 January 2019	(18,770)	(221)	–	(15)	6	(19,000)
Implementation of IFRS 16 'Leases' [28]	4	–	(1,194)	–	–	(1,190)
At 1 January 2019 (revised)	**(18,766)**	**(221)**	**(1,194)**	**(15)**	**6**	**(20,190)**
Cash flows						
– Outflow (inflow)	4,403	624	372	(13)	150	5,536
Non-cash changes						
– Financing costs	(211)	(590)	(18)	0	0	(819)
– Business combinations	(1)	0	(86)	0	0	(87)
– Fair value and other	(23)	9	(310)	(61)	(1)	(386)
– Foreign exchange rates	235	2	17	1	(7)	248
At 31 December 2019	**(14,363)**	**(176)**	**(1,219)**	**(88)**	**148**	**(15,698)**

Significant non-cash transactions

In 2019 there were no significant non-cash transactions (2018: none) except for the leasing transactions where the Group is a lessee (see Note 28).

31. Risk management

Group risk management

Risk management is a fundamental element of the Group's business practice on all levels and encompasses different types of risks. At Group level, risk management is an integral part of the long-term forecasting and controlling processes. Material risks are monitored and regularly discussed with the Corporate Executive Committee and the Audit Committee of the Board of Directors.

Financial risk management

The Group is exposed to various financial risks arising from its underlying operations and corporate finance activities. The Group's financial risk exposures are predominantly related to changes in foreign exchange rates, interest rates and equity prices as well as the creditworthiness and the solvency of the Group's counterparties.

Financial risk management within the Group is governed by policies reviewed by the boards of directors of Roche and Chugai as appropriate to their areas of statutory responsibility. These policies cover credit risk, liquidity risk and market risk. The policies provide guidance on risk limits, types of authorised financial instruments and monitoring procedures. As a general principle, the policies prohibit the use of derivative financial instruments for speculative trading purposes. Policy implementation and day-to-day risk management are carried out by the relevant treasury functions and regular reporting on these risks is performed by the relevant accounting and controlling functions within Roche and Chugai.

Credit risk

Credit risk arises from the possibility that counterparties to transactions may default on their obligations, causing financial losses for the Group. The objective of managing counterparty credit risk is to prevent losses of liquid funds deposited with or invested in such counterparties. The maximum exposure to credit risk resulting from financial activities, without considering netting agreements and without taking account of any collateral held or other credit enhancements, is equal to the carrying value of the Group's financial assets.

The Group considers a financial asset to be in default when the counterparty is unlikely to pay its obligations to the Group in full. In assessing whether a counterparty is in default, the Group considers both qualitative and quantitative indicators (e.g. overdue status) that are based on data developed internally and for certain financial assets are also obtained from external sources. A major part of the Group's receivables which are past due more than 90 days relate to public customers. Risk of default of public customers is considered low. The Group has reasonable and supportable information to demonstrate that a more lagging default criterion is more appropriate for this particular customer segment.

Accounts receivable. At 31 December 2019 the Group has trade receivables of CHF 11.3 billion (2018: CHF 10.7 billion). These are subject to a policy of active credit risk management which focuses on the assessment of country risk, credit availability, ongoing credit evaluation and account monitoring procedures. The objective of trade receivables management is to maximise the collection of unpaid amounts.

The Group uses an allowance matrix to estimate the allowance for doubtful accounts for all trade receivables. The expected credit loss ('ECL') rate is based on the Group's historical experience and the Group's expectation of economic conditions over the period until receivables are expected to be paid.

Customer credit risk exposure based on accounts receivable days overdue (IFRS 9) in millions of CHF

	Total	Current	Overdue 1–3 months	Overdue 3–12 months	Overdue more than 1 year	Credit impaired
At 31 December 2019						
Gross carrying amount	10,972	8,739	1,084	490	612	47
Group's expected credit loss rate	5%	0%	1%	6%	68%	100%
Allowance for doubtful accounts	(532)	(29)	(13)	(27)	(416)	(47)
At 31 December 2018						
Gross carrying amount	10,316	8,374	950	429	510	53
Group's expected credit loss rate	5%	0%	2%	8%	80%	100%
Allowance for doubtful accounts	(540)	(23)	(19)	(19)	(409)	(53)

At 31 December 2019 the Group's combined trade receivables balance with three US national wholesale distributors, McKesson Corp., AmerisourceBergen Corp. and Cardinal Health, Inc., was equivalent to CHF 2.9 billion representing 26% of the Group's consolidated trade receivables (2018: CHF 2.7 billion representing 25%). There is no other significant concentration of counterparty credit risk due to the Group's large number of customers and their wide geographical spread. Risk limits and exposures are continuously monitored by country and by the nature of counterparties. The Group obtains credit insurance and similar enhancements when appropriate to protect the collection of trade receivables. At 31 December 2019 no collateral was considered to measure expected credit losses for trade receivables (2018: none).

Since 2010 there have been financial difficulties in Southern European countries, notably Spain, Italy, Greece and Portugal. The Group is a leading supplier to the healthcare sectors in these countries and has trade receivables of CHF 0.8 billion (2018: CHF 0.8 billion) with the public and private customers in these countries. The Group uses different measures to improve collections in these countries, including intense communication with customers, factoring, negotiations of payment plans, charging of interest for late payments, and legal actions.

The nature and geographic location of counterparties to accounts receivable that are not overdue or impaired are shown in the table below. These include the balances with US national wholesalers and Southern Europe public customers described above.

Accounts receivable (not overdue), net of allowances for doubtful accounts and other allowances: nature and geographical location of counterparties in millions of CHF

	2019				2018			
Regions	Total	Public	Wholesalers/ distributors	Private	Total	Public	Wholesalers/ distributors	Private
Switzerland	139	22	78	39	47	19	8	20
Europe	1,560	668	379	513	1,445	646	355	444
North America	3,413	91	3,313	9	3,255	74	3,161	20
Latin America	584	173	226	185	591	144	278	169
Japan	1,100	1	1,076	23	1,285	5	1,263	17
Asia, Australia and Oceania	1,474	200	1,029	245	1,129	144	766	219
Rest of the World	440	5	229	206	599	10	427	162
Total	**8,710**	**1,160**	**6,330**	**1,220**	**8,351**	**1,042**	**6,258**	**1,051**

Cash and marketable securities (excluding equity securities). At 31 December 2019 the Group has cash and marketable securities (excluding equity securities) of CHF 11.8 billion (2018: CHF 13.1 billion). These are subject to a policy of restricting exposures to high-quality counterparties and setting defined limits for individual counterparties. These limits and counterparty credit ratings are reviewed regularly.

Cash and cash equivalents are held with banks and financial institutions, which are predominantly rated as investment grade (96% and 97% in 2019 and 2018, respectively), based on Moody's and Standard & Poor's ratings. Cash and short-term time deposits are subject to rules which limit the Group's exposure to individual financial institutions.

Impairment on cash and cash equivalents is measured on a 12-month expected credit losses ('ECL') basis with a reference to external credit ratings of the counterparties, and reflect the short maturities of the exposures. The Group considers that its cash and cash equivalents have low credit risk based on these external credit ratings.

Investments in marketable securities (excluding equity securities) are entered into on the basis of guidelines with regard to liquidity, quality and maximum amount. As a general rule, the Group invests only in high-quality securities with adequate liquidity and with counterparties that have a credit rating of at least Baa3 from Moody's and BBB- from Standard & Poor's.

The credit risk of the counterparties with external ratings below investment grade or non-rated is closely monitored and reviewed on an individual basis.

Rating analysis of cash and marketable securities (excluding equity securities) – market values in millions of CHF

	2019			2018		
	Total	Fair value through OCI (12-month ECL)	Amortised costs (12-month ECL)	Total	Fair value through OCI (12-month ECL)	Amortised costs (12-month ECL)
AAA range	581	382	199	1,637	1,439	198
AA range	1,489	95	1,394	1,822	283	1,539
A range	8,976	1,673	7,303	8,687	2,042	6,645
BBB range	535	141	394	764	481	283
Total investment grade	**11,581**	**2,291**	**9,290**	**12,910**	**4,245**	**8,665**
Below BBB range (below investment grade)	97	7	90	93	0	93
Unrated	167	0	167	106	0	106
Total gross carrying amounts	**11,845**	**2,298**	**9,547**	**13,109**	**4,245**	**8,864**
Loss allowance [1]	**1**	**0**	**1**	**1**	**0**	**1**

1) The loss allowance related to fair value through OCI does not affect the carrying amount of marketable securities (excluding equity securities) but is booked against corresponding OCI reserve instead.

Debt securities at amortised cost and those at fair value through OCI are investment grade and therefore considered to be low risk, and thus the impairment allowance is determined at 12-month expected credit losses ('ECL') with a reference to external credit ratings of the counterparties. There were no debt securities for which the Group observed a significant increase in the credit risk which would require the application of the lifetime expected credit losses impairment model. In addition, there were no material movements in the loss allowance in 2019 and 2018, respectively.

Master netting agreements. The Group enters into derivative transactions and collateral agreements under International Swaps and Derivatives Association (ISDA) master netting agreements with the respective counterparties in order to mitigate counterparty risk. Under such agreements the amounts owed by each counterparty on a single day in respect of all transactions outstanding in the same currency are aggregated into a single net amount that is payable by one party to the other. The ISDA agreements do not meet the criteria for offsetting in the balance sheet as the Group does not have a currently enforceable right to offset recognised amounts, because the right to offset is only enforceable on the occurrence of future events, such as a default or other credit events.

Contract terms. At 31 December 2019 there are no significant financial assets whose terms have been renegotiated (2018: none).

Impairment losses on financial assets excluding equity investments/securities. During 2019 there were no impairment losses (2018: impairment losses of CHF 1 million).

Liquidity risk

Liquidity risk arises through a surplus of financial obligations over available financial assets due at any point in time. The Group's approach to liquidity risk is to maintain sufficient readily available reserves in order to meet its liquidity requirements at any point in time. Roche and Chugai enjoy strong credit quality and are rated by at least one major credit rating agency. The ratings will permit efficient access to the international capital markets in the event of major financing requirements. At 31 December 2019 the Group has an unused committed credit line with various financial institutions totalling CHF 7.6 billion (2018: CHF 7.7 billion), of which CHF 7.3 billion (2018: CHF 7.4 billion) serve as a back-stop line for the commercial paper program. On 3 July 2019 the previously existing committed credit lines were refinanced by one new committed credit line with an initial maturity of five years.

The remaining undiscounted cash flow contractual maturities of financial liabilities, including estimated interest payments, are shown in the table below.

Contractual maturities of financial liabilities in millions of CHF

	Carrying value	Total	Less than 1 year	1–2 years	2–5 years	Over 5 years
At 31 December 2019						
Debt [21]						
– Bonds and notes	12,666	16,228	371	2,234	4,389	9,234
– Other debt	1,697	1,697	1,695	2	0	0
Contingent consideration [20]	205	231	18	31	157	25
Accounts payable [17]	3,822	3,822	3,822	–	–	–
Other non-current liabilities [18]	1,144	1,209	0	496	406	307
– of which lease liabilities	*879*	*944*	*–*	*268*	*388*	*288*
Other current liabilities [19]	11,879	11,911	11,792	119	0	0
– of which lease liabilities	*340*	*372*	*372*	*–*	*–*	*–*
– of which derivative financial instruments	*266*	*266*	*147*	*119*	*0*	*0*
Total financial liabilities	**31,413**	**35,098**	**17,698**	**2,882**	**4,952**	**9,566**
At 31 December 2018						
Debt [21]						
– Bonds and notes	18,041	22,689	2,469	1,068	6,402	12,750
– Other debt	729	729	726	1	2	0
Contingent consideration [20]	511	564	183	23	262	96
Accounts payable [17]	3,526	3,526	3,526	–	–	–
Other non-current liabilities [18]	188	188	–	125	25	38
Other current liabilities [19]	10,677	10,677	10,588	11	78	0
– of which derivative financial instruments	*153*	*153*	*64*	*11*	*78*	*0*
Total financial liabilities	**33,672**	**38,373**	**17,492**	**1,228**	**6,769**	**12,884**

Take-or-pay commitments. The Group has entered into contract manufacturing agreements with various companies to further develop manufacturing capacity and flexibility, mainly in the Pharmaceuticals Division. There are future minimum take-or-pay commitments within some of these agreements with a total potential commitment from the Group of CHF 1.4 billion at 31 December 2019 (2018: CHF 1.4 billion).

Market risk

Market risk arises from changing market prices, mainly foreign exchange rates and interest rates, of the Group's financial assets or financial liabilities which affect the Group's financial result and equity.

Value-at-Risk. The Group uses Value-at-Risk (VaR) to measure the impact of market risk on its financial instruments. VaR indicates the value range within which a given financial instrument will fluctuate with a pre-set probability as a result of movements in market prices. VaR is calculated using a historical simulation approach and for each scenario, all financial instruments are fully valued and the total change in value and earnings is determined. VaR calculations are based on a 95% confidence level and a holding period of 20 trading days over the past ten years. This holding period reflects the time required to change the corresponding risk exposure, should this be deemed appropriate.

Actual future gains and losses associated with our treasury activities may differ materially from the VaR analyses due to the inherent limitations associated with predicting the timing and amount of changes to interest rates, foreign exchange rates and equity investment prices, particularly in periods of high market volatilities. Furthermore, VaR does not include the effect of changes in credit spreads.

Market risk of financial instruments in millions of CHF

	2019	2018
VaR – Interest rate component	158	312
VaR – Foreign exchange component	44	17
VaR – Other price component	34	32
Diversification	(72)	(40)
VaR – Total market risk	**164**	**321**

The interest rate component decreased due to the repayment and early redemption of long-term debt in the second half of 2019 as well as due to the reduction in the underlying interest rates across major currencies. The foreign exchange component increased due to an unfavourable exposure mix. The other price component remained stable.

Foreign exchange risk

The Group uses the Swiss franc as its reporting currency and as a result is exposed to movements in foreign currencies, mainly the US dollar, Japanese yen and euro. The Group's foreign exchange risk management strategy is to preserve the economic value of its current and future assets and to minimise the volatility of the Group's financial result. The primary focus of the Group's foreign exchange risk management activities is on hedging transaction exposures arising through foreign currency flows or monetary positions held in foreign currencies. The Group uses forward contracts, foreign exchange options and cross-currency swaps to hedge transaction exposures. Application of these instruments intends to continuously immunise against unfavourable developments of foreign exchange rates.

Interest rate risk

The Group mainly raises debt on a fixed rate basis for bonds and notes. The Group is exposed to movements in interest rates, mainly for its US dollar, Swiss franc and euro floating rate financial instruments and short-term debt. The Group's interest rate risk management strategy is to optimise the net interest result. The Group may use forward contracts, options and interest rate swaps to hedge its interest rate exposures. Depending on the interest rate environment of major currencies, the Group will use these instruments to generate an appropriate mix of fixed and floating rate exposures.

Other price risk

Other price risk arises mainly from movements in the prices of equity securities. The Group manages the price risk through placing limits on individual and total equity investments. These limits are defined both as a percentage of total liquid funds and as an absolute number for individual equity investments.

Capital management

The Group defines the capital that it manages as the Group's total capitalisation, being the sum of debt plus equity, including non-controlling interests. The Group's objectives when managing capital are:

- To safeguard the Group's ability to continue as a going concern, so that it can continue to provide benefits for patients and returns to investors.
- To provide an adequate return to investors based on the level of risk undertaken.
- To have available the necessary financial resources to allow the Group to invest in areas that may deliver future benefits for patients and returns to investors.
- To maintain sufficient financial resources to mitigate against risks and unforeseen events.

The capitalisation is reported to senior management as part of the Group's regular internal management reporting and is shown in the table below.

Capital in millions of CHF

	2019	2018	2017
Capital and reserves attributable to Roche shareholders [22]	32,747	27,622	26,441
Equity attributable to non-controlling interests [24]	3,120	2,744	2,566
Total equity	**35,867**	**30,366**	**29,007**
Total debt [21]	**14,363**	**18,770**	**18,960**
Capitalisation	**50,230**	**49,136**	**47,967**

The Group's net equity was significantly impacted by the 2009 Genentech transaction (see Note 22).

The Group is not subject to regulatory capital adequacy requirements as known in the financial services industry. The Group has a majority shareholding in Chugai (see Note 23). Chugai is a public company and its objectives, policies and processes for managing its own capital are determined by Chugai management.

Financial instrument accounting classifications and fair values

The fair values of financial assets and liabilities, together with the carrying value shown in the consolidated balance sheet, are as follows:

Carrying value and fair value of financial instruments – 2019 in millions of CHF

	Financial instruments mandatorily at fair value through profit or loss	Financial instruments at fair value through OCI	Fair value – hedging instruments	Financial assets at amortised cost	Other financial liabilities	Total carrying value	Fair value
At 31 December 2019							
Other non-current assets [15]							
– Equity investments	696	41	–	–	–	737	737
– Other financial non-current assets	–	–	–	130	–	130	130
Accounts receivable [12]	–	–	–	10,440	–	10,440	10,440
Marketable securities [13]							
– Equity securities	13	–	–	–	–	13	13
– Debt securities	–	807	–	–	–	807	807
– Money market instruments	–	1,491	–	–	–	1,491	1,491
– Time accounts over three months	–	–	–	3,472	–	3,472	3,472
Cash and cash equivalents [14]	–	–	–	6,075	–	6,075	6,075
Other current assets [16]							
– Derivative financial instruments	–	–	178	–	–	178	178
– Other financial current assets	–	–	–	943	–	943	943
Total financial assets	**709**	**2,339**	**178**	**21,060**	**–**	**24,286**	**24,286**
Debt [21]							
– Bonds and notes	–	–	–	–	(12,666)	(12,666)	(13,593)
– Other debt	–	–	–	–	(1,697)	(1,697)	(1,697)
Contingent consideration [20]	(205)	–	–	–	–	(205)	(205)
Accounts payable [17]	–	–	–	–	(3,822)	(3,822)	(3,822)
Other non-current liabilities [18]	–	–	–	–	(1,144)	(1,144)	(1,144)
Other current liabilities [19]	–	–	(266)	–	(11,613)	(11,879)	(11,879)
Total financial liabilities	**(205)**	**–**	**(266)**	**–**	**(30,942)**	**(31,413)**	**(32,700)**

Carrying value and fair value of financial instruments – 2018 in millions of CHF

	Financial instruments mandatorily at fair value through profit or loss	Financial instruments at fair value through OCI	Fair value – hedging instruments	Financial assets at amortised cost	Other financial liabilities	Total carrying value	Fair value
At 31 December 2018							
Other non-current assets [15]							
– Equity investments	458	102	–	–	–	560	560
– Other financial non-current assets	–	–	–	134	–	134	134
Accounts receivable [12]	–	–	–	9,776	–	9,776	9,776
Marketable securities [13]							
– Equity securities	9	–	–	–	–	9	9
– Debt securities	–	1,047	–	–	–	1,047	1,047
– Money market instruments	–	3,198	–	–	–	3,198	3,198
– Time accounts over three months	–	–	–	2,183	–	2,183	2,183
Cash and cash equivalents [14]	–	–	–	6,681	–	6,681	6,681
Other current assets [16]							
– Derivative financial instruments	–	–	138	–	–	138	138
– Other financial current assets	–	–	–	941	–	941	941
Total financial assets	**467**	**4,347**	**138**	**19,715**	**–**	**24,667**	**24,667**
Debt [21]							
– Bonds and notes	–	–	–	–	(18,041)	(18,041)	(18,721)
– Other debt	–	–	–	–	(729)	(729)	(729)
Contingent consideration [20]	(511)	–	–	–	–	(511)	(511)
Accounts payable [17]	–	–	–	–	(3,526)	(3,526)	(3,526)
Other non-current liabilities [18]	–	–	–	–	(188)	(188)	(188)
Other current liabilities [19]	–	–	(153)	–	(10,524)	(10,677)	(10,677)
Total financial liabilities	**(511)**	**–**	**(153)**	**–**	**(33,008)**	**(33,672)**	**(34,352)**

The fair value of bonds and notes is Level 1 and is calculated based on the observable market prices of the debt instruments or the present value of the future cash flows on the instrument, discounted at a market rate of interest for instruments with similar credit status, cash flows and maturity periods.

Fair value hierarchy

The table below analyses financial instruments carried at fair value, by valuation method. The different levels have been defined as follows:
- Level 1 – quoted prices (unadjusted) in active markets for identical assets and liabilities.
- Level 2 – observable inputs other than quoted prices in active markets for identical assets and liabilities.
- Level 3 – unobservable inputs.

Fair value hierarchy of financial instruments in millions of CHF

	Level 1	Level 2	Level 3	Total
At 31 December 2019				
Marketable securities [13]				
– Equity securities at fair value through profit or loss	13	–	–	13
– Debt securities at fair value through OCI	729	78	–	807
– Money market instruments at fair value through OCI	–	1,491	–	1,491
Derivative financial instruments [16]	–	178	–	178
Equity investments at fair value through OCI [15]	–	41	–	41
Equity investments at fair value through profit or loss [15]	465	231	–	696
Financial assets recognised at fair value	**1,207**	**2,019**	**–**	**3,226**
Derivative financial instruments [19]	–	(266)	–	(266)
Contingent consideration [20]	–	–	(205)	(205)
Financial liabilities recognised at fair value	**–**	**(266)**	**(205)**	**(471)**
At 31 December 2018				
Marketable securities [13]				
– Equity securities at fair value through profit or loss	9	–	–	9
– Debt securities at fair value through OCI	976	71	–	1,047
– Money market instruments at fair value through OCI	–	3,198	–	3,198
Derivative financial instruments [16]	–	138	–	138
Equity investments at fair value through OCI [15]	–	102	–	102
Equity investments at fair value through profit or loss [15]	248	210	–	458
Financial assets recognised at fair value	**1,233**	**3,719**	**–**	**4,952**
Derivative financial instruments [19]	–	(153)	–	(153)
Contingent consideration [20]	–	–	(511)	(511)
Financial liabilities recognised at fair value	**–**	**(153)**	**(511)**	**(664)**

Level 1 financial assets consist of treasury bills, bonds and quoted shares. Level 2 financial assets consist primarily of commercial paper, certificates of deposit and derivative financial instruments.

The Group determines Level 2 fair values using the following valuation techniques:
- Marketable securities and derivative financial instruments are based on valuation models that use observable market data for interest rates, yield curves, foreign exchange rates and implied volatilities for similar instruments at the measurement date.
- Equity investments at fair value through OCI and at fair value through profit or loss are based on a valuation model that uses the most recently published observable market data.

The Group recognises transfers between levels of the fair value hierarchy as of the end of the reporting period during which the transfer has occurred. There were no significant transfers between Level 1 and Level 2 and vice versa during the year (2018: none).

Level 3 fair values

Details of the determination of Level 3 fair value measurements are set out below.

Contingent consideration arrangements in millions of CHF

	2019	2018
At 1 January	(511)	(591)
Arising from business combinations	0	0
Utilised for settlements [6]	172	14
Total gains and losses included in the income statement		
– Unused amounts reversed – recorded within general and administration	152	130
– Additional amount created – recorded within general and administration	(6)	(51)
– Discount unwind included in financing costs	(14)	(15)
Total gains and losses included in other comprehensive income		
– Currency translation effects	2	2
At 31 December	**(205)**	**(511)**

During 2019 contingent consideration provisions decreased mainly due to the reversal of some of the provisions and to the payment of milestones. Payments of CHF 172 million were made during 2019 for milestones related to the Dutalys, Santaris, Ariosa, GeneWeave, Genia and other acquisitions. There was CHF 146 million of income, net, mainly from the reversal of the provisions related to the Santaris, Ariosa and GeneWeave acquisitions.

Contingent consideration arrangements

The Group is party to certain contingent consideration arrangements arising from business combinations. The fair values are determined considering the expected payments, discounted to present value using a risk-adjusted average discount rate of 3.0% (2018: 3.6%). The expected payments are determined by considering the possible scenarios of forecast sales and other performance criteria, the amount to be paid under each scenario, and the probability of each scenario. The significant unobservable inputs are the forecast sales, other performance criteria and the risk-adjusted discount rate. The estimated fair value would increase if the forecast sales or other performance criteria rates were higher or the risk-adjusted discount rate was lower. At 31 December 2019 the total potential payments under contingent consideration arrangements could be up to CHF 0.5 billion (2018: CHF 1.0 billion) as follows:

Potential payments under contingent consideration arrangements in millions of CHF

Acquisition	Year acquired	Operating segment	2019	2018
Dutalys	2014	Roche Pharmaceuticals	223	246
Santaris	2014	Roche Pharmaceuticals	142	156
GeneWeave	2015	Diagnostics	0	167
Genia	2014	Diagnostics	157	165
Ariosa	2015	Diagnostics	0	148
Others	Various	Diagnostics	10	127
At 31 December			**532**	**1,009**

Derivative financial instruments

The Group has entered into various currency swaps for certain non-US dollar debt instruments. Cash collateral agreements were entered into with the counterparties to the currency swaps to mitigate counterparty risk. The following table sets out the carrying value of derivative financial instruments and the amounts that are subject to master netting agreements.

Derivative financial instruments in millions of CHF

	Assets			Liabilities		
	2019	2018	2017	2019	2018	2017
Foreign currency derivatives						
– Forward exchange contracts	170	131	92	(147)	(64)	(92)
– Cross-currency swaps	0	0	0	(119)	(67)	(9)
– Other	0	0	0	0	0	0
Interest rate derivatives						
– Swaps	8	7	5	0	(22)	(18)
– Other	0	0	0	0	0	0
Other derivatives	0	0	0	0	0	0
Carrying value of derivative financial instruments [16, 19]	**178**	**138**	**97**	**(266)**	**(153)**	**(119)**
Derivatives subject to master netting agreements	(64)	(63)	(70)	64	63	70
Collateral arrangements	16	(33)	25	132	39	14
Net amount	**130**	**42**	**52**	**(70)**	**(51)**	**(35)**

Collateral arrangements

Movements in cash collateral other receivable (accrued liability) in millions of CHF

	2019	2018
At 1 January	6	39
Net cash delivered by (to) the Group	150	(33)
Fair value and other	(1)	0
Currency translation effects	(7)	0
At 31 December	**148**	**6**

Hedge accounting

As described above the Group's risk management strategy is to hedge the transaction exposures arising through foreign currency flows or monetary positions held in foreign currencies as well as to generate an appropriate mix of fixed and floating rate exposures. The level of hedging depends on market conditions and business requirements of the Group. The Group designates a specific interest rate risk management objective to ensure that a predetermined level of its interest rate risk exposure is at a floating rate.

Hedge effectiveness is determined at the inception of the hedge relationship, and through periodic prospective effectiveness assessments at each reporting date to ensure that an economic relationship exists between the hedged item and hedging instrument. The Group performs a qualitative assessment of the hedge effectiveness using a critical terms match method. As the critical terms of the hedged items and the hedging instruments match, the Group concludes that risks being hedged for the hedged items and the hedging instruments are sufficiently aligned, that there is no inherent mismatch in the hedging relationship and that a 100% hedge ratio applies both for the actual quantities hedged and for the hedge accounting.

Accounting treatment, sources of ineffectiveness and prospective effectiveness assessment method by risk category

	Accounting treatment	Potential sources of ineffectiveness	Prospective effectiveness assessment method
Interest rate and foreign exchange rate fluctuations	Cash flow hedge	Counterparty credit risk	Critical terms match
Foreign exchange rate fluctuations	Cash flow hedge	Lower volume of hedged items/ counterparty credit risk	Critical terms match
Interest rate fluctuations	Fair value hedge	Counterparty credit risk	Critical terms match

The ineffective portion of the hedge accounting is recognised in the income statement and included in other financial income (expense). It is measured using the hypothetical derivative method for cash flow hedges and the cumulative dollar offset method for fair value hedges. At 31 December 2019 and 31 December 2018, respectively, none of the above potential sources of ineffectiveness, individually or collectively, resulted in material amounts of actual ineffectiveness being reported for any hedge accounting relationships.

The table below shows fair values and nominal amounts of derivative financial instruments, including a range of the maturity of the nominal amount of the hedging instruments, which are designated as hedging instruments in a cash flow hedge and a fair value hedge. At 31 December the Group has the following cash flow hedges and fair value hedges which are designated in a qualifying hedge relationship:

Fair values and nominal amounts of derivatives used for hedge accounting – at 31 December 2019

	Nominal amount	Fair value asset in million CHF	Fair value liability in million CHF	Maturity range
Cash flow hedges				
Risk hedged: Interest rate and foreign exchange rate fluctuations				
– Cross-currency swaps	EUR 850 million fixed into USD	0	(119)	2021
Risk hedged: Foreign exchange rate fluctuations				
– Forward exchange contracts	JPY 422 billion	40	(56)	2020–2021
Total		**40**	**(175)**	
Fair value hedges				
Risk hedged: Interest rate fluctuations				
– Interest rate swaps	USD 200 million	3	0	2021
– Interest rate swaps	EUR 100 million	0	0	2021
– Interest rate swaps	CHF 400 million	5	0	2022
Total		**8**	**0**	

Fair values and nominal amounts of derivatives used for hedge accounting – at 31 December 2018

	Nominal amount	Fair value asset in million CHF	Fair value liability in million CHF	Maturity range
Cash flow hedges				
Risk hedged: Interest rate and foreign exchange rate fluctuations				
– Cross-currency swaps	EUR 850 million fixed into USD	0	(67)	2021
Risk hedged: Foreign exchange rate fluctuations				
– Forward exchange contracts	JPY 224 billion	13	(12)	2019–2020
Total		**13**	**(79)**	
Fair value hedges				
Risk hedged: Interest rate fluctuations				
– Interest rate swaps	USD 3,305 million	1	(22)	2019–2022
– Interest rate swaps	EUR 100 million	1	0	2021
– Interest rate swaps	CHF 250 million	5	0	2022
Total		**7**	**(22)**	

The fair values of derivative financial instruments used for hedge accounting are included in other current assets (see Note 16) or other current liabilities (see Note 19). The Group's approach to managing market risk, including interest rate risk and foreign currency risk, is discussed in the 'Market risk' section in this Note.

Cash flow hedges. The Group has entered into cross-currency swaps to hedge foreign exchange and interest rate risk on some of the bonds and notes issued by the Group which are denominated in euro. At 31 December 2019 such instruments are recorded as a net fair value liability of CHF 119 million (2018: net fair value liability of CHF 67 million). There was no ineffective portion.

Chugai has entered into forward exchange contracts to hedge a part of its foreign translation exposure to Swiss franc and US dollar. At 31 December 2019 such instruments are recorded as fair value assets of CHF 40 million and as fair value liabilities of CHF 56 million (2018: fair value assets of CHF 13 million and fair value liabilities of CHF 12 million). There was no ineffective portion.

None of the hedging instruments currently held for applying hedge accounting is affected by the InterBank Offered Rates ('IBOR') reform.

Carrying amount of items designated as hedged items in a cash flow hedging relationship in millions of CHF

	2019 Assets	2019 Liabilities	2018 Assets	2018 Liabilities
At 31 December				
Bonds and notes				
Risk hedged by cross-currency swaps: Interest rate and foreign exchange rate fluctuations				
– Bonds and notes	–	922	–	956
Inventories				
Risk hedged by forward exchange contracts: Foreign exchange rate fluctuations				
– Inventories	3,753	–	2,001	–

Hedging reserve for continuing hedging relationships in millions of CHF

	2019 Total	2019 Cross-currency swaps	2019 Forward exchange contracts	2018 Total	2018 Cross-currency swaps	2018 Forward exchange contracts
At 1 January	47	47	0	61	60	1
Gains (losses) taken to equity	(72)	(55)	(17)	(61)	(59)	(2)
Transferred to income statement[a)]	20	20	0	42	42	0
Income taxes	13	8	5	4	4	0
Non-controlling interests	5	0	5	1	0	1
Currency translation effects	0	0	0	0	0	0
At 31 December	**13**	**20**	**(7)**	**47**	**47**	**0**

a) The entire amount transferred to the income statement was reported in other financial income (expense).

In 2019 there are no hedging relationships for which hedge accounting is no longer applied (2018: none). The changes in the hedging reserve within equity are shown in Note 22.

The expected undiscounted cash flows from qualifying cash flow hedges, including interest payments during the duration of the derivative contract and final settlement on maturity, are shown in the table below.

Expected cash flows of qualifying cash flow hedges in millions of CHF

	2019 Total	2019 Less than 1 year	2019 More than 1 year	2018 Total	2018 Less than 1 year	2018 More than 1 year
Cash inflows	4,834	3,012	1,822	3,136	1,581	1,555
Cash outflows	(5,001)	(3,027)	(1,974)	(3,281)	(1,588)	(1,693)
Total cash inflow (outflow)	**(167)**	**(15)**	**(152)**	**(145)**	**(7)**	**(138)**

The undiscounted cash flows in the table above will affect profit or loss as shown below. These include interest payments during the duration of the derivative contract but do not include the final settlement on maturity.

Expected cash flows of qualifying cash flow hedges with impact on profit or loss in millions of CHF

	2019 Total	2019 Less than 1 year	2019 More than 1 year	2018 Total	2018 Less than 1 year	2018 More than 1 year
Cash inflows	120	60	60	188	63	125
Cash outflows	(148)	(74)	(74)	(225)	(75)	(150)
Total cash inflow (outflow)	**(28)**	**(14)**	**(14)**	**(37)**	**(12)**	**(25)**

Fair value hedges. The Group has entered into some interest rate swaps to hedge its exposure to changes in the fair value of some of its fixed-term debt instruments in respect of a benchmark interest rate. At 31 December 2019 such instruments are recorded as fair value assets of CHF 8 million (2018: fair value assets of CHF 7 million and fair value liabilities of CHF 22 million). During 2019 fair value adjustments of CHF 23 million were recorded on these interest rate swaps (2018: CHF 2 million). All interest rate swaps currently held for applying hedge accounting are referenced to a benchmark rate other than the London InterBank Offered Rate ('LIBOR') except for the hedging instrument hedging a portion of EUR 100 million of the 6.5% notes due 4 March 2021. As the fair value hedge had been highly effective since inception, the result of the interest rate swaps was largely offset by changes in the fair value of the hedged debt instruments. The Group's approach to managing market risk, including interest rate risk, is discussed in the 'Market risk' section in this Note.

Carrying amount of items designated as hedged items in a fair value hedging relationship in millions of CHF

	Liabilities	Fair value adjustments cumulative	Fair value adjustments in current year
At 31 December 2019			
Bonds and notes			
Risk hedged by interest rate swaps: Interest rate fluctuations			
– Bonds and notes	705	8	23
At 31 December 2018			
Bonds and notes			
Risk hedged by interest rate swaps: Interest rate fluctuations			
– Bonds and notes	3,569	(15)	(2)

On 13 December 2019 the Group resolved to exercise its option to call for early redemption of the 2.0% fixed rate notes with a principal amount of USD 0.6 billion at par three months before the scheduled due date of 13 March 2020 (see Note 21). This resulted in a termination of the fair value hedge accounting applied to the interest rate swaps with a nominal value of USD 600 million and a fair value of less than CHF 1 million at the date of the termination.

Net investment hedges. The Group does not have any net investment hedges.

32. Related parties

Controlling shareholders

The share capital of Roche Holding Ltd, which is the Group's parent company, consists of 160,000,000 bearer shares.

At 31 December 2019 and 2018, based on information supplied to the Group, a shareholder group with pooled voting rights owned 72,018,000 shares, which represented 45.01% of the issued shares. On 5 December 2019 the shareholder group announced that it would continue the shareholder pooling agreement with a modified shareholder composition. This group now consists of Mr André Hoffmann, Ms Marie-Anne Hoffmann, Ms Vera Michalski, Mr Alexander Hoffmann, Mr Frederic Hoffmann, Ms Isabel Hoffmann, Mr Lucas Hoffmann, Ms Marina Hoffmann, Ms Kasia Barbotin-Larrieu, Ms Tatiana Fabre, Mr Andreas Oeri, Ms Catherine Oeri, Ms Sabine Duschmalé, Mr Jörg Duschmalé, Mr Lukas Duschmalé, the charitable foundation Wolf and Artuma Holding Ltd. The shareholder pooling agreement has existed since 1948. The duration of the pool was extended for an indefinite period in 2009. The figures above do not include any shares without pooled voting rights held outside this group by individual members of the group. Ms Maja Oeri, formerly a member of the pool, holds 8,091,900 shares representing 5.057% of the voting rights independently of the pool.

Mr André Hoffmann and Dr Andreas Oeri are members of the Board of Directors of Roche Holding Ltd. Mr Hoffmann received remuneration totalling CHF 439,753 (2018: CHF 439,123) and Dr Oeri received remuneration totalling CHF 360,000 (2018: CHF 360,000).

There were no other transactions between the Group and the individual members of the above shareholder group with the exception of Dr Jörg Duschmalé, who worked as a post-doc at Roche until the end of September 2018.

Subsidiaries and associates

A listing of the Group subsidiaries and associates is included in Note 33. This listing excludes Chugai's subsidiaries as well as not material companies, notably companies that are inactive, dormant or in liquidation. Transactions between the parent company and its subsidiaries and between subsidiaries are eliminated on consolidation. There were no significant transactions between the Group and its associates.

Key management personnel

Total remuneration of key management personnel was CHF 46 million (2018: CHF 51 million).

Members of the Board of Directors of Roche Holding Ltd receive an annual remuneration and payment for their time and expenses related to their membership of Board committees. The Chairman of the Board of Directors and members of the Corporate Executive Committee (CEC) of Roche Holding Ltd receive remuneration, which consists of an annual salary, bonus and an expense allowance. The Group pays social insurance contributions in respect of the above remuneration and pays contributions to pension and other post-employment benefit plans for the Chairman of the Board of Directors and the members of the CEC. The members of the CEC also participate in certain equity compensation plans as described below. The terms, vesting conditions and fair value of these awards are disclosed in Note 27. New members of the CEC are included in the table below for the full calendar year in which they joined the CEC. Similarly, members of the CEC retiring partway through the year are included for the full calendar year in which they left the CEC.

Remuneration of the members of the Board of Directors and the Corporate Executive Committee in millions of CHF

	2019	2018
Salaries, including cash-settled bonus	23	22
Bonus Stock Awards	6	6
Social security costs	2	2
Pensions and other post-employment benefits	4	4
Equity compensation plans	6	13
Board fees	4	3
Other employee benefits	1	1
Total	**46**	**51**

For the purposes of these remuneration disclosures the values for equity compensation plans, including the Bonus Stock Awards, are calculated based on the fair value used in Note 27. These represent the cost to the Group of such awards at grant date and reflect, amongst other matters, the observed exercise behaviour and exit rate for the whole population that receive the awards and initial simulations of any performance conditions.

The detailed disclosures regarding executive remuneration that are required by Swiss law are included in the Remuneration Report included in the Annual Report on pages 120 to 148. In those disclosures the values for equity compensation plans, including the Bonus Stock Awards, represent the fair value that the employee receives taking into account the preliminary assessment of any completed performance conditions. These fair values are shown in the table below, which reconciles those disclosures required by Swiss law to the above related party disclosures for key management personnel.

Reconciliation to executive remuneration disclosures required by Swiss law in millions of CHF

	2019	2018
Total remuneration of the members of the Board of Directors and Corporate Executive Committee (IFRS basis – see table above)	46	51
Deduct		
– Bonus Stock Awards (IFRS basis)	(6)	(6)
– Equity compensation plans (IFRS basis)	(6)	(13)
Add back		
– Bonus Stock Awards (Swiss legal basis)	3	4
– Equity compensation plans (Swiss legal basis)	12	15
Total remuneration of the members of the Board of Directors and Corporate Executive Committee (Swiss legal basis)	**49**	**51**
Of which (including social security costs)		
– Board of Directors (page 134 of the Annual Report)	10	10
– Corporate Executive Committee (page 144 of the Annual Report)	39	41

Bonus Stock Awards. The Chairman of the Board of Directors and the Chief Executive Officer will be granted Bonus Stock Awards in lieu of their cash-settled bonus for the financial year 2019. These are subject to approval by the 2020 Annual General Meeting in March 2020 and will be issued in March 2020. The number of awards and fair value per award will be calculated at the grant date.

Equity compensation plans. The members of the Corporate Executive Committee received equity compensation as shown in the following tables.

Number of rights, options and awards granted to members of the Corporate Executive Committee

	2019	2018
Roche Stock-settled Stock Appreciation Rights	308,965	278,433
Roche Restricted Stock Unit Plan	10,664	0
Roche Performance Share Plan	0	32,535

Contributions paid for members of the Corporate Executive Committee in millions of CHF

	2019	2018
Roche Connect	0.2	0.3

Transactions with former members of the Board of Directors and Corporate Executive Committee. Pensions totalling CHF 2 million were paid by the Group to former Corporate Executive Committee members (2018: CHF 2 million).

Defined benefit plans

Transactions between the Group and the various defined benefit plans for the employees of the Group are described in Note 26.

33. List of subsidiaries and associates

The following is a listing of the Group subsidiaries and associates. It excludes Chugai's subsidiaries as well as not material companies, notably companies that are inactive, dormant or in liquidation.

Listed companies

Country	Company	City		Share capital (in millions)	Equity interest (in %)
Switzerland	Roche Holding Ltd Stock Exchange: SIX Swiss Exchange Zurich Stock code (Share): RO, Valor: 1203211 Stock code *(Genussschein)*: ROG, Valor: 1203204 ISIN Share: CH0012032113 ISIN *Genussschein*: CH0012032048 Market capitalisation: CHF 267,684 million	Basel	CHF	160.0	
Japan	Chugai Pharmaceutical Co., Ltd. Stock Exchange: Tokyo Stock code: TSE:4519 ISIN: JP3519400000 Market capitalisation: JPY 5,519,037 million	Tokyo	JPY	335.2	61.2

Non-listed companies

Country	Company	City		Share capital (in millions)	Equity interest (in %)
Algeria	Roche Algérie SPA	Hydra	DZD	1.0	48
Argentina	Productos Roche S.A. Química e Industrial	Tigre	ARS	2,841.6	100
	Roche Diabetes Care Argentina S.A.	Tigre	ARS	87.4	100
Australia	Roche Diabetes Care Australia Pty Limited	Bella Vista	AUD	14.1	100
	Roche Diagnostics Australia Pty. Limited	North Ryde	AUD	5.0	100
	Roche Products Pty. Limited	Dee Why	AUD	65.0	100
Austria	mySugr GmbH	Vienna	EUR	5.7	100
	Roche Austria GmbH	Vienna	EUR	14.5	100
	Roche Diabetes Care Austria GmbH	Vienna	EUR	(–)	100
	Roche Diagnostics GmbH	Vienna	EUR	1.1	100
Bangladesh	Roche Bangladesh Limited	Dhaka	BDT	27.2	100
Belarus	FLLC "Roche Products Limited"	Minsk	USD	1.5	100
Belgium	N.V. Roche S.A.	Brussels	EUR	32.0	100
	Roche Diagnostics Belgium NV	Brussels	EUR	3.8	100
Bermuda	Chemical Manufacturing and Trading Company Limited	Hamilton	USD	(–)	100
	Hoffmann-La Roche Products Limited	Hamilton	USD	(–)	100
	Roche Capital Services Ltd.	Hamilton	RUB	(–)	100
	Roche Catalyst Investments Ltd.	Hamilton	USD	(–)	100
	Roche Financial Investments Ltd.	Hamilton	USD	(–)	100
	Roche Financial Management Ltd.	Hamilton	USD	(–)	100
	Roche Financial Services Ltd.	Hamilton	USD	(–)	100
	Roche International Ltd.	Hamilton	USD	(–)	100
	Roche Intertrade Limited	Hamilton	USD	10.0	100
	Roche Operations Ltd.	Hamilton	USD	(–)	100
	Roche Services Holdings Ltd.	Hamilton	USD	(–)	100
	Sapac Corporation Ltd.	Hamilton	CAD	(–)	100
	Syntex Pharmaceuticals International Limited	Hamilton	USD	(–)	100
Bolivia	Roche Bolivia SRL.	Santa Cruz	BOB	0.1	100
Bosnia and Herzegovina	Roche d.o.o. farmaceutsko drustvo - Roche Ltd. Pharmaceutical Company	Sarajevo	BAM	13.1	100
Brazil	Produtos Roche Químicos e Farmacêuticos S.A.	São Paulo	BRL	1,141.7	100
	Roche Diabetes Care Brasil Ltda.	São Paulo	BRL	44.4	100
	Roche Diagnostica Brasil Ltda.	São Paulo	BRL	415.9	100
Bulgaria	Roche Bulgaria EOOD	Sofia	BGN	5.1	100
Cameroon	Roche Cameroun SARL	Douala	XAF	60.0	100
Canada	Hoffmann-La Roche Limited	Mississauga	CAD	40.3	100
Chile	Roche Chile Limitada	Santiago de Chile	CLP	70.9	100
China	Roche (China) Holding Ltd.	Shanghai	USD	37.3	100
	Roche (Shanghai) Pharmaceuticals Consulting Co., Ltd.	Shanghai	CNY	30.0	100
	Roche (Shanghai) Pharmaceuticals Trading Co., Ltd.	Shanghai	USD	55.0	100
	Roche Diagnostics (Hong Kong) Limited	Hong Kong	HKD	10.0	100
	Roche Diagnostics (Shanghai) Ltd.	Shanghai	USD	31.0	100
	Roche Diagnostics (Suzhou) Limited	Suzhou	USD	100.0	100
	Roche Hong Kong Limited	Hong Kong	HKD	10.0	100
	Roche R&D Center (China) Ltd.	Shanghai	USD	35.8	100
	Shanghai Roche Pharmaceuticals Limited	Shanghai	USD	278.7	70

Country	Company	City		Share capital (in millions)	Equity interest (in %)
Colombia	Productos Roche S.A.	Bogotá	COP	26,923.7	100
Costa Rica	Roche Services Americas, Sociedad de Responsabilidad Limitada	San Jose	CRC	361.4	100
	Roche Servicios S.A.	Heredia	USD	8.1	100
Côte d'Ivoire	Roche Côte d'Ivoire SARL	Abidjan	XOF	50.0	100
Croatia	Roche d.o.o.	Zagreb	HRK	4.8	100
Czech Republic	Roche s.r.o.	Prague	CZK	200.0	100
Denmark	Roche a/s, Medicinalvarer og Kemikalier	Hvidovre	DKK	4.0	100
	Roche Diagnostics a/s	Hvidovre	DKK	1.3	100
	Roche Innovation Center Copenhagen A/S	Hoersholm	DKK	100.1	100
Dominican Republic	Productos Roche Dominicana, S.R.L.	Santo Domingo	DOP	0.6	100
Ecuador	Roche Ecuador S.A.	Quito	USD	28.1	100
Egypt	Roche Diagnostics Egypt for Trading S.A.E.	Giza	EGP	5.0	100
	Roche Egypt for Manufacturing and Trading SAE	Cairo	EGP	1.0	100
	Roche Egypt LLC	Cairo	EGP	0.1	95
El Salvador	Productos Roche (El Salvador) S.A. de C.V.	Antiguo Cuscatlan	SVC	0.2	100
Estonia	Roche Eesti OÜ	Tallinn	EUR	0.1	100
Finland	Roche Diagnostics Oy	Espoo	EUR	0.2	100
	Roche Oy	Espoo	EUR	(–)	100
France	Institut Roche SAS	Boulogne-Billancourt	EUR	0.5	100
	Roche Diabetes Care France SAS	Meylan	EUR	4.5	100
	Roche Diagnostics France SAS	Meylan	EUR	16.0	100
	Roche SAS	Boulogne-Billancourt	EUR	38.2	100
	Timkl SAS	Montbonnot-Saint-Martin	EUR	0.8	100
	Trophos SA	Marseille	EUR	1.9	100
Georgia	Roche Georgia LLC	Tbilisi	GEL	0.5	100
Germany	Ascur Versicherungsvermittlungs GmbH	Grenzach-Wyhlen	EUR	(–)	100
	FMI Germany GmbH	Penzberg	EUR	(–)	100
	Galenus Mannheim Pharma GmbH	Mannheim	EUR	(–)	100
	Roche Beteiligungs GmbH	Grenzach-Wyhlen	EUR	3.6	100
	Roche Deutschland Holding GmbH	Grenzach-Wyhlen	EUR	6.0	100
	Roche Diabetes Care Deutschland GmbH	Mannheim	EUR	(–)	100
	Roche Diabetes Care GmbH	Mannheim	EUR	(–)	100
	Roche Diagnostics Automation Solutions GmbH	Waiblingen	EUR	(–)	100
	Roche Diagnostics Deutschland GmbH	Mannheim	EUR	1.0	100
	Roche Diagnostics GmbH	Mannheim	EUR	94.6	100
	Roche mtm laboratories AG	Mannheim	EUR	1.4	100
	Roche Pharma AG	Grenzach-Wyhlen	EUR	61.4	100
	Roche Privacy GmbH	Grenzach-Wyhlen	EUR	(–)	100
	Roche Real Estate Services Mannheim GmbH	Mannheim	EUR	1.8	100
	Roche Registration GmbH	Grenzach-Wyhlen	EUR	(–)	100
	Signature Diagnostics GmbH	Potsdam	EUR	0.1	100
Ghana	Roche Products Ghana Limited	Accra	GHS	1.2	100
Greece	Roche (Hellas) S.A.	Athens	EUR	19.2	100
	Roche Diagnostics (Hellas) S.A.	Athens	EUR	27.8	100
Guatemala	Productos Roche Guatemala (Sociedad Anónima)	Guatemala	GTQ	0.6	100
Honduras	Productos Roche (Honduras), S.A.	Tegucigalpa	HNL	(–)	100
Hungary	Roche (Hungary) Ltd	Budapest	HUF	30.0	100
	Roche Services (Europe) Ltd	Budapest	HUF	3.0	100
India	Roche Diabetes Care India Private Limited	Mumbai	INR	15.2	100
	Roche Diagnostics India Private Limited	Mumbai	INR	149.2	100
	Roche Products (India) Private Limited	Mumbai	INR	14.0	100
	Viewics India Private Limited	Pune	INR	(–)	100
Indonesia	P.T. Roche Indonesia	Jakarta	IDR	1,323.0	98.6
Iran	Roche Pars Co. (Ltd.)	Tehran	IRR	41,610.0	100
Ireland	Roche Ireland Limited	Clarecastle	EUR	2.4	100
	Roche Products (Ireland) Limited	Dublin	EUR	(–)	100
	Spark Therapeutics Ireland Limited	Dublin	EUR	(–)	100
Israel	Medingo Ltd.	Yoqneam Illit	ILS	8.0	100
	Roche Pharmaceuticals (Israel) Ltd.	Hod Hasharon	ILS	(–)	100
Italy	Roche Diabetes Care Italy S.p.A.	Monza	EUR	40.2	100
	Roche Diagnostics S.p.A.	Monza	EUR	18.1	100
	Roche S.p.A.	Monza	EUR	34.1	100
Japan	Roche DC Japan K. K.	Tokyo	JPY	10.0	100
	Roche Diagnostics K.K.	Tokyo	JPY	2,500.0	100
Jordan	F. Hoffmann-La Roche Ltd / Jordan P.S.C.	Amman	JOD	(–)	100
Kazakhstan	Roche Kazakhstan LLP	Almaty	KZT	150.0	100

Country	Company	City		Share capital (in millions)	Equity interest (in %)
Kenya	Roche Kenya Limited	Nairobi	KES	40.0	100
Latvia	Roche Latvija SIA	Riga	EUR	1.7	100
Lebanon	Roche Lebanon S.A.R.L.	Beirut	LBP	1,000.0	100
Lithuania	UAB Roche Lietuva	Vilnius	EUR	0.2	100
Malaysia	Roche (Malaysia) Sdn. Bhd.	Kuala Lumpur	MYR	4.0	100
	Roche Diagnostics (Malaysia) Sdn. Bhd.	Petaling Jaya	MYR	0.9	100
	Roche Services (Asia Pacific) Sdn. Bhd.	Kuala Lumpur	MYR	0.5	100
Mauritius	Roche Products (Mauritius) Ltd	Moka	MUR	4.0	100
Mexico	Productos Roche, S.A. de C.V.	Mexico City	MXN	82.6	100
	Roche DC México, S.A. de C.V.	Mexico City	MXN	3.9	100
	Roche Servicios de México, S.A. de C.V.	Mexico City	MXN	3.5	100
Morocco	Roche S.A.	Casablanca	MAD	59.5	100
Myanmar	Roche Myanmar Company Limited	Yangon	USD	(–)	100
Netherlands	Roche Diabetes Care Nederland B.V.	Almere	EUR	(–)	100
	Roche Diagnostics Nederland B.V.	Almere	EUR	2.3	100
	Roche Finance Europe B.V.	Woerden	EUR	2.0	100
	Roche Nederland B.V.	Woerden	EUR	10.9	100
	Roche Pharmholding B.V.	Woerden	EUR	467.8	100
New Zealand	Roche Diagnostics NZ Limited	Auckland	NZD	3.0	100
	Roche Products (New Zealand) Limited	Auckland	NZD	13.5	100
Nicaragua	Productos Roche (Nicaragua), S.A.	Managua	NIO	0.9	100
Nigeria	Roche Products Limited	Lagos	NGN	200.0	100
North Macedonia	Roche Makedonija DOOEL	Skopje	EUR	0.3	100
Norway	Roche Diagnostics Norge A/S	Oslo	NOK	5.8	100
	Roche Norge A/S	Oslo	NOK	6.2	100
Pakistan	Roche Pakistan Limited	Karachi	PKR	2,063.3	100
Panama	Productos Roche (Panama), S.A.	Panama City	PAB	(–)	100
	Productos Roche Interamericana S.A. (PRISA)	Panama City	USD	0.1	100
Peru	Productos Roche Química Farmacéutica S.A.	Lima	PEN	11.1	100
	Roche Farma (Peru) S.A.	Lima	PEN	38.1	100
Philippines	Roche (Philippines) Inc.	Taguig City	PHP	300.0	100
Poland	Roche Diabetes Care Polska sp. z o.o.	Warsaw	PLN	2.0	100
	Roche Diagnostics Polska Sp. z o.o.	Warsaw	PLN	8.0	100
	Roche Polska Sp. z o.o.	Warsaw	PLN	25.0	100
Portugal	Roche Farmacêutica Química, Lda.	Amadora	EUR	1.1	100
	Roche Sistemas de Diagnósticos, Sociedade Unipessoal, Lda.	Amadora	EUR	2.6	100
Puerto Rico	Genentech P.R., Inc.	San Juan	USD	(–)	100
	Roche Products Inc.	Ponce	USD	0.5	100
	Syntex Puerto Rico, Inc.	Ponce	USD	(–)	100
Romania	Roche Romania S.R.L.	Bucharest	RON	472.2	100
Russian Federation	"Roche-Moscow" JSC	Moscow	RUB	2.6	100
	Limited Liability Company Roche Diabetes Care Rus	Moscow	RUB	100.0	100
	Limited Liability Company Roche Diagnostics Rus	Moscow	RUB	250.0	100
Saudi Arabia	Roche Diagnostics Saudi Arabia LLC	Riyadh	SAR	200.0	75
	Roche Products Saudi Arabia LLC	Jeddah	SAR	30.0	100
Serbia	Roche d.o.o. Beograd	Belgrade	EUR	9.6	100
Singapore	Roche Diabetes Care Asia Pacific Pte. Ltd.	Singapore	SGD	0.6	100
	Roche Diagnostics Asia Pacific Pte. Ltd.	Singapore	SGD	20.4	100
	Roche Singapore Pte. Ltd.	Singapore	SGD	4.0	100
	Roche Singapore Technical Operations, Pte. Ltd.	Singapore	USD	35.0	100
Slovakia	Roche Slovensko, S.R.O.	Bratislava	EUR	0.3	100
Slovenia	Roche farmacevtska družba, d.o.o.	Ljubljana	EUR	0.2	100
South Africa	Kapa Biosystems (Pty) Ltd	Cape Town	ZAR	(–)	100
	Roche Diabetes Care South Africa Proprietary Limited	Midrand	ZAR	15.0	100
	Roche Diagnostics Proprietary Limited	Midrand	ZAR	(–)	100
	Roche Products (Proprietary) Limited	Illovo	ZAR	60.0	100
South Korea	Roche Diagnostics Korea Co., Ltd.	Seoul	KRW	22,969.0	100
	Roche Korea Company Ltd.	Seoul	KRW	13,375.0	100
Spain	Roche Diabetes Care Spain, S.L.	Sant Cugat del Vallès	EUR	1.0	100
	Roche Diagnostics S.L.	Sant Cugat del Vallès	EUR	17.0	100
	Roche Farma, S.A.	Madrid	EUR	45.0	100
Sweden	Roche AB	Solna	SEK	20.0	100
	Roche Diagnostics Scandinavia AB	Solna	SEK	9.0	100

Country	Company	City		Share capital (in millions)	Equity interest (in %)
Switzerland	Biopharm AG	Basel	CHF	0.3	100
	F. Hoffmann-La Roche Ltd	Basel	CHF	150.0	100
	Hoffmann - La Roche Ltd	Basel	CHF	0.5	100
	InterMune International AG	Basel	CHF	10.0	100
	Museum Tinguely AG	Basel	CHF	0.1	100
	Phaor AG	Basel	CHF	0.2	100
	Rabbit-Air Ltd	Bachenbülach	CHF	3.0	100
	Roche Capital Market Ltd	Basel	CHF	1.0	100
	Roche Chemische Unternehmungen AG	Basel	CHF	1.3	100
	Roche Diabetes Care (Switzerland) Ltd	Rotkreuz	CHF	0.1	100
	Roche Diagnostics (Switzerland) Ltd	Rotkreuz	CHF	1.0	100
	Roche Diagnostics International Ltd	Rotkreuz	CHF	20.0	100
	Roche Finance Ltd	Basel	CHF	409.2	100
	Roche Forum Buonas Ltd	Buonas	CHF	0.1	100
	Roche Glycart Ltd	Schlieren	CHF	0.3	100
	Roche Long Term Foundation	Basel	CHF	0.5	100
	Roche Pharma (Switzerland) Ltd	Basel	CHF	2.0	100
	Syntex Pharm AG	Rotkreuz	CHF	0.5	100
	Tavero AG	Basel	CHF	0.1	100
Taiwan	Roche Diagnostics Ltd.	Taipei	TWD	396.3	100
	Roche Products Ltd.	Taipei	TWD	1,249.0	100
Thailand	Roche Diagnostics (Thailand) Limited	Bangkok	THB	103.0	100
	Roche Thailand Limited	Bangkok	THB	12.0	100
Tunisia	Roche Tunisie SA	Tunis	TND	0.8	100
Turkey	Infogenetik Moleküler Bilgi Hizmetleri Anonim Şirketi	Istanbul	TRY	3.5	100
	Roche Diagnostics Turkey Anonim Şirketi	Istanbul	TRY	80.0	100
	Roche Müstahzarlari Sanayi Anonim Şirketi	Istanbul	TRY	249.5	100
Ukraine	Roche Ukraine LLC	Kiev	UAH	124.0	100
United Arab Emirates	Roche Diabetes Care Middle East FZCO	Dubai	AED	0.5	100
	Roche Diagnostics Middle East FZCO	Dubai	AED	19.0	100
	Roche Pharmaceuticals Middle East FZCO	Dubai	AED	0.5	100
United Kingdom	InterMune Holdings Limited	Welwyn Garden City	GBP	(–)	100
	Roche Diabetes Care Limited	Burgess Hill	GBP	0.4	100
	Roche Diagnostics Limited	Burgess Hill	GBP	32.6	100
	Roche Holding (UK) Limited	Welwyn Garden City	GBP	100.0	100
	Roche Products Limited	Welwyn Garden City	GBP	98.3	100
	Roche Registration Limited	Welwyn Garden City	GBP	(–)	100
	Spark Therapeutics UK Limited	London	GBP	(–)	100
	Tusk Therapeutics Limited	Welwyn Garden City	GBP	(–)	100
United States	Adheron Therapeutics Inc.	South San Francisco	USD	(–)	100
	Anadys Pharmaceuticals, Inc.	South San Francisco	USD	(–)	100
	Ariosa Diagnostics, Inc.	San Jose	USD	(–)	100
	Bina Technologies, Inc.	Belmont	USD	(–)	100
	BioVeris Corporation	Indianapolis	USD	(–)	100
	Flatiron Health, Inc.	New York	USD	(–)	100
	ForSight VISION4, Inc.	South San Francisco	USD	(–)	100
	Foundation Medicine Securities Corporation	Cambridge	USD	(–)	100
	Foundation Medicine, Inc.	Cambridge	USD	(–)	100
	Genentech USA, Inc.	South San Francisco	USD	(–)	100
	Genentech, Inc.	South San Francisco	USD	(–)	100
	GeneWEAVE Biosciences, Inc.	Los Gatos	USD	(–)	100
	Hoffmann-La Roche Inc.	Little Falls	USD	3.0	100
	I5 Surviving Corp.	South San Francisco	USD	(–)	100
	IGEN International, Inc.	Pleasanton	USD	(–)	100
	IGEN LS LLC	Pleasanton	USD	(–)	100
	Ignyta, Inc.	South San Francisco	USD	(–)	100
	InterMune, Inc.	South San Francisco	USD	(–)	100
	IQuum, Inc.	Marlborough	USD	(–)	100
	Jecure Therapeutics, Inc.	South San Francisco	USD	(–)	100
	Kapa Biosystems, Inc.	Wilmington	USD	(–)	100
	Memory Pharmaceuticals Corp.	Little Falls	USD	(–)	100
	mySugr Inc.	Encinitas	USD	(–)	100
	Roche Diabetes Care, Inc.	Indianapolis	USD	(–)	100
	Roche Diagnostics Corporation	Indianapolis	USD	(–)	100
	Roche Diagnostics Hematology, Inc.	Westborough	USD	(–)	100
	Roche Diagnostics Operations, Inc.	Indianapolis	USD	(–)	100

Country	Company	City		Share capital (in millions)	Equity interest (in %)
United States *(continued)*	Roche Health Solutions Inc.	Indianapolis	USD	(–)	100
	Roche Holdings, Inc.	South San Francisco	USD	1.0	100
	Roche Laboratories Inc.	Little Falls	USD	(–)	100
	Roche Molecular Systems, Inc.	Pleasanton	USD	(–)	100
	Roche Palo Alto LLC	South San Francisco	USD	(–)	100
	Roche Sequencing Solutions, Inc.	Pleasanton	USD	(–)	100
	Roche TCRC, Inc.	Little Falls	USD	(–)	100
	Seragon Pharmaceuticals Inc.	South San Francisco	USD	(–)	100
	Spark Therapeutics, Inc.	Philadelphia	USD	(-)	100
	Spark Therapeutics International Holdings, Inc.	Philadelphia	USD	(-)	100
	Tanox, Inc.	South San Francisco	USD	(–)	100
	Tensha Therapeutics, Inc.	South San Francisco	USD	(–)	100
	Therapeutic Human Polyclonals, Inc.	South San Francisco	USD	(–)	100
	Ventana Medical Systems, Inc.	Tucson	USD	(–)	100
	Viewics, Inc.	Santa Clara	USD	(–)	100
Uruguay	Roche International Ltd. (Montevideo Branch)	Montevideo	UYU	(–)	100
Venezuela	Productos Roche S.A.	Caracas	VEF	156.9	100
Vietnam	Roche Pharma (Vietnam) Company Limited	Ho Chi Minh City	VND	23,000.0	100
	Roche Vietnam Company Limited	Ho Chi Minh City	USD	25.0	100

(–) = share capital of less than 100,000 local currency units.

34. Significant accounting policies

Consolidation policy

Subsidiaries are all companies over which the Group has control. The Group controls an entity when the Group is exposed to, or has rights to, variable returns from its involvement with the entity and has the ability to affect those returns through its power over the entity. Companies acquired during the year are consolidated from the date on which control is transferred to the Group, and subsidiaries to be divested are included up to the date on which control passes from the Group. Intercompany balances, transactions and resulting unrealised income are eliminated in full. Changes in ownership interests in subsidiaries are accounted for as equity transactions if they occur after control has already been obtained and if they do not result in a loss of control. Associates are companies over which the Group exercises, or has the power to exercise, significant influence, but which it does not control, and they are accounted for using the equity method.

Segment reporting

For the purpose of segment reporting the Group's Corporate Executive Committee (CEC) is considered to be the Group's Chief Operating Decision Maker. The determination of the Group's operating segments is based on the organisation units for which information is reported to the CEC on a regular basis. The information provided is used as the basis of the segment revenue and profit disclosures reported in Note 2, with the geographic analysis based on the location of customers. Selected segment balance sheet information is also routinely provided to the CEC.

Transfer prices between operating segments are set on an arm's length basis. Operating assets and liabilities consist of property, plant and equipment, goodwill and intangible assets, trade receivables/payables, inventories and other assets and liabilities, such as provisions, which can be reasonably attributed to the reported operating segments. Non-operating assets and liabilities mainly include current and deferred income tax balances, post-employment benefit assets/liabilities and financial assets/liabilities such as cash, marketable securities, investments and debt.

Foreign currency translation

The Annual Financial Statements are presented in Swiss francs. Most Group companies use their local currency as their functional currency. Certain Group companies use other currencies (such as US dollar, Swiss franc or euro) as their functional currency where this is the currency of the primary economic environment in which the entity operates. Local transactions in other currencies are initially reported using the exchange rate at the date of the transaction. Gains and losses from the settlement of such transactions and gains and losses on translation of monetary assets and liabilities denominated in other currencies are included in income, except when they are qualifying cash flow hedges or arise on monetary items that, in substance, form part of the Group's net investment in a foreign entity. In such cases the gains and losses are deferred into other comprehensive income.

Upon consolidation, assets and liabilities of Group companies using functional currencies other than Swiss francs are translated into Swiss francs using year-end rates of exchange. The income statement and statement of cash flows are translated at the average rates of exchange for the year. Translation differences due to the changes in exchange rates between the beginning and the end of the year and the difference between net income translated at the average and year-end exchange rates are taken directly to other comprehensive income.

Revenue

Sales. Revenue from the sale of goods supplied (product sales) and services rendered are recoded as 'Sales'.

Sales are recognised when a promise in a customer contract (performance obligation) has been satisfied by transferring control over the promised goods and services to the customer. Control over a promised good or service refers to the ability to direct the use of, and obtain substantially all of the remaining benefits from, those goods or services. Control is usually transferred upon shipment, delivery to, upon receipt of goods by the customer, or as services are rendered, in accordance with the delivery and acceptance terms agreed with the customers. For goods subject to installation, such as instruments sold in the Diagnostics Division, sales are generally recognised upon completion of the installation at the customer's site and customer acceptance. The amount of sales to be recognised (transaction price) is based on the consideration the Group expects to receive in exchange for its goods and services, excluding amounts collected on behalf of third parties such as value added taxes or other taxes directly linked to sales. If a contract contains more than one performance obligation, the transaction price is allocated to each performance obligation based on their relative stand-alone selling prices.

Instruments in the Diagnostics Division may be sold together with other goods such as reagents and other consumables as well as services under a single contract or under several contracts that are combined for revenue recognition purposes. Sales are recognised upon satisfaction of each of the performance obligations in the contract. Instruments are either sold in cash and instalment sales transactions or otherwise made available to customers under finance lease and operating lease transactions.

- Finance leases: Arrangements in which the Group transfers substantially all of the risks and rewards of ownership to the customer are treated as finance lease arrangements. Income from finance leases is recognised as revenue at amounts that represent the fair value of the instrument, which approximates the present value of the minimum lease payments under the arrangement. As interest rates embedded in finance lease arrangements are approximately market rates, income from finance leases is comparable to revenue for outright sales. Finance income for finance lease arrangements longer than twelve months is deferred and subsequently recognised based on a pattern that approximates the use of the effective interest rate method and recorded in royalty and other operating income.
- Operating leases: Income from operating leases is recognised as revenue on a straight-line basis over the lease term or, when lease revenue is entirely variable and subject to subsequent reagent sales, as the performance obligation to deliver reagents is satisfied.

Sales, net of discounts, are based on estimates regarding the related obligations, including their stand-alone selling prices or fair values. It requires judgement to determine when different obligations are satisfied, including whether enforceable purchase commitments for further obligations exist and when they arise.

For contracts with distributors, no sales are recognised when goods are physically transferred to the distributor under a consignment arrangement, or if the distributor acts as an agent. In such cases, sales are recognised when control over the goods transfers to the end-customer, and distributor's commissions are presented within marketing and distribution. Commissions and similar payments to distributors acting as principals are deducted from sales unless such payments are in exchange for a distinct service.

The consideration received by the Group in exchange for its goods and services may be fixed or variable. Variable consideration is only recognised when it is considered highly probable that a significant revenue reversal will not occur once the underlying uncertainty related to variable consideration is subsequently resolved. The most common elements of variable consideration in the Pharmaceuticals Division are listed below:

- Government and regulatory mandatory price reductions. These consist of mandatory price reductions. The major elements are 340B Drug Discount Program, Medicaid and other plans in the US.
- Contractual price reductions. These include rebates and chargebacks that are the result of contractual agreements that are primarily volume based and performance based.
- Cash discounts. These include credits offered to wholesalers for remitting payment on their purchases within contractually defined incentive periods.
- Customer returns reserves. These are allowances established for expected product returns.

Revenues from product sales are recorded net of allowances for estimated rebates, chargebacks, cash discounts and estimates of product returns, all of which are established at the time of sale. All product sales allowances are based on estimates of the amounts earned or to be claimed on the related sales. These estimates take into consideration historical experience, current contractual and statutory requirements, specific known market events and trends such as competitive pricing and new product introductions, estimated inventory levels, and the shelf life of products. If actual future results vary, these estimates need to be adjusted, with an effect on sales and earnings in the period of the adjustment. Sales reductions that are expected to be withheld by the customer upon settlement, such as contractual price reductions and cash discounts, are recorded in the balance sheet as a deduction from trade receivables. Sales reductions that are separately payable to customers, governmental health authorities or healthcare regulatory authorities are recorded in the balance sheet as accrued liabilities. Provisions for sales returns are recorded in the balance sheet as other provisions.

The Group recognises a deferred income (contract liability) if consideration has been received (or has become receivable) before the Group transfers the promised goods or services to the customer. Deferred income mainly relates to remaining performance obligations for goods free of charge under certain patient access or similar programmes, reagents and other consumables and services.

Remaining performance obligations in (partially) unsatisfied long-term contracts are either included in deferred income or are related to amounts the Group expects to receive for goods and services that have not yet been transferred to customers under existing, non-cancellable or otherwise enforceable contracts. These are mainly associated with contracts with minimum purchase commitments related to reagents and consumables for previously sold instruments as well as monitoring and maintenance services. For contracts that have an original duration of one year or less, the Group has elected the practical expedient to not disclose the transaction price for remaining performance obligations at the end of each reporting period and at which point in time the Group expects to recognise these sales.

Royalty and other operating income. Royalty and other operating income includes royalty income, income from out-licensing agreements and income from disposal of products and other items.

Royalty income earned through a licence is recognised as the underlying sales are recorded by the licensee.

Income from out-licensing agreements typically arises from the receipt of upfront, milestone and other similar payments from third parties for granting a licence to product- or technology-related intellectual property (IP). Out-licensing agreements may be entered into with no further obligation or may include commitments to conduct research, late-stage development, regulatory approval, co-marketing or manufacturing. Licences granted are usually rights to use IP and are generally unique. Therefore the basis of allocating revenue to performance obligations makes use of the residual approach. Upfront payments and other licensing fees are usually recognised upon granting the licence unless some of the income shall be deferred for other performance obligations using the residual approach. Such deferred income is released and recognised as revenue when other performance obligations are satisfied. Milestone payments are typically received upon reaching a specific scientific milestone (development milestone) or upon achieving a certain annual sales milestone (commercial milestone). Development milestone income is recognised at the point in time when it is highly probable that the respective milestone event criteria is achieved, and the risk of revenue reversal is considered remote. Commercial milestone income is accrued and recognised as revenue when it is highly probable that the annual sales milestone is reached during the period.

Payments received for the disposal of product and similar rights are recognised as revenue upon transfer of control over such rights. To the extent that some of these payments relate to other performance obligations, a portion is deferred using the residual approach and recognised as revenue when or as activities such as manufacturing or other services are rendered. Income from profit-sharing arrangements with collaboration partners is recognised as underlying sales and cost of sales are recorded by the collaboration partners. Also included is income from other services rendered which are usually not part of the Group's primary business activities, to the extent that such revenue is not recorded under 'Sales', and is recognised when control transfers and performance obligations are satisfied.

Cost of sales

Cost of sales includes the corresponding direct production costs and related production overheads of goods sold and services rendered. Royalties, alliance and collaboration expenses, including all collaboration profit-sharing arrangements are also reported as part of cost of sales. Start-up costs between validation and the achievement of normal production capacity are expensed as incurred.

Research and development

Internal research and development activities are expensed as incurred for the following:

- Internal research costs incurred for the purpose of gaining new scientific or technical knowledge and understanding.
- Internal development costs incurred for the application of research findings or other knowledge to plan and develop new products for commercial production. The development projects undertaken by the Group are subject to technical, regulatory and other uncertainties, such that, in the opinion of management, the criteria for capitalisation as intangible assets are not met prior to obtaining marketing approval by the regulatory authorities in major markets.
- Post-marketing studies after regulatory approval, such as phase IV costs in the pharmaceuticals business, generally involve safety surveillance and ongoing technical support of a drug after it receives marketing approval to be sold. They may be required by regulatory authorities or may be undertaken for safety or commercial reasons. The costs of such post-marketing studies are not capitalised as intangible assets as, in the opinion of management, they do not generate separately identifiable incremental future economic benefits that can be reliably measured.

Acquired in-process research and development resources obtained through in-licensing arrangements, business combinations or separate asset purchases are capitalised as intangible assets. The acquired asset must be controlled by the Group, be separately identifiable and expected to generate future economic benefits, even if uncertainty exists as to whether the research and development will ultimately result in a marketable product. Consequently, upfront and milestone payments to third parties for pharmaceutical products or compounds before regulatory marketing approval are recognised as intangible assets. Assets acquired through such arrangements are measured on the basis set out in the 'Intangible assets' policy. Subsequent internal research and development costs incurred post-acquisition are treated in the same way as other internal research and development costs. If research and development are embedded in contracts for strategic alliances, the Group carefully assesses whether upfront or milestone payments constitute funding of research and development work or acquisition of an asset.

Employee benefits

Short-term employee benefits include wages, salaries, social security contributions, paid annual leave and sick leave, profit sharing and bonuses, and non-monetary benefits for current employees. The costs are recognised within the operating results when the employee has rendered the associated service. The Group recognises a liability for profit sharing and bonuses where contractually obliged or where there is a past practice that has created a constructive obligation.

Long-term employee benefits include long-service or sabbatical leave, long-service benefits and long-term disability benefits. The expected costs of these benefits are accrued over the period of employment. Any changes in the carrying value of other long-term employee benefit liabilities are recognised within the operating results.

Termination benefits are payable when employment is terminated by the Group before the normal retirement date, or whenever an employee accepts voluntary redundancy in exchange for these benefits. Termination costs are recognised at the earlier of when the Group can no longer withdraw the offer of the benefits or when the Group recognises any related restructuring costs.

Pensions and other post-employment benefits

For defined contribution plans the Group contributions are recognised within the operating results when the employee has rendered the associated service. Prepaid contributions are recognised as an asset to the extent that a cash refund or a reduction in future payments is available.

For defined benefit plans the liability recognised in the balance sheet is the present value of the defined benefit obligation less the fair value of the plan assets. All changes in the net defined benefit liability are recognised as they occur as follows:

Recognised in the income statement:
- Current service cost is charged to the appropriate income statement heading within the operating results.
- Past service cost, including curtailment gains or losses, is recognised immediately in general and administration within the operating results.
- Settlement gains or losses are recognised in general and administration within the operating results.
- Net interest on the net defined benefit liability is recognised in financing costs.

Recognised in other comprehensive income:
- Actuarial gains and losses arising from experience adjustments (the difference between previous assumptions and what has actually occurred) and changes in actuarial assumptions.
- The return on plan assets, excluding amounts included in net interest on the net defined benefit liability.
- Any change in the limit on the recognition of plan assets, excluding amounts included in net interest on the net defined benefit liability.

Net interest on the net defined benefit liability is comprised of interest income on plan assets, interest cost on the defined benefit obligation and interest on the effect of the limit on the recognition of pension assets. The net interest is calculated using the same discount rate that is used in calculating the defined benefit obligation, applied to the net defined liability at the start of the period, taking into account any changes from contribution or benefit payments.

Pension assets and liabilities in different defined benefit plans are not offset unless the Group has a legally enforceable right to use the surplus in one plan to settle obligations in the other plan.

Equity compensation plans

The fair value of all equity compensation awards granted to employees is estimated at the grant date and recorded as an expense over the vesting period. The expense is charged to the appropriate income statement heading within the operating results. For equity-settled plans, an increase in equity is recorded for this expense and any subsequent cash flows from exercises of vested awards are recorded as changes in equity.

Property, plant and equipment

Property, plant and equipment are initially recorded at cost of purchase or construction, and include all costs directly attributable to bringing the asset to the location and condition necessary for it to be capable of operating in the manner intended by management. These include items such as costs of site preparation, installation and assembly costs, and professional fees. The net costs of testing whether the asset is functioning properly, including validation costs, are also included in the initially recorded cost of construction. Interest and other borrowing costs incurred with respect to qualifying assets are capitalised and included in the carrying value of the assets. Property, plant and equipment are depreciated on a straight-line basis, except for land, which is not depreciated. The estimated useful lives of major classes of depreciable assets are as follows:

Land improvements	40 years
Buildings	10–50 years
Machinery and equipment	4–15 years
Diagnostic instruments	3–5 years
Office equipment	3–6 years
Motor vehicles	5–8 years

Where parts of an item of property, plant and equipment have different useful lives, they are accounted for as separate components. The estimated useful lives of the assets are regularly reviewed and, if necessary, the future depreciation charges are accelerated. Repairs and maintenance costs are expensed as incurred.

Leases

Where the Group is the lessee – policy applicable from 1 January 2019. At inception of a contract the Group assesses whether a contract is, or contains, a lease. A contract is, or contains, a lease if the contract conveys the right to control the use of an identified asset for a period of time in exchange for consideration. The Group recognises a right-of-use asset and a corresponding lease liability for each contract that is, or contains, a lease at the lease commencement date, except for short-term leases and leases of low-value assets. Payments for short-term leases and leases of low-value assets are recognised as an expense on a straight-line basis over the term of the respective lease. The lease liability is initially measured at the present value of the future lease payments that are not paid at the lease commencement date. The lease payments are discounted using the interest rate implicit in the lease or, if not readily determinable, the Group's incremental borrowing rate in the respective markets. Lease payments include fixed payments, variable payments that depend on an index or rate known at the lease commencement date and payments from exercising extension or purchase options if the Group is reasonably certain to exercise. The lease liability is subsequently measured at amortised costs using the effective interest method. It is remeasured, with a corresponding adjustment to the related right-of-use asset, when there is a change in future lease payments following a contract renegotiation, a change of an index or rate or a reassessment of options. The right-of-use asset is initially measured at cost, which comprises the initial amount of the lease liability adjusted for any payments made at or before the lease commencement date and which includes any initial direct costs incurred and expected costs of obligations to dismantle, remove or refurbish the underlying asset, less any incentives received. Right-of-use assets are depreciated on a straight-line basis from the lease commencement date over the shorter of the lease term or the useful life of the underlying asset. Right-of-use assets are assessed for impairment whenever there is an indication for impairment.

Where the Group is the lessee – policy applicable before 1 January 2019. The Group classified leases that substantially transferred all of the risks and rewards of ownership as finance leases. Finance leases were capitalised as property, plant and equipment at the start of the lease at fair value, or the present value of the minimum lease payments, if lower. The rental obligation, net of finance charges, was reported within debt. Finance lease assets were depreciated over the shorter of the lease term and its useful life. The interest element of the lease payment was charged against income over the lease term based on the effective interest rate method. All other leases were classified as operating leases. Operating leases existed when substantially all of the risks and rewards of ownership were not transferred to the Group. Payments made under operating leases were charged against income on a straight-line basis over the period of the lease.

Where the Group is the lessor. Certain assets, mainly Diagnostics instruments, are leased to third-party customers through both finance and operating lease arrangements. Such transactions may be entered into in separate contracts or in combined contracts including reagents and other consumables and services. The treatment of leasing transactions is mainly determined by whether the lease is considered to be an operating or finance lease. In making this assessment, management looks at the substance of the lease, as well as the legal form, and makes a judgement about whether substantially all of the risks and rewards of ownership are transferred. If this is the case, then the lease is a finance lease. If not, then it is an operating lease. Arrangements which do not take the legal form of a lease but that nevertheless convey the right to use an asset are also covered by such assessments.

- Finance leases: Finance lease assets are reported as receivables at an amount equal to the net investment in the lease. Income from finance leases is recognised as revenue at amounts that represent the stand-alone selling price of the instrument, which approximates the present value of the minimum lease payments under the arrangement. Minimum lease payments exclude any variable lease payments or contingent rent. Finance income for finance lease arrangements longer than twelve months is deferred and subsequently recognised based on a pattern that approximates the use of the effective interest method and recorded in royalty and other operating income.
- Operating leases: Income from operating leases is recognised as revenue on a straight-line basis over the lease term at amounts that represent the stand-alone selling price of the instrument, which approximates the present value of the minimum lease payments under the arrangement. Minimum lease payments exclude any variable lease payments or contingent rent. When lease revenue is entirely based on variable lease payments and subject to subsequent reagent sales, it is recognised as the performance obligations for reagents are satisfied.

Sales, net of discounts, are based on estimates regarding the related obligations, including their stand-alone selling prices. It requires judgement to determine when different obligations are satisfied, including whether enforceable purchase commitments for further obligations exist and when they arise.

Mergers and acquisitions

Business combinations. Business combinations are accounted for using the acquisition method of accounting. At the date of the acquisition the Group initially recognises the fair value of the identifiable assets acquired, the liabilities assumed and any non-controlling interest in the acquired business. The consideration transferred is measured at fair value at the date of acquisition. Where the Group does not acquire 100% ownership of the acquired business, non-controlling interests are recorded either at fair value or as the proportion of the fair value of the acquired net assets attributable to the non-controlling interest. Directly attributable acquisition-related costs are expensed as incurred within general and administration expenses.

Asset acquisitions. Asset acquisitions are acquisitions of legal entities that do not qualify as business combinations. At the date of the acquisition the Group initially recognises the individual identifiable assets acquired and liabilities assumed. The cost to the Group at the date of the acquisition is allocated to the individual identifiable assets and liabilities on the basis of their relative fair values at the date of the acquisition. Subsequent consideration for performance-related development milestones is recognised as intangible assets when the specific milestones have been achieved. Such transactions do not give rise to goodwill. Material directly attributable acquisition-related costs are included in the cost of the acquired assets.

Goodwill

Goodwill arises in a business combination and is the excess of the consideration transferred to acquire the business over the underlying fair value of the net identified assets acquired. Goodwill is not amortised but is tested for impairment at least annually and upon the occurrence of an indication of impairment.

Intangible assets

Purchased patents, licences, trademarks and other intangible assets are initially recorded at cost. Assets that have been acquired through a business combination are initially recorded at fair value. Once available for use, intangible assets are amortised on a straight-line basis over their useful lives. Intangible assets are reviewed for impairment at each reporting date. The estimated useful life is the lower of the legal duration and the economic useful life. The estimated useful lives of intangible assets are regularly reviewed. Estimated useful lives of major classes of amortisable intangible assets are as follows:

Product intangibles in use	up to 20 years
Marketing intangibles in use	up to 15 years
Technology intangibles in use	up to 20 years

Impairment of property, plant and equipment, right-of-use assets and intangible assets

An impairment assessment is carried out when there is evidence that an asset may be impaired. In addition, intangible assets that are not yet available for use are tested for impairment annually. When the recoverable amount of an asset, being the higher of its fair value less costs of disposal and its value in use, is less than its carrying value, then the carrying value is reduced to its recoverable amount. This reduction is reported in the income statement as an impairment loss. Value in use is calculated using estimated cash flows, generally over a five-year period, with extrapolating projections for subsequent years. These are discounted using an appropriate long-term interest rate. When an impairment loss arises, the useful life of the asset is reviewed and, if necessary, the future depreciation/amortisation charge is accelerated. If the amount of impairment loss subsequently decreases and the decrease can be related objectively to an event occurring after the impairment was recognised, then the previously recognised impairment loss is reversed through the income statement as an impairment reversal.

Impairment of goodwill

Goodwill is assessed for impairment at each reporting date and is additionally tested annually for impairment. Goodwill is allocated to cash-generating units and when the recoverable amount of the cash-generating unit, being the higher of its fair value less costs of disposal or its value in use, is less than its carrying value, then the carrying value of the goodwill is reduced to its recoverable amount. This reduction is reported in the income statement as an impairment loss. When an acquired business that is included within a cash-generating unit permanently ceases to operate then it is treated as a disposal of that business. For separately identifiable goodwill that was generated on the initial acquisition of that business and where all of the factors that made up that goodwill are entirely unrelated to the continuing operations of the cash-generating unit, then the goodwill is deemed to have been disposed of and is fully impaired. The impairment testing methodology is further described in Note 9.

Inventories

Inventories are stated at the lower of cost and net realisable value. The cost of finished goods, work in process and intermediates includes raw materials, direct labour and other directly attributable costs and overheads based upon the normal capacity of production facilities. Cost is determined using the weighted average method. Net realisable value is the estimated selling price less cost to completion and selling expenses.

Receivables, including accounts receivable

Receivables are carried at the original invoice amount less allowances made for doubtful accounts, trade discounts, cash discounts, volume rebates and similar allowances. A receivable represents a right to consideration that is unconditional and excludes contract assets. An allowance for doubtful accounts is recorded for expected credit losses over the term of the receivables. These estimates are based on specific indicators, such as the ageing of customer balances, specific credit circumstances and the Group's historical loss rates for each category of customers, and adjusted for forward-looking macroeconomic data. Expenses for doubtful trade receivables are recognised within marketing and distribution expenses. Trade discounts, cash discounts, volume rebates and similar allowances are recorded on an accrual basis consistent with the recognition of the related sales, using estimates based on existing contractual obligations, historical trends and the Group's experience.

Receivables are written off (either partly or in full) when there is no reasonable expectation of recovery. Where receivables have been written off, the Group continues to engage in enforcement activities to attempt to recover the receivable due. Where recoveries are made, these are recognised in profit or loss.

For trade and lease receivables, the Group applies the simplified approach prescribed by IFRS 9, which requires/permits the use of the lifetime expected loss provision from initial recognition of the receivables. The Group measures an allowance for doubtful accounts equal to the credit losses expected over the lifetime of the trade and lease receivables.

Cash and cash equivalents

Cash and cash equivalents include cash on hand and time, call and current balances with banks and similar institutions. Such balances are only reported as cash equivalents if they are readily convertible to known amounts of cash, are subject to insignificant risk of changes in their fair value and have a maturity of three months or less from the date of acquisition.

Provisions and contingencies

Provisions are recognised where a legal or constructive obligation has been incurred which will probably lead to an outflow of resources that can be reliably estimated. In particular, restructuring provisions are recognised when the Group has a detailed formal plan that has either commenced implementation or has been announced. Provisions are recorded for the estimated ultimate liability that is expected to arise and are discounted when the time value of money is material. A contingent liability is disclosed where the existence of the obligation will only be confirmed by future events or where the amount of the obligation cannot be measured with reasonable reliability. Contingent assets are not recognised, but are disclosed where an inflow of economic benefits is probable.

Fair values

Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. It is determined by reference to quoted market prices or by the use of established valuation techniques such as option pricing models and the discounted cash flow method if quoted prices in an active market are not available.

Financial instruments

Policy applicable from 1 January 2018. From 1 January 2018 the Group classifies its financial instruments in the following measurement categories which are disclosed in Note 31: amortised cost; fair value through OCI; fair value through OCI – equity investments; or fair value through profit or loss (including hedging instruments).

The classification depends on the Group's business model for managing the financial assets and the contractual terms of the cash flows. The Group reclassifies debt securities and financial assets at amortised cost when and only when its business model for managing those assets changes.

At initial recognition, the Group measures a financial asset at its fair value plus, in the case of a financial asset not at fair value through profit or loss, transaction costs that are directly attributable to the acquisition of the financial asset. Transaction costs of financial assets carried at fair value through profit or loss are expensed in profit or loss.

Amortised cost. Assets that are held for collection of contractual cash flows where those cash flows represent solely payments of principal and interest are measured at amortised cost, less provision for impairment. A gain or loss on a debt security that is subsequently measured at amortised cost and is not part of a hedging relationship is recognised in profit or loss when the asset is derecognised or impaired. Interest income from these financial assets is included in other financial income using the effective interest rate method. Assets at amortised cost are mainly comprised of accounts receivable, cash and cash equivalents and time accounts over three months.

Fair value through other comprehensive income (fair value through OCI). These are financial assets that are held for collection of contractual cash flows and for selling the financial assets, where the assets' cash flows represent solely payments of principal and interest. Those are initially recorded and subsequently carried at fair value. Changes in the fair value are recorded in other comprehensive income, except for the recognition of impairment gains or losses, interest revenue and foreign exchange gains and losses which are recognised in profit or loss. When the financial asset is derecognised, the cumulative gain or loss previously recognised in OCI is reclassified from equity to profit or loss. Interest income from these financial assets is included in other financial income using the effective interest rate method. Fair value through other comprehensive income assets are mainly comprised of money market instruments and debt securities.

Equity investments at fair value through other comprehensive income (fair value through OCI). These are equity investments in private biotechnology companies, which are kept as part of the Group's strategic alliance efforts. These assets are subsequently measured at fair value. Dividends are recognised as other financial income in profit or loss unless the dividend clearly represents a recovery of part of the cost of the investment. Other net gains and losses are recognised in OCI and included in the fair value reserve. When such an asset is derecognised, the cumulative gain or loss previously recognised in OCI is reclassified within equity from the fair value reserve to retained earnings and never to profit or loss.

Fair value through profit or loss. These are financial assets whose performance is evaluated on a fair value basis. A gain or loss on a financial asset that is subsequently measured at fair value through profit or loss and is not part of a hedging relationship is recognised in profit or loss and presented within other financial income (expense) in the period in which it arises. Fair value through profit or loss assets are mainly comprised of equity investments/securities. Contingent consideration liabilities are initially recorded and subsequently carried at fair value with changes in fair value recorded in general and administration within the operating results of the income statement.

Fair value through profit or loss – hedging instruments. These are derivative financial instruments that are used to manage the exposures to foreign currency, interest rate, equity market and credit risks. These instruments are initially recorded and subsequently carried at fair value. Apart from those derivatives designated as qualifying cash flow hedging instruments, all changes in fair value are recorded as other financial income (expense).

Other financial liabilities. These are non-derivative financial liabilities. Other financial liabilities are initially recorded at fair value, less transaction costs, and subsequently carried at amortised cost using the effective interest rate method. Other financial liabilities are mainly comprised of debt and trade payables.

Debt. Debt instruments are initially recorded at cost, which is the proceeds received, net of transaction costs. Subsequently they are reported at amortised cost. Any discount between the net proceeds received and the principal value due on redemption is amortised over the duration of the debt instrument and is recognised as part of financing costs using the effective interest rate method.

A financial asset is derecognised when the contractual cash flows from the asset expire or when the Group transfers the rights to receive the contractual cash flows from the financial assets in a transaction in which substantially all the risks and rewards of ownership of the financial asset are transferred. A financial liability is derecognised when the contractual obligations are discharged, cancelled or expire.

Policy applicable before 1 January 2018 for financial instruments previously classified as available-for-sale. These were non-derivative financial assets that were either designated as such or were not classified in any other financial asset category. Available-for-sale assets were initially recorded and subsequently carried at fair value. Changes in fair value were recorded in other comprehensive income, except for impairments and interest and foreign exchange components. When an investment was derecognised, the cumulative gains and losses in equity were reclassified to other financial income (expense). Available-for-sale assets were mainly comprised of marketable securities.

Impairment of financial assets

The Group recognises loss allowances for expected credit losses ('ECL') for financial assets measured at amortised cost and debt securities measured at fair value through OCI.

For trade and lease receivables the Group measures the allowance for doubtful accounts at an amount equal to lifetime ECL.

For debt securities carried at fair value through OCI and debt securities and other financial assets at amortised cost, which are determined to have low credit risk based on external credit ratings of the counterparties, the Group measures loss allowances at an amount equal to 12-month ECL. The Group considers debt securities to have low credit risk when their credit risk rating is equivalent to the globally understood definition of 'investment grade'. The Group considers this to be at least Baa3 from Moody's and BBB- from Standard & Poor's. When the credit risk of debt securities carried at fair value through OCI and debt securities and other financial assets at amortised cost has increased significantly since their initial recognition, the Group measures loss allowances at an amount equal to lifetime ECL. The Group assumes that the credit risk of such instruments have increased significantly if they are more than 30 days past due.

Financial assets are written off (either partially or in full) when there is no realistic prospect of recovery. This is generally the case when the Group determines that the customer does not have assets or sources of income that could generate sufficient cash flows to repay the amounts subject to the write-off. However, financial assets that are written off are still subject to enforcement activities in order to comply with the Group's policy for recovery of amounts due.

Hedge accounting

The Group uses derivatives to manage its exposures to foreign currency, interest rate, equity market and credit risks. The instruments used may include interest rate swaps, cross-currency swaps, forwards contracts and options. The Group generally limits the use of hedge accounting to certain significant transactions. To qualify for hedge accounting, the hedging relationship must meet several strict conditions on eligibility of hedging and hedged instruments, formal designation and documentation, as well as hedge effectiveness and reliability of measurement. While many of these transactions can be considered as hedges in economic terms, if the required conditions are not met, then the relationship does not qualify for hedge accounting. In this case the hedging instrument and the hedged item are reported independently as if there were no hedging relationship, which means that any derivatives are reported at fair value, with changes in fair value included in other financial income (expense).

Cash flow hedge. This is a hedge of the exposure to variability in cash flows that is attributable to a particular risk associated with a recognised asset or liability or a highly probable forecast transaction and could affect profit or loss. The hedging instrument is recorded at fair value. The effective portion of the hedge is included in other comprehensive income and any ineffective portion is reported in other financial income (expense). If the hedging relationship is the hedge of the foreign currency risk of a firm commitment or highly probable forecasted transaction that results in the recognition of a non-financial item, the cumulative changes in the fair value of the hedging instrument that have been recorded in other comprehensive income are included in the initial carrying value of the non-financial item at the date of recognition. For all other cash flow hedges, the cumulative changes in the fair value of the hedging instrument that have been recorded in other comprehensive income are included in other financial income (expense) when the forecasted transaction affects net income.

Fair value hedge. This is a hedge of the exposure to changes in fair value of a recognised asset or liability, or an unrecognised firm commitment, or an identified portion of such an asset, liability or firm commitment, that is attributable to a particular risk and could affect profit or loss. The hedging instrument is recorded at fair value and the hedged item is recorded at its previous carrying value, adjusted for any changes in fair value that are attributable to the hedged risk. Changes in the fair values are reported in other financial income (expense).

Taxation

Income taxes include all taxes based upon the taxable profits of the Group, including withholding taxes payable on the distribution of retained earnings within the Group. Other taxes not based on income, such as property and capital taxes, are included within general and administration expenses.

Liabilities for income taxes, mainly withholding taxes, which could arise on the remittance of retained earnings, principally relating to subsidiaries, are only recognised where it is probable that such earnings will be remitted in the foreseeable future. Where the amount of tax liabilities is uncertain, accruals are recorded within income tax liabilities for management's best estimate of the ultimate liability that is expected to arise based on the specific circumstances and the Group's historical experience.

Deferred tax assets and liabilities are recognised on temporary differences between the tax bases of assets and liabilities and their carrying values. Deferred tax assets are recognised to the extent that it is probable that future taxable profit will be available against which the unused tax losses can be utilised.

Current and deferred tax assets and liabilities are offset when the income taxes are levied by the same taxation authority and when there is a legally enforceable right to offset them. Deferred taxes are determined based on the currently enacted tax rates applicable in each tax jurisdiction where the Group operates.

Own equity instruments

The Group's holdings in its own equity instruments are recorded as a deduction from equity. The original purchase cost, consideration received for subsequent resale of these equity instruments and other movements are reported as changes in equity. These instruments are held for the Group's potential conversion obligations that may arise from the Group's equity compensation plans.

Changes in accounting policies

In 2019 the Group has adopted IFRS 16 'Leases', including any consequential amendments to other standards, effective 1 January 2019. The Group has applied the cumulative catch-up method for the transition, meaning that the comparative 2018 results have not been restated. Full details are given in Note 28.

The Group has also implemented various other minor amendments to existing standards and interpretations, including IFRIC 23 'Uncertainty over Income Tax Treatments', which have no material impact on the Group's overall results and financial position.

Future new and revised standards

The Group is currently assessing the potential impacts of the various new and revised standards and interpretations which the Group has not yet applied. Based on an analysis of the standards and interpretations that will be mandatory from 1 January 2020, the Group does not anticipate that these will have a material impact on the Group's overall results and financial position.

Report of Roche Management on Internal Control over Financial Reporting

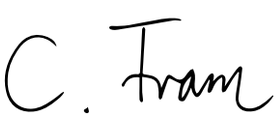
Report of Roche Management on Internal Control over Financial Reporting

The Board of Directors and management of Roche Holding Ltd are responsible for establishing and maintaining adequate control over financial reporting. The internal control system was designed to provide reasonable assurance over the reliability of financial reporting and the preparation and fair presentation of consolidated financial statements in accordance with International Financial Reporting Standards.

All internal control systems, no matter how well designed, have inherent limitations. Therefore, even those systems determined to be effective may not prevent or detect misstatements and can provide only reasonable assurance with respect to financial statement preparation and presentation. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions or that the degree of compliance with the policies or procedures may deteriorate.

Management assessed the effectiveness of its system of internal control over financial reporting as of 31 December 2019 based on the criteria for effective internal control over financial reporting described in *Internal Control – Integrated Framework 2013* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this assessment, management has concluded that the system of internal control over financial reporting was effective as of 31 December 2019.

The Statutory Auditor KPMG AG has audited the consolidated financial statements of Roche Holding Ltd for the year ended 31 December 2019, in accordance with Swiss Auditing Standards and with the International Standards on Auditing (ISA). They have also issued a report on the effectiveness of the Group's system of internal control over financial reporting. This report is set out on pages 156 to 157.



Christoph Franz
Chairman of the Board of Directors

Alan Hippe
Chief Financial Officer

Basel, 27 January 2020

Statutory Auditor's Report

To the General Meeting of Roche Holding Ltd, Basel

Report on the Audit of the Consolidated Financial Statements

Opinion

We have audited the consolidated financial statements of Roche Holding Ltd and its subsidiaries (the Group), which comprise the consolidated balance sheet as at 31 December 2019 and the consolidated income statement, consolidated statement of comprehensive income, consolidated statement of changes in equity and consolidated statement of cash flows for the year then ended, and notes to the consolidated financial statements, including a summary of significant accounting policies.

In our opinion the consolidated financial statements (pages 42–148) give a true and fair view of the consolidated financial position of the Group as at 31 December 2019, and its consolidated financial performance and its consolidated cash flows for the year then ended in accordance with International Financial Reporting Standards (IFRS) and comply with Swiss law.

Basis for Opinion

We conducted our audit in accordance with Swiss law, International Standards on Auditing (ISAs) and Swiss Auditing Standards. Our responsibilities under those provisions and Standards are further described in the Auditor's Responsibilities for the Audit of the Consolidated Financial Statements section of our report. We are independent of the Group in accordance with the provisions of Swiss law and the requirements of the Swiss audit profession, as well as the IESBA Code of Ethics for Professional Accountants, and we have fulfilled our other ethical responsibilities in accordance with those requirements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Key Audit Matters

Chargebacks, other rebates and sales returns in the US pharmaceuticals business

Carrying value of product intangible assets

Income tax – uncertain tax positions

Key audit matters are those matters that, in our professional judgement, were of most significance in our audit of the consolidated financial statements of the current period. These matters were addressed in the context of our audit of the consolidated financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters.

KPMG

Chargebacks, other rebates and sales returns in the US pharmaceuticals business

Key Audit Matter

The Group's pharmaceuticals business makes sales to various customers in the US that fall under certain commercial and government-mandated contracts, purchasing and reimbursement arrangements, of which the most significant are Medicaid and the 340B Drug Discount Program. The Group also provides a right of return to its US customers for certain products, with return periods that in some cases extend several years into the future. These arrangements result in deductions to gross amounts invoiced in arriving at revenue and create obligations for the Group to provide customers with credits, chargebacks or rebate payments. The estimated amounts are deducted from gross sales and recorded as accrued liabilities (rebates) or provisions for sales returns, or as a deduction from accounts receivable (chargebacks). These estimates are based on analyses of existing contractual or legislatively mandated obligations, recent trends and historical experience.

Management has determined accrued liabilities and deductions to accounts receivable for expected chargebacks and other rebates, predominantly Medicaid, of CHF 1,459 million to be necessary at 31 December 2019. Additionally, provisions for sales returns mainly relating to products at or near loss of exclusivity of CHF 562 million were recorded at 31 December 2019.

We focused on this area because the arrangements are complex and because establishing an appropriate year-end position requires significant judgement and estimation by management. The assumptions required for estimating provisions for sales returns are also made more complicated given the recent or impending loss of exclusivity in the US for some of the Group's pharmaceutical products.

Our response

Our audit procedures included, amongst others, on a sample basis, obtaining management's calculations for accrued liabilities, provisions and accounts receivable deductions, testing the accuracy of the calculations and assessing the appropriateness of key inputs and assumptions used in the estimates. In performing our assessment, we referenced internal and external sources of information, including the terms of the applicable contracts, US government pricing information, historical rates of chargebacks and other rebates, historical rates of sales returns and consideration of current trends.

We also evaluated the accuracy of management's estimates by comparing rates used in historical estimates to the rates of actual rebate payments and chargebacks. We assessed changes in the accrual rates used within the estimates for 2019 by comparing the accrual rates to current chargeback, other rebate payment and sales return trends.

We also evaluated the appropriateness of the Group's revenue recognition accounting policies, including the recognition and measurement of deductions to gross sales relating to chargebacks, other rebates and sales returns and related disclosures.

For further information on chargebacks, other rebates and sales returns in the US pharmaceuticals business refer to the following:

Page 138 (Significant accounting policies, note 34), page 48 (General accounting principles – Key accounting judgements, estimates and assumptions, note 1) and pages 56, 79 and 82–88 (Financial disclosures, note 3 Revenue, note 12 Accounts receivable, note 19 Other current liabilities and note 20 Provisions and contingent liabilities).

KPMG

Carrying value of product intangible assets

Key Audit Matter

The Group has significant product intangible assets (31 December 2019 – CHF 7,786 million) acquired through business combinations or in-licensing arrangements. These comprise product intangibles in use (CHF 6,072 million) being amortised and product intangibles not available for use (CHF 1,714 million) not being amortised. An impairment assessment is carried out for all product intangibles when there is evidence that an asset may be impaired, with intangible assets that are not yet available for use also being tested for impairment annually.

Product intangibles in use (CHF 6,072 million) predominantly relate to acquired products that have been launched, with the key risk being the ability to successfully commercialise the products concerned. Key estimates and assumptions include revenue growth, the timing and impact of loss of exclusivity, discount rates and the development and commercialisation of competing products. The drivers of revenue growth include persistence rate, treatment rate and market share.

Product intangibles not available for use (CHF 1,714 million) mostly represent in-process research and development assets. Due to the inherent uncertainties in the research and development processes, intangible assets not available for use are particularly at risk of impairment. The impairment assessment requires management to make key assumptions and judgements on the clinical, technical and commercial viability of the new products. Accordingly, we also focused our audit work on these areas. Risks include an inability to achieve successful trial results, obtain required clinical and/or regulatory approvals and a highly competitive business environment in the therapeutic areas where the Group has significant assets in research or development.

Our response

Our audit procedures included, amongst others, challenging the robustness of the key assumptions used to determine the recoverable amounts, including forecast revenues, useful lives and the discount rates. Our challenge was based on our understanding of the commercial prospects of the individual products, as well as the relevant business areas and markets in which they operate. We used our valuation specialists to assist us in evaluating the assumptions and methodologies used by management in relation to the discount rates. We assessed the key inputs such as projected pricing and volumes, and the products' projected share of the therapeutic area or *in vitro* diagnostic market, by comparing relevant assumptions to industry forecasts, reviewing analyst commentaries and by retrospective assessment of the accuracy of previous projections. We compared management's assumptions with external data where it was available. We performed sensitivity analysis over individual intangible asset impairment models to assess the level of sensitivity to key assumptions so we could focus our work on those areas and assess management's allowance for risk.

For product intangibles not yet available for use, our audit included assessing the reasonableness of management's assumptions regarding the probability of obtaining regulatory approval through comparison to industry practice, past history, and consideration of the Group's internal governance and approval processes. We also interviewed senior research, development and commercial personnel in order to understand and challenge those assumptions.

For further information on the carrying value of product-related intangible assets refer to the following:

Page 138 (Significant accounting policies, note 34), page 48 (General accounting principles – Key accounting judgements, estimates and assumptions, note 1) and pages 75–78 (Financial disclosures, note 10 Intangible assets).

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Income tax – uncertain tax positions

Key Audit Matter

The Group operates across a wide range of different tax jurisdictions around the world and thus its tax treatments in tax filings are subject to challenge by local tax authorities in respect of cross-border transfer pricing arrangements for goods and services, financing and transaction-related tax matters in connection with the integration of investments, divestments and licensing contracts. Tax treatments involving uncertainty include agreements and transfer pricing arrangements between affiliates involved in the Group's global manufacturing supply chains.

Where it is not probable that the tax authority will accept a treatment, the tax liability recognised in the financial statements reflects management's best estimate of the outcome based on the facts known in the relevant jurisdiction. The Group has open tax and transfer pricing matters with various tax authorities where the range of possible outcomes is broad. At 31 December 2019, the Group has recognised current income tax liabilities of CHF 3,838 million which includes accruals for uncertain tax positions.

We focused on this area as there is uncertainty regarding the estimates of the amounts of tax receivable or payable, and these therefore require a significant level of expertise and judgement.

Our response

Our audit procedures included, amongst others, obtaining an understanding of uncertain tax positions through inquiry of employees of the tax department and management of affiliates. We inspected documentation in relation to tax exposure items including correspondence with tax authorities and reports issued by tax advisors to verify whether uncertain tax positions have been considered and provided for where necessary.

For significant items we challenged management's judgement regarding the eventual resolution the uncertainty with the assistance of our local country tax specialists and re-performed the calculation of the estimated exposure. We inspected third-party transfer pricing studies and evaluated, where applicable, past experience of management's interactions with the tax authorities in the respective jurisdiction. Additionally, we used our own tax specialists' expertise to assess the appropriateness of the key assumptions made by management and to conclude on a best estimate of the outcome.

Our audit approach included additional audit procedures performed at Group level to consider uncertain tax positions arising for the Group in particular with respect to transfer pricing arrangements for goods and services and transaction-related tax matters.

For further information on uncertain tax positions refer to the following:

Page 138 (Significant accounting policies, note 34), page 48 (General accounting principles – Key accounting judgements, estimates and assumptions, note 1) and pages 60–63 (Financial disclosures, note 5 Income taxes).

Other Information in the Annual Report

The Board of Directors is responsible for the other information in the annual report. The other information comprises all information included in the annual report, but does not include the consolidated financial statements, the stand-alone financial statements of the company, the remuneration report and our auditor's reports thereon.

Our opinion on the consolidated financial statements does not cover the other information in the annual report and we do not express any form of assurance conclusion thereon.

In connection with our audit of the consolidated financial statements, our responsibility is to read the other information in the annual report and, in doing so, consider whether the other information is materially inconsistent with the consolidated financial statements or our knowledge obtained in the audit, or otherwise appears to be materially misstated. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Responsibility of the Board of Directors for the Consolidated Financial Statements

The Board of Directors is responsible for the preparation of consolidated financial statements that give a true and fair view in accordance with IFRS and the provisions of Swiss law, and for such internal control as the Board of Directors determines is necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, the Board of Directors is responsible for assessing the Group's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the Board of Directors either intends to liquidate the Group or to cease operations, or has no realistic alternative but to do so.

Auditor's Responsibilities for the Audit of the Consolidated Financial Statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Swiss law, ISAs and Swiss Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements.

As part of an audit in accordance with Swiss law, ISAs and Swiss Auditing Standards, we exercise professional judgment and maintain professional scepticism throughout the audit. We also:

— Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

— Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances.

— Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made.

— Conclude on the appropriateness of the Board of Directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the consolidated financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Group to cease to continue as a going concern.

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— Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

— Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the consolidated financial statements. We are responsible for the direction, supervision and performance of the Group audit. We remain solely responsible for our audit opinion.

We communicate with the Board of Directors or its relevant committee regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide the Board of Directors or its relevant committee with a statement that we have complied with relevant ethical requirements regarding independence, and communicate to them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

From the matters communicated with the Board of Directors or its relevant committee, we determine those matters that were of most significance in the audit of the consolidated financial statements of the current period and are therefore the key audit matters. We describe these matters in our auditor's report, unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

Report on Other Legal and Regulatory Requirements

In accordance with article 728a para. 1 item 3 CO and the Swiss Auditing Standard 890, we confirm that an internal control system exists, which has been designed for the preparation of consolidated financial statements according to the instructions of the Board of Directors.

We recommend that the consolidated financial statements submitted to you be approved.

KPMG AG

Mark Baillache
Licensed Audit Expert
Auditor in Charge

Marc Ziegler
Licensed Audit Expert

Basel, 27 January 2020

KPMG AG, Viaduktstrasse 42, PO Box 3456, CH-4002 Basel

Independent Reasonable Assurance Report on Internal Control over Financial Reporting

To the Board of Directors of Roche Holding Ltd, Basel

We were engaged by the Board of Directors to carry out a reasonable assurance engagement on the design, implementation and operating effectiveness of the system of internal control over financial reporting of the Roche Group as it was in place at 31 December 2019. Management of Roche Holding Ltd assessed the effectiveness of its system of internal control over financial reporting as of 31 December 2019 based on the criteria for effective internal control over financial reporting described in *Internal Control – Integrated Framework 2013*, issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

Responsibilities of the Board of Directors and Management

The Board of Directors and management of Roche Holding Ltd are responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting as included in the accompanying Report of Roche Management on Internal Control over Financial Reporting.

An entity's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial statements prepared in accordance with International Financial Reporting Standards (IFRS). An entity's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the entity; (2) provide reasonable assurance that transactions are recorded as necessary to permit the preparation of financial statements in accordance with the applicable financial reporting framework; and (3) provide reasonable assurance regarding the prevention or timely detection of the unauthorised acquisition, use, or disposition of the entity's assets that could have a material effect on the entity's financial statements.

Because of the inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Our Responsibilities

Our responsibility is to examine the design, implementation and effectiveness of the company's internal control over financial reporting and to report thereon in the form of an independent, reasonable assurance conclusion, based on the evidence obtained. We conducted our engagement in accordance with the International Standard on Assurance Engagements (ISAE) 3000 *Assurance Engagements Other Than Audits or Reviews of Historical Financial Information* issued by the International Auditing and Assurance Standards Board. That standard requires that we plan and perform our procedures to obtain reasonable assurance about whether effective internal control over financial reporting was maintained, in all material respects.

The procedures selected depend on our judgement, including the assessment of the risks of material misstatement of the design, implementation and effectiveness of the company's internal control over financial reporting. Our examination included obtaining an understanding of internal control over financial reporting, testing and evaluating the design, implementation and operating effectiveness of internal control based on the assessed risk, and performing such other procedures, as we considered necessary in the circumstances.

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Our Independence and Quality Control

The firm applies International Standard on Quality Control 1 and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

We have complied with the independence and other ethical requirements of the *Code of Ethics for Professional Accountants* issued by the International Ethics Standards Board for Accountants, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

Conclusion

Our conclusion has been formed on the basis of, and is subject to, the matters outlined in this report.

We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our conclusion.

In our opinion, the Roche Group maintained, in all material respects, effective internal control over financial reporting as of 31 December 2019 based on criteria established in *Internal Control – Integrated Framework 2013* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

We also have audited, in accordance with Swiss Auditing Standards and International Standards on Auditing, the consolidated financial statements of Roche Holding Ltd for the year ended 31 December 2019 and our report dated 27 January 2020 expressed an unqualified opinion on those consolidated financial statements.

KPMG AG

Mark Baillache
Licensed Audit Expert

Marc Ziegler
Licensed Audit Expert

Basel, 27 January 2020

KPMG AG, Viaduktstrasse 42, PO Box 3456, CH-4002 Basel

Multi-Year Overview and Supplementary Information

Multi-Year Overview

Statistics, as reported

	2010	2011	2012
Income statement in millions of CHF			
Sales	47,473	42,531	45,499
EBITDA	18,517	16,933	19,040
Operating profit	13,486	13,454	14,125
Net income attributable to Roche shareholders	8,666	9,343	9,539
Research and development	10,026	8,326	9,552
Balance sheet in millions of CHF			
Non-current assets	33,408	33,344	33,434
Current assets	27,612	28,232	31,371
Total assets	61,020	61,576	64,805
Non-current liabilities	(34,380)	(30,884)	(27,868)
Current liabilities	(14,978)	(16,210)	(20,209)
Total liabilities	(49,358)	(47,094)	(48,077)
Net assets	11,662	14,482	16,728
Capital and reserves attributable to Roche shareholders	9,469	12,095	14,494
Equity attributable to non-controlling interests	2,193	2,387	2,234
Additions to property, plant and equipment	2,633	2,006	2,130
Personnel			
Number of employees at end of year	80,653	80,129	82,089
Key ratios			
Net income attributable to Roche shareholders as % of sales	18	22	21
Net income attributable to Roche shareholders as % of equity	92	77	66
Research and development as % of sales	21	20	21
Current ratio %	184	174	155
Equity and non-controlling interests as % of total assets	19	24	26
Human capital return on investment ratio	2.13	2.31	2.25
Data on shares and non-voting equity securities			
Number of shares	160,000,000	160,000,000	160,000,000
Number of non-voting equity securities *(Genussscheine)*	702,562,700	702,562,700	702,562,700
Total shares and non-voting equity securities	862,562,700	862,562,700	862,562,700
Total dividend in millions of CHF	5,693	5,865	6,340
Earnings per share and non-voting equity security (diluted) in CHF	10.11	10.98	11.16
Dividend per share and non-voting equity security in CHF	6.60	6.80	7.35

Information in this table is stated as reported and changes in accounting policies arising from changes in International Financial Reporting Standards are not applied retrospectively.

2013	2014	2015	2016	2017	2018	2019
46,780	47,462	48,145	50,576	53,299	56,846	61,466
19,802	19,558	19,479	20,483	21,201	22,825	25,419
16,376	14,090	13,821	14,069	13,003	14,769	17,548
11,164	9,332	8,863	9,576	8,633	10,500	13,497
9,270	9,895	9,581	11,532	11,292	12,092	12,774
33,003	44,426	47,581	48,149	45,104	46,273	51,837
29,164	31,114	28,182	28,670	31,572	32,244	31,254
62,167	75,540	75,763	76,819	76,676	78,517	83,091
(25,166)	(30,874)	(28,695)	(27,817)	(25,509)	(25,118)	(23,105)
(15,760)	(23,108)	(23,768)	(22,600)	(22,160)	(23,033)	(24,119)
(40,926)	(53,982)	(52,463)	(50,417)	(47,669)	(48,151)	(47,224)
21,241	21,558	23,300	26,402	29,007	30,366	35,867
19,294	19,586	20,979	23,911	26,441	27,622	32,747
1,947	1,972	2,321	2,491	2,566	2,744	3,120
2,458	2,905	4,077	3,790	3,477	3,796	3,479
85,080	88,509	91,747	94,052	93,734	94,442	97,735
24	20	18	19	16	19	22
58	48	42	40	33	38	41
20	21	20	23	21	21	21
185	135	119	127	142	140	130
34	29	31	34	38	39	43
2.45	2.16	2.06	2.06	1.89	1.96	2.07
160,000,000	160,000,000	160,000,000	160,000,000	160,000,000	160,000,000	160,000,000
702,562,700	702,562,700	702,562,700	702,562,700	702,562,700	702,562,700	702,562,700
862,562,700	862,562,700	862,562,700	862,562,700	862,562,700	862,562,700	862,562,700
6,728	6,901	6,987	7,073	7,159	7,504	7,763[a]
12.93	10.81	10.28	11.13	10.04	12.21	15.62
7.80	8.00	8.10	8.20	8.30	8.70	9.00[a]

a) 2019 dividend proposed by the Board of Directors.

Sales by division in millions of CHF

	2015	2016	2017	2018	2019
Pharmaceuticals	37,331	39,103	41,220	43,967	48,516
Diagnostics	10,814	11,473	12,079	12,879	12,950
Total	**48,145**	**50,576**	**53,299**	**56,846**	**61,466**

Sales by geographical area in millions of CHF

	2015	2016	2017	2018	2019
Switzerland	497	577	574	627	590
Germany	2,734	3,004	3,041	3,147	3,050
Rest of Europe	10,046	10,264	10,135	9,828	9,654
Europe	**13,277**	**13,845**	**13,750**	**13,602**	**13,294**
United States	20,164	21,192	23,122	26,105	29,724
Rest of North America	855	851	897	931	985
North America	**21,019**	**22,043**	**24,019**	**27,036**	**30,709**
Latin America	2,832	2,681	3,024	2,870	2,858
Japan	3,648	4,211	4,214	4,175	4,545
Rest of Asia	6,006	6,461	6,824	7,689	8,701
Asia	**9,654**	**10,672**	**11,038**	**11,864**	**13,246**
Africa, Australia and Oceania	1,363	1,335	1,468	1,474	1,359
Total	**48,145**	**50,576**	**53,299**	**56,846**	**61,466**

Additions to property, plant and equipment by division in millions of CHF

	2015	2016	2017	2018	2019
Pharmaceuticals	2,706	2,154	2,030	2,340	1,864
Diagnostics	1,363	1,629	1,443	1,376	1,552
Corporate	8	7	4	80	63
Total	**4,077**	**3,790**	**3,477**	**3,796**	**3,479**

Additions to property, plant and equipment by geographical area in millions of CHF

	2015	2016	2017	2018	2019
Switzerland	964	892	846	858	754
Germany	602	759	541	543	459
Rest of Europe	349	315	322	329	339
Europe	**1,915**	**1,966**	**1,709**	**1,730**	**1,552**
United States	1,382	1,060	844	900	900
Rest of North America	4	7	7	4	3
North America	**1,386**	**1,067**	**851**	**904**	**903**
Latin America	132	133	110	113	120
Japan	230	192	331	647	502
Rest of Asia	379	387	422	371	367
Asia	**609**	**579**	**753**	**1,018**	**869**
Africa, Australia and Oceania	35	45	54	31	35
Total	**4,077**	**3,790**	**3,477**	**3,796**	**3,479**

Alternative Performance Measures

The financial information included in the Financial Review includes certain Alternative Performance Measures (APMs) which are not accounting measures as defined by IFRS, in particular the core results, net working capital, net operating assets, free cash flow and constant exchange rates. These APMs should not be used instead of, or considered as alternatives to, the Group's consolidated financial results based on IFRS. These APMs may not be comparable to similarly titled measures disclosed by other companies. All APMs presented in the Financial Review relate to the performance of the current year and comparative periods.

Core results

Core results allow for an assessment of both the Group's actual results as defined by IFRS and the underlying performance of the business. The core results concept, which is used in the internal management of the business, is based on the IFRS results, with the following adjustments:

- Global restructuring plans (see Note 7) are excluded.
- Amortisation and impairment of intangible assets (see Note 10) and impairment of goodwill (see Note 9) are excluded.
- Acquisition accounting and other impacts from the accounting for merger and acquisition transactions and alliance arrangements (see Financial Review) are excluded.
- Discontinued operations (currently none) are excluded.
- Legal and environmental cases (see Financial Review) are excluded.
- Global issues outside the healthcare sector beyond the Group's control are excluded.
- Material treasury items such as major debt restructurings (currently none) are excluded.
- Pension plan settlements (see Note 26) are excluded.
- The tax benefit recorded under IFRS in respect of Equity Compensation Plans (ECPs), which varies according to the price of the underlying equity, is replaced by a normalised tax benefit, being the IFRS 2 expense multiplied by the applicable tax rate (see Note 5).

The core results concept was further described on 22 October 2010 at an Investor Update teleconference, which is available for download at: http://www.roche.com/investors/ir_agenda/csr_151010.htm

The Group's IFRS results, including the divisional breakdown, are reconciled to the core results in the tables below. The calculation of Core EPS is also given in the tables below. Additional commentary to the adjustment items is given in the Financial Review.

Core results reconciliation – 2019 in millions of CHF

	IFRS	Global restructuring	Intangibles amortisation	Intangibles impairment	M&A and alliance transactions	Legal & environmental	Pension plan settlements	Global issues	Normalisation of ECP tax benefit	Core
Sales	61,466	–	–	–	–	–	–	–	–	61,466
Royalties and other operating income	2,285	0	–	–	–	–	–	–	–	2,285
Cost of sales	(18,351)	380	1,264	344	–	–	–	–	–	(16,363)
Marketing and distribution	(10,960)	405	41	1	–	–	–	–	–	(10,513)
Research and development	(12,774)	219	227	632	–	–	–	–	–	(11,696)
General and administration	(4,118)	202	–	779	(43)	481	(1)	–	–	(2,700)
Operating profit	**17,548**	**1,206**	**1,532**	**1,756**	**(43)**	**481**	**(1)**	**–**	**–**	**22,479**
Financing costs	(993)	0	–	–	14	17	–	–	–	(962)
Other financial income (expense)	59	–	–	–	–	–	–	–	–	59
Profit before taxes	**16,614**	**1,206**	**1,532**	**1,756**	**(29)**	**498**	**(1)**	**–**	**–**	**21,576**
Income taxes	(2,506)	(236)	(152)	(186)	(23)	(81)	0	(236)	(94)	(3,514)
Net income	**14,108**	**970**	**1,380**	**1,570**	**(52)**	**417**	**(1)**	**(236)**	**(94)**	**18,062**
Attributable to										
– Roche shareholders	13,497	946	1,375	1,570	(52)	411	(1)	(236)	(94)	17,416
– Non-controlling interests	611	24	5	0	–	6	–	–	–	646

Core results reconciliation – 2018 in millions of CHF

	IFRS	Global restructuring	Intangibles amortisation	Intangibles impairment	M&A and alliance transactions	Legal & environmental	Pension plan settlements	Global issues	Normalisation of ECP tax benefit	Core
Sales	56,846	–	–	–	–	–	–	–	–	56,846
Royalties and other operating income	2,651	(16)	–	–	–	–	–	–	–	2,635
Cost of sales	(17,269)	400	1,111	294	–	–	–	–	–	(15,464)
Marketing and distribution	(10,109)	168	36	–	–	–	–	–	–	(9,905)
Research and development	(12,092)	110	147	788	–	–	–	–	–	(11,047)
General and administration	(5,258)	245	–	2,254	35	159	5	–	–	(2,560)
Operating profit	**14,769**	**907**	**1,294**	**3,336**	**35**	**159**	**5**	**–**	**–**	**20,505**
Financing costs	(770)	2	–	–	15	9	–	–	–	(744)
Other financial income (expense)	149	–	–	–	–	–	–	–	–	149
Profit before taxes	**14,148**	**909**	**1,294**	**3,336**	**50**	**168**	**5**	**–**	**–**	**19,910**
Income taxes	(3,283)	(150)	(184)	(229)	(29)	(37)	(1)	(35)	19	(3,929)
Net income	**10,865**	**759**	**1,110**	**3,107**	**21**	**131**	**4**	**(35)**	**19**	**15,981**
Attributable to										
– Roche shareholders	10,500	759	1,097	3,097	21	131	4	(35)	19	15,593
– Non-controlling interests	365	–	13	10	–	–	–	–	–	388

Divisional core results reconciliation – 2019 in millions of CHF

	IFRS	Global restructuring	Intangibles amortisation	Intangibles impairment	M&A and alliance transactions	Legal & environmental	Pension plan settlements	Core
Pharmaceuticals								
Sales	48,516	–	–	–	–	–	–	48,516
Royalties and other operating income	2,198	–	–	–	–	–	–	2,198
Cost of sales	(11,593)	260	1,153	0	–	–	–	(10,180)
Marketing and distribution	(7,905)	267	33	1	–	–	–	(7,604)
Research and development	(11,221)	141	220	632	–	–	–	(10,228)
General and administration	(2,049)	68	–	0	80	215	(1)	(1,687)
Operating profit	**17,946**	**736**	**1,406**	**633**	**80**	**215**	**(1)**	**21,015**
Diagnostics								
Sales	12,950	–	–	–	–	–	–	12,950
Royalties and other operating income	87	0	–	–	–	–	–	87
Cost of sales	(6,758)	120	111	344	–	–	–	(6,183)
Marketing and distribution	(3,055)	138	8	0	–	–	–	(2,909)
Research and development	(1,553)	78	7	0	–	–	–	(1,468)
General and administration	(1,429)	5	–	779	(123)	257	0	(511)
Operating profit	**242**	**341**	**126**	**1,123**	**(123)**	**257**	**0**	**1,966**
Corporate								
General and administration	(640)	129	–	–	0	9	0	(502)
Operating profit	**(640)**	**129**	**–**	**–**	**0**	**9**	**0**	**(502)**

Divisional core results reconciliation – 2018 in millions of CHF

	IFRS	Global restructuring	Intangibles amortisation	Intangibles impairment	M&A and alliance transactions	Legal & environmental	Pension plan settlements	Core
Pharmaceuticals								
Sales	43,967	–	–	–	–	–	–	43,967
Royalties and other operating income	2,553	–	–	–	–	–	–	2,553
Cost of sales	(10,491)	292	969	(274)	–	–	–	(9,504)
Marketing and distribution	(7,068)	97	32	0	–	–	–	(6,939)
Research and development	(10,299)	76	130	507	–	–	–	(9,586)
General and administration	(3,874)	58	–	2,147	91	24	5	(1,549)
Operating profit	**14,788**	**523**	**1,131**	**2,380**	**91**	**24**	**5**	**18,942**
Diagnostics								
Sales	12,879	–	–	–	–	–	–	12,879
Royalties and other operating income	98	(16)	–	–	–	–	–	82
Cost of sales	(6,778)	108	142	568	–	–	–	(5,960)
Marketing and distribution	(3,041)	71	4	0	–	–	–	(2,966)
Research and development	(1,793)	34	17	281	–	–	–	(1,461)
General and administration	(748)	38	–	107	(56)	131	0	(528)
Operating profit	**617**	**235**	**163**	**956**	**(56)**	**131**	**0**	**2,046**
Corporate								
General and administration	(636)	149	–	–	0	4	0	(483)
Operating profit	**(636)**	**149**	**–**	**–**	**0**	**4**	**0**	**(483)**

Core EPS (basic)

	2019	2018
Core net income attributable to Roche shareholders (CHF millions)	17,416	15,593
Weighted average number of shares and non-voting equity securities in issue used to calculate basic earnings per share (millions) [29]	856	854
Core earnings per share (basic) (CHF)	**20.35**	**18.25**

Core EPS (diluted)

	2019	2018
Core net income attributable to Roche shareholders (CHF millions)	17,416	15,593
Increase in non-controlling interests' share of core net income, assuming all outstanding Chugai stock options exercised (CHF millions)	(2)	(1)
Net income used to calculate diluted earnings per share (CHF millions)	**17,414**	**15,592**
Weighted average number of shares and non-voting equity securities in issue used to calculate diluted earnings per share (millions) [29]	**864**	**860**
Core earnings per share (diluted) (CHF)	**20.16**	**18.14**

Free cash flow

Free cash flow is used to assess the Group's ability to generate the cash required to conduct and maintain its operations. It also indicates the Group's ability to generate cash to finance dividend payments, repay debt and to undertake merger and acquisition activities. The free cash flow concept is used in the internal management of the business.

Operating free cash flow is calculated based on the IFRS operating profit and adjusted for certain cash items, movements in net working capital and capital expenditures (investments in property, plant and equipment and intangible assets as well as the principal portion of lease liabilities paid for leased assets). Operating free cash flow is different from cash flows from operating activities as defined by IAS 7 in that it includes capital expenditures (which is within the responsibility of divisional management) and excludes income taxes paid (which is not within the responsibility of divisional management). Cash outflows from defined benefit plans are allocated to the operating free cash flow based on the current service cost with the residual allocated to treasury activities.

Free cash flow is calculated as the operating free cash flow adjusted for treasury activities and taxes paid. Free cash flow is different from total cash flows as defined by IAS 7 in that it excludes dividend payments, cash inflows/outflows from financing activities such as issuance/repayment of debt, purchase/sale of marketable securities and cash inflows/outflows from mergers, acquisitions and divestments.

Effective 1 January 2019 the Group has implemented IFRS 16 'Leases' and the comparative 2018 results have not been restated. The main impact of the new standard is to bring operating leases onto the balance sheet. The application of the new standard does not materially impact operating free cash flow, as repayment of the principal portion of the lease liabilities paid in the 2019 presentation almost entirely matches the operating lease expenses that were included in operating profit in the 2018 presentation.

Operating free cash flow and free cash flow are calculated as shown in the tables below. Additional commentary to the adjustment items is given in the Financial Review.

Operating free cash flow reconciliation in millions of CHF

	2019	2018
Cash flows from operating activities (IFRS basis in accordance with IAS 7)	**22,385**	**19,979**
Add back		
– Income taxes paid	3,543	3,288
Deduct		
– Investments in property, plant and equipment	(3,503)	(4,043)
– Principal portion of lease liabilities paid	(372)	–
– Investments in intangible assets	(1,393)	(879)
– Disposal of property, plant and equipment	71	146
– Disposal of intangible assets	2	0
Pensions and other post-employment benefits		
– Add back total payments for defined benefit plans	676	785
– Deduct allocation of payments to operating free cash flow	(578)	(582)
Other operating items	90	47
Operating free cash flow	**20,921**	**18,741**

Free cash flow reconciliation in millions of CHF

	2019	2018
Cash flows from operating activities (IFRS basis in accordance with IAS 7)	**22,385**	**19,979**
Deduct		
– Investments in property, plant and equipment	(3,503)	(4,043)
– Principal portion of lease liabilities paid	(372)	–
– Investments in intangible assets	(1,393)	(879)
– Disposal of property, plant and equipment	71	146
– Disposal of intangible assets	2	0
– Interest paid	(624)	(593)
Other operating items	90	47
Other treasury items	108	154
Free cash flow	**16,764**	**14,811**

Supplementary information used to calculate the divisional operating free cash flow is shown in the table below.

Divisional operating free cash flow information in millions of CHF

	Pharmaceuticals		Diagnostics		Corporate		Group	
	2019	2018	2019	2018	2019	2018	2019	2018
Depreciation, amortisation and impairment								
Depreciation of property, plant and equipment	1,227	1,129	1,109	1,097	73	66	2,409	2,292
Depreciation of right-of-use assets	229	–	112	–	10	–	351	–
Amortisation of intangible assets	1,406	1,131	126	163	–	–	1,532	1,294
Impairment of property, plant and equipment	246	137	13	1	2	3	261	141
Impairment (reversal) of right-of-use assets	(12)	–	0	–	0	–	(12)	–
Impairment of goodwill	0	2,147	779	107	–	–	779	2,254
Impairment of intangible assets	633	233	344	849	–	–	977	1,082
Total	**3,729**	**4,777**	**2,483**	**2,217**	**85**	**69**	**6,297**	**7,063**
Other adjustments								
Add back								
– Expenses for equity-settled equity compensation plans	464	392	92	78	41	38	597	508
– Net (income) expense for provisions	1,259	750	390	269	36	85	1,685	1,104
– Net (gain) loss from disposals	(456)	(336)	(11)	14	(1)	0	(468)	(322)
– Non-cash working capital and other items	454	583	133	160	(8)	(11)	579	732
Deduct								
– Utilisation of provisions	(480)	(637)	(221)	(153)	(60)	(58)	(761)	(848)
– Proceeds from disposals	497	377	65	107	1	(3)	563	481
Total	**1,738**	**1,129**	**448**	**475**	**9**	**51**	**2,195**	**1,655**
Operating profit cash adjustments	**5,467**	**5,906**	**2,931**	**2,692**	**94**	**120**	**8,492**	**8,718**

EBITDA

The Group does not use Earnings Before Interest, Tax, Depreciation and Amortisation (EBITDA) in either its internal management reporting or its external communications. In the opinion of the Group's management, operating free cash flow gives a more useful and consistent measurement of 'cash earnings' than EBITDA, which includes many non-cash items such as provisions, allowances for trade receivables and inventories, and certain non-cash entries arising from acquisition accounting and pension accounting. Operating free cash flow also includes the cash used for investments in property, plant and equipment, leased assets and intangible assets, whereas EBITDA excludes all costs and cash outflows for these items.

For the convenience of those readers who do use EBITDA, this is provided in the table below. As the starting point this uses the core results, which already exclude the amortisation and impairment of goodwill and intangible assets.

For the EBITDA information, the main impact of the implementation of IFRS 16 'Leases' is to exclude depreciation and impairment of right-of-use assets for leases where the Group is the lessee, which were previously reported as operating leases, effective 1 January 2019. As a result the Group's EBITDA increased by approximately CHF 0.4 billion during 2019 as the costs and cash outflows for leased assets are now completely excluded from EBITDA.

EBITDA (using core results) in millions of CHF

	Pharmaceuticals		Diagnostics		Corporate		Group	
	2019	2018	2019	2018	2019	2018	2019	2018
EBITDA								
Core operating profit	21,015	18,942	1,966	2,046	(502)	(483)	22,479	20,505
Depreciation and impairment of property, plant and equipment – Core basis	1,410	1,159	1,105	1,092	75	69	2,590	2,320
Depreciation and impairment of right-of-use assets – Core basis	228	–	112	–	10	–	350	–
EBITDA	**22,653**	**20,101**	**3,183**	**3,138**	**(417)**	**(414)**	**25,419**	**22,825**
– margin, % of sales	46.7	45.7	24.6	24.4	–	–	41.4	40.2

Net operating assets

Net operating assets allow for an assessment of the Group's operating performance of the business independently from financing and tax activities. Net operating assets are calculated as property, plant and equipment, leased assets ('right-of-use assets'), goodwill, intangible assets, net working capital and long-term net operating assets minus provisions.

The main impact of the implementation of IFRS 16 'Leases' is to include right-of-use assets for leases where the Group is the lessee and which were previously reported as operating leases, as part of segment operating assets, effective 1 January 2019. Details of all the additional assets and liabilities reported effective 1 January 2019 are provided in Note 28 with a divisional split in Note 2.

The calculation of the net operating assets disclosed in Note 2 of the Annual Financial Statements is shown in the tables below.

Net operating assets reconciliation – 2019 in millions of CHF

	Pharmaceuticals	Diagnostics	Corporate	Taxation and Treasury	Group
Property, plant and equipment	15,306	6,598	269	–	22,173
Right-of-use assets	801	303	41	–	1,145
Goodwill	8,258	4,198	–	–	12,456
Intangible assets	7,526	832	–	–	8,358
Inventories	3,696	2,359	–	–	6,055
Provisions	(3,140)	(958)	(302)	–	(4,400)
Current income tax net liabilities	–	–	–	(3,601)	(3,601)
Deferred tax net assets	–	–	–	4,913	4,913
Defined benefit plan net liabilities	–	–	–	(6,535)	(6,535)
Lease liabilities	–	–	–	(1,219)	(1,219)
Marketable securities	–	–	–	5,783	5,783
Cash and cash equivalents	–	–	–	6,075	6,075
Debt	–	–	–	(14,363)	(14,363)
Other net assets (liabilities)					
– Net working capital	(2,255)	383	(240)	–	(2,112)
– Other long-term net operating assets	365	63	(13)	–	415
– Other	–	–	–	724	724
Total net assets	**30,557**	**13,778**	**(245)**	**(8,223)**	**35,867**

Net operating assets reconciliation – 2018 in millions of CHF

	Pharmaceuticals	Diagnostics	Corporate	Taxation and Treasury	Group
Property, plant and equipment	15,123	6,413	282	–	21,818
Goodwill	3,883	5,065	–	–	8,948
Intangible assets	8,297	1,049	–	–	9,346
Inventories	4,284	2,336	1	–	6,621
Provisions	(2,508)	(948)	(325)	–	(3,781)
Current income tax net liabilities	–	–	–	(3,600)	(3,600)
Deferred tax net assets	–	–	–	3,511	3,511
Defined benefit plan net liabilities	–	–	–	(6,140)	(6,140)
Marketable securities	–	–	–	6,437	6,437
Cash and cash equivalents	–	–	–	6,681	6,681
Debt	–	–	–	(18,770)	(18,770)
Other net assets (liabilities)					
– Net working capital	(1,812)	361	(215)	–	(1,666)
– Other long-term net operating assets	420	46	(1)	–	465
– Other	–	–	–	496	496
Total net assets	**27,687**	**14,322**	**(258)**	**(11,385)**	**30,366**

Net debt

Net debt is used to monitor the Group's overall short- and long-term liquidity. Net debt is calculated as the sum of total debt (long-term and short-term) less marketable securities, cash and cash equivalents. Net debt is unaffected by the implementation of IFRS 16 'Leases' as the Group's definition of net debt does not include lease liabilities.

Net debt calculations, including details of movements during the current year, are shown in the table on page 34 in the Financial Review.

Net working capital

Net working capital is used to assess the Group's efficiency in utilising assets and short-term liquidity. Net trade working capital is calculated as trade receivables and inventories minus trade payables. Net working capital is calculated as net trade working capital adjusted for other receivables and other payables.

Net working capital and net trade working capital calculations are shown in the tables on page 21 (Pharmaceuticals Division), page 27 (Diagnostics Division) and page 29 (Corporate) in the Financial Review.

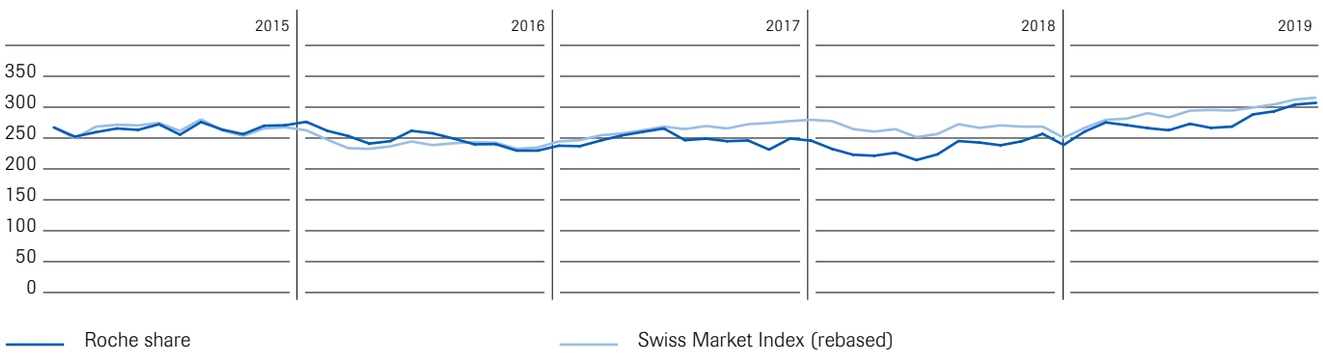
Constant exchange rates

Certain percentage changes in the Financial Review have been calculated using constant exchange rates (CER) which allow for an assessment of the Group's financial performance with the effects of exchange rate fluctuations eliminated. The percentage changes at constant exchange rates are calculated using simulations by reconsolidating both the current reported period and the prior period numbers at constant currency exchange rates, equalling the average exchange rates for the prior year. For example, a CER change between a 2019 line item and its 2018 equivalent is calculated using the average exchange rate for the year ended 31 December 2018 for both the 2019 line item and the 2018 line item and subsequently calculating the change in percent with respect to the two recalculated numbers.

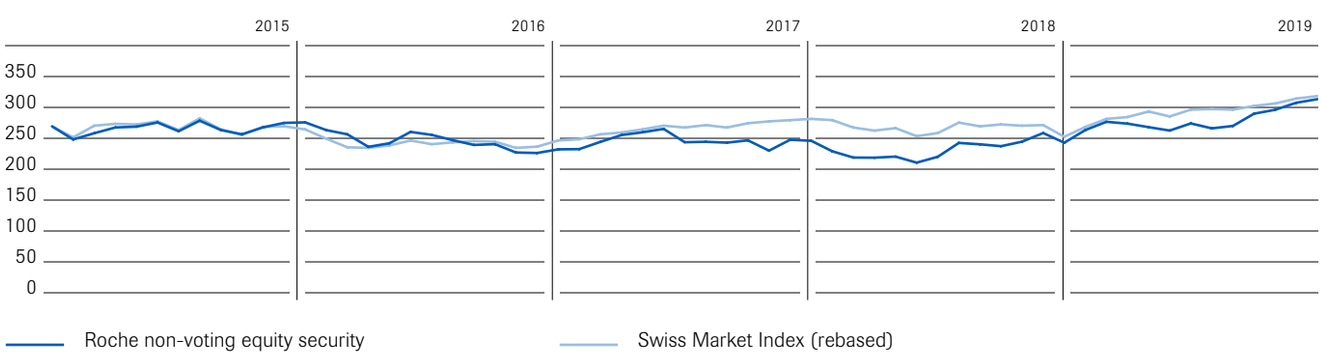
Foreign exchange gains and losses are excluded from the calculation of CER growth rates in the earnings per share disclosures. In countries where there is a significant devaluation in the local currency in the current year, the simulations use the average exchange rate of the current year instead of the prior year to avoid that CER growth rates are artificially inflated.

Roche Securities

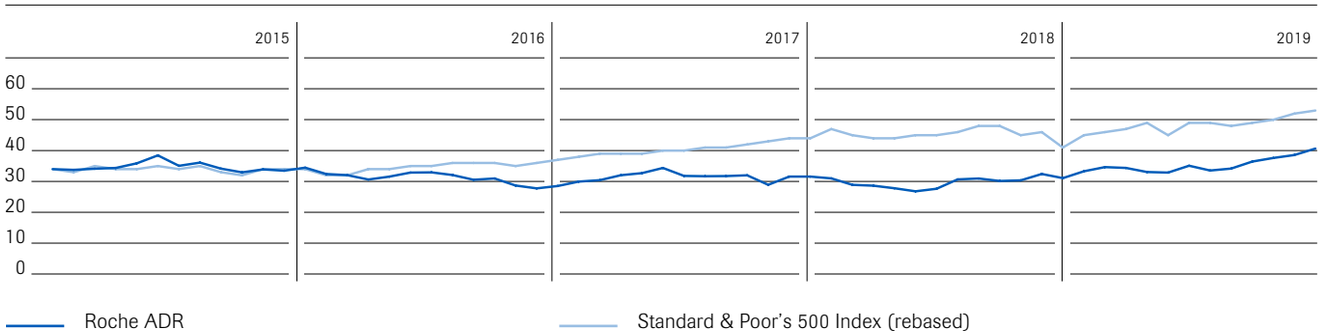
Price development of share in CHF



Price development of non-voting equity security *(Genussschein)* in CHF



Price development of American Depositary Receipt (ADR) in USD



Eight Roche American Depositary Receipts (ADRs) are equivalent to one non-voting equity security *(Genussschein)*. ADRs have been traded in the US over-the-counter market since July 1992.
Information in these tables is restated for the change in the ratio for the ADRs from 1:1 to 2:1 effective 24 January 2005, the change in the ratio for the ADRs from 2:1 to 4:1 effective 9 January 2009 and the change in the ratio for the ADRs from 4:1 to 8:1 effective 27 February 2014.

Number of shares and non-voting equity securities[a]

	2015	2016	2017	2018	2019
Number of shares (nominal value: CHF 1.00)	160,000,000	160,000,000	160,000,000	160,000,000	160,000,000
Number of non-voting equity securities *(Genussscheine)* (no nominal value)	702,562,700	702,562,700	702,562,700	702,562,700	702,562,700
Total	**862,562,700**	**862,562,700**	**862,562,700**	**862,562,700**	**862,562,700**
Number of own shares and non-voting equity securities *(Genussscheine)* held	(10,542,434)	(10,635,070)	(8,712,977)	(8,134,699)	(6,806,245)
Total in issue	**852,020,266**	**851,927,630**	**853,849,723**	**854,428,001**	**855,756,455**

Data per share and non-voting equity security in CHF

		2015	2016	2017	2018	2019
Earnings (basic)		10.42	11.24	10.12	12.29	15.77
Earnings (diluted)		10.28	11.13	10.04	12.21	15.62
Core earnings (basic)		13.66	14.68	15.47	18.25	20.35
Core earnings (diluted)		13.49	14.53	15.34	18.14	20.16
Equity attributable to Roche shareholders		24.62	28.07	30.97	32.33	38.27
Dividend		8.10	8.20	8.30	8.70	9.00[c]
Stock price of share[b]	Opening	267.75	276.75	238.00	246.20	239.40
	High	284.50	276.75	271.75	258.00	312.20
	Low	244.40	223.50	230.40	211.60	239.40
	Year-end	276.75	238.00	246.20	239.40	307.60
Stock price of non-voting equity security *(Genussschein)*[b]	Opening	269.90	276.40	232.60	246.50	243.40
	High	286.20	276.40	272.60	259.50	317.25
	Low	241.70	220.10	227.70	207.70	243.40
	Year-end	276.40	232.60	246.50	243.40	314.00

Market capitalisation in millions of CHF

		2015	2016	2017	2018	2019
	Year-end	235,554	199,022	210,426	207,328	267,684

Key ratios (year-end)

	2015	2016	2017	2018	2019
Dividend yield of shares in %	2.9	3.4	3.4	3.6	2.9
Dividend yield of non-voting equity securities *(Genussscheine)* in %	2.9	3.5	3.4	3.6	2.9
Price/earnings of shares	27	21	25	20	20
Price/earnings of non-voting equity securities *(Genussscheine)*	27	21	25	20	20

a) Each non-voting equity security *(Genussschein)* confers the same rights as any of the shares to participate in the available earnings and any remaining proceeds from liquidation following repayment of the nominal value of the shares and the participation certificate capital (if any). Shares and non-voting equity securities are listed on the SIX Swiss Exchange. Roche Holding Ltd has no restrictions as to ownership of its shares or non-voting equity securities.
b) All stock price data reflect daily closing prices.
c) 2019 dividend proposed by the Board of Directors.

Stock codes

	Share	Non-voting equity security	American Depositary Receipt (ADR)
SIX Swiss Exchange	RO	ROG	–
Bloomberg	RO SW	ROG VX	RHHBY US
Reuters	RO.S	ROG.VX	RHHBY.PK

Roche Holding Ltd, Basel

Financial Statements

Balance sheet in millions of CHF

	31 December 2019	31 December 2018
Current assets		
Cash and cash equivalents	1,455	1,754
Marketable securities	1,585	930
Accounts receivable from Group companies	4,427	4,859
Short-term loans to Group companies	1,500	1,000
Total current assets	**8,967**	**8,543**
Non-current assets		
Long-term loans to Group companies	604	618
Investments	8,869	8,869
Total non-current assets	**9,473**	**9,487**
Total assets	**18,440**	**18,030**
Short-term liabilities		
Accounts payable to Group companies	3	6
Interest-bearing liabilities to Group companies	870	789
Other short-term liabilities	15	16
Total short-term liabilities	**888**	**811**
Long-term liabilities		
Provisions	35	35
Total long-term liabilities	**35**	**35**
Total liabilities	**923**	**846**
Shareholders' equity		
Share capital	160	160
Non-voting equity securities *(Genussscheine)*	p.m.	p.m.
Legal retained earnings:		
– General legal retained earnings	300	300
Voluntary reserves and retained earnings:		
– Free reserve	6,000	6,000
– Special reserve	2,152	2,152
– Available earnings		
– Balance brought forward from previous year	1,068	919
– Net income for the year	7,837	7,653
Total shareholders' equity	**17,517**	**17,184**
Total shareholders' equity and liabilities	**18,440**	**18,030**

p.m. = pro memoria. Non-voting equity securities *(Genussscheine)* have no nominal value.

Income statement in millions of CHF

	Year ended 31 December	
	2019	2018
Income		
Income from investments (dividend income)	7,814	7,614
Other financial income		
– Interest income from loans to Group companies	32	31
– Income from marketable securities and other	3	7
Guarantee fee income from Group companies	69	77
Other income	32	36
Total income	**7,950**	**7,765**
Expenses		
Administration expenses	(35)	(35)
Other expenses	(39)	(45)
Financial expenses	(30)	(16)
Direct taxes	(9)	(16)
Total expenses	**(113)**	**(112)**
Net income	**7,837**	**7,653**

Notes to the Financial Statements

1. Summary of significant accounting policies

Basis of preparation

The financial statements of Roche Holding Ltd, Basel (the 'Company') have been prepared in accordance with the provisions of Swiss Law on Accounting and Financial Reporting (32nd title of the Swiss Code of Obligations, 'CO'). Where not prescribed by law, the significant accounting principles applied are described below.

The Company has prepared its consolidated financial statements in accordance with a recognised accounting standard (International Financial Reporting Standards). In accordance with the CO, the Company decided to forgo presenting additional information on audit fees in the notes as well as a cash flow statement.

Valuation methods and translation of foreign currencies

Marketable securities are reported at the lower of cost or market value. All other financial assets, including investments, are reported at cost less appropriate write-downs. Own equity instruments are recognised at cost and deducted from equity at the time of purchase. If the own equity instruments are sold, the gain or loss is recognised through the income statement. Assets and liabilities denominated in foreign currencies are translated into Swiss francs using year-end rates of exchange, except investments which are translated at historical rates. Transactions during the year which are denominated in foreign currencies are translated at the exchange rates effective at the relevant transaction dates. Resulting exchange gains and losses are recognised in the income statement with the exception of unrealised gains which are deferred.

Investments

The direct and indirect investments of the Company are listed in Note 33 to the Roche Group Annual Financial Statements. This listing excludes Chugai's subsidiaries as well as not material companies, notably companies that are inactive, dormant or in liquidation. Ownership interests equal voting rights.

Taxes

Direct taxes include corporate income and capital taxes.

2. Shareholders' equity

Share capital

As in the previous year, share capital amounts to CHF 160 million. The share capital consists of 160,000,000 bearer shares with a nominal value of CHF 1.00 each. Included in equity are 702,562,700 non-voting equity securities *(Genussscheine)*. They are not part of the share capital and confer no voting rights. However, each non-voting equity security confers the same rights as any of the shares to participate in the available earnings and in any remaining proceeds from liquidation following repayment of the nominal value of the share capital and, if any, participation certificates.

Own equity instruments

At 31 December 2019 the Company did not hold any Roche shares or non-voting equity securities (2018: none). During 2019 and 2018 the Company neither purchased nor sold Roche shares or non-voting equity securities.

Company's subsidiaries that meet the definitions and requirements of Article 659b CO do not hold equity instruments. Within the Roche Group Annual Financial Statements some entities (mainly foundations) are included in the consolidation which do not qualify as subsidiaries under Article 659b CO.

Movement in recognised amounts in millions of CHF

			Voluntary reserves and retained earnings				
	Share capital	Legal retained earnings	Free reserve	Special reserve	Available earnings	Own equity instruments	Total equity
As at 1 January 2017	160	300	6,000	2,152	7,951	0	16,563
Net income	–	–	–	–	7,200	–	7,200
Dividends	–	–	–	–	(7,073)	–	(7,073)
Transactions in own equity instruments	–	–	–	–	–	0	0
As at 31 December 2017	**160**	**300**	**6,000**	**2,152**	**8,078**	**0**	**16,690**
Net income	–	–	–	–	7,653	–	7,653
Dividends	–	–	–	–	(7,159)	–	(7,159)
Transactions in own equity instruments	–	–	–	–	–	0	0
As at 31 December 2018	**160**	**300**	**6,000**	**2,152**	**8,572**	**0**	**17,184**
Net income	–	–	–	–	7,837	–	7,837
Dividends	–	–	–	–	(7,504)	–	(7,504)
Transactions in own equity instruments	–	–	–	–	–	0	0
As at 31 December 2019	**160**	**300**	**6,000**	**2,152**	**8,905**	**0**	**17,517**

3. Contingent liabilities

Guarantees

The Company has issued guarantees for certain bonds and notes, commercial paper and credit facilities of Group companies. The nominal amount outstanding at 31 December 2019 was CHF 13.9 billion (2018: CHF 18.4 billion). These are described in Note 21 to the Roche Group Annual Financial Statements.

4. Significant shareholders

All shares in the Company are bearer shares, and for this reason the Company does not keep a register of shareholders. The following figures are based on information from shareholders, the shareholder validation check at the Annual General Meeting of 5 March 2019 and on other information available to the Company.

Controlling shareholders

At 31 December 2019 and 2018, based on information supplied to the Group, a shareholder group with pooled voting rights owned 72,018,000 shares, which represented 45.01% of the issued shares. On 5 December 2019 the shareholder group announced that it would continue the shareholder pooling agreement with a modified shareholder composition. This group consists now of Mr André Hoffmann, Ms Marie-Anne Hoffmann, Ms Vera Michalski, Mr Alexander Hoffmann, Mr Frederic Hoffmann, Ms Isabel Hoffmann, Mr Lucas Hoffmann, Ms Marina Hoffmann, Ms Kasia Barbotin-Larrieu, Ms Tatiana Fabre, Mr Andreas Oeri, Ms Catherine Oeri, Ms Sabine Duschmalé, Mr Jörg Duschmalé, Mr Lukas Duschmalé, the charitable Foundation Wolf and Artuma Holding Ltd. The shareholder pooling agreement has existed since 1948. The duration of the pool was extended for an indefinite period in 2009. The figures above do not include any shares without pooled voting rights that are held outside this group by individual members of the group. Ms Maja Oeri, formerly a member of the pool, holds 8,091,900 shares representing 5.057% of the voting rights independently of the pool.

At 31 December 2019, based on information supplied to the Group, 53,332,863 shares (2018: 53,332,863 shares) are owned by Novartis Holding AG, Basel (participation below 33⅓%).

5. Full-time equivalent employees

The annual average number of full-time equivalent employees for 2019 and 2018 did not exceed ten people.

6. Board and Executive shareholdings

Board of Directors

Directors Mr André Hoffmann and Dr Andreas Oeri and certain other members of the founder's families who are closely associated with them belong to a shareholder group with pooled voting rights. At the end of 2019 and 2018 this group held 72,018,000 shares (45.01% of issued shares). Detailed information about this group is given in Note 4. In addition, at the end of the year the members of the Board of Directors and persons closely associated with them held shares and non-voting equity securities *(Genussscheine)* as shown in the table below.

Shareholdings of members of the Board of Directors

	Shares		Non-voting equity securities *(Genussscheine)*		
	2019	2018	2019	2018	Other
C. Franz	19,771	16,014	4,810	4,810	
A. Hoffmann	0[a]	0[a]	200	200	
J. Bell	1,115	1,115	1,647	1,647	
J. Brown	729	729	0	0	
P. Bulcke	0	0	4,000	4,000	
H. Clevers	0	n/a	0	n/a	
A. Hauser	3,000	0	150	150	[d]
R. P. Lifton	0	0	0	0	[e]
A. Oeri	0[a]	0[a]	187,793	187,793	
B. Poussot	500	500	500	500	
S. Schwan	–	–	–	–	[b]
C. Suessmuth Dyckerhoff	0	0	2,100[c]	2,100[c]	
P. R. Voser	n/a	0	n/a	5,000	
Total	**25,115**	**18,358**	**201,200**	**206,200**	

a) Does not include shares held in the shareholder group with pooled voting rights.
b) As a member of the Corporate Executive Committee, Dr Schwan's shareholdings are disclosed in the tables below.
c) Jointly held with close relative.
d) Close relatives of A. Hauser held 20 non-voting equity securities *(Genussscheine)* (2018: 20).
e) R. P. Lifton held 300 Roche American Depositary Receipts (ADRs) (2018: 300). Eight ADRs are equivalent to one non-voting equity security *(Genussschein)*. ADRs have been traded in the US over-the-counter market since July 1992.

Corporate Executive Committee

At the end of the year members of the Corporate Executive Committee and persons closely associated with them held shares and non-voting equity securities as shown in the table below.

Shareholdings of members of the Corporate Executive Committee

	Shares		Non-voting equity securities *(Genussscheine)*		Other
	2019	2018	2019	2018	
S. Schwan	191,595	175,890	35,273	35,270	a)
B. Anderson	0	n/a	1,986	n/a	a)
M. Heuer	n/a	3	n/a	18,602	a), c), d)
A. Hippe	6,970	6,970	20,830	19,956	a)
G.A. Keller	19,441	19,191	27,271	21,462	a), b)
D. O'Day	n/a	3,065	n/a	19,432	a)
T. Schinecker	0	n/a	155	n/a	a)
C.A. Wilbur	0	0	4,315	3,955	a)
Total	**218,006**	**205,119**	**89,830**	**118,677**	

a) Equity compensation awards: S-SARs, RSUs and Roche Performance Share Plan.
b) Close relatives of Dr Keller held 1,100 Roche shares (2018: 1,100 Roche shares).
c) At 31 December 2018 M. Heuer held 4,897 Restricted Stock Units (RSUs), whereof 1,519 were issued in 2016, 1,532 in 2017 and 1,846 in 2018. RSU's terms and vesting conditions of these awards are disclosed in Note 27 to the Roche Group Annual Financial Statements.
d) At 31 December 2018 close relatives of M. Heuer held 729 Roche non-voting equity securities.

As of 2019 the remuneration from equity compensation plans to members of the Corporate Executive Committee has been complemented with Restricted Stock Units (RSUs) and is composed of 80% Stock-settled Stock Appreciation Rights (S-SARs) and 20% RSUs. No new Performance Share Plan (PSP) awards were granted in 2019.

At 31 December 2019 members of the Corporate Executive Committee held Stock-settled Stock Appreciation Rights (S-SARs) as shown in the table below. The terms and vesting conditions of these awards are disclosed in Note 27 to the Roche Group Annual Financial Statements and additional supplementary information is in the Remuneration Report included in the Annual Report on pages 120 to 148. S-SARs awards granted to members of the Corporate Executive Committee vest after four years (awards granted before 2019 vest after three years).

S-SARs awards held at 31 December 2019

Year of issue	2019	2018	2017	2016	2015	2014	2013	Total
S. Schwan	122,322	100,677	85,476	89,517	59,997	54,453	0	512,442
B. Anderson	55,045	43,929	35,925	30,993	21,297	17,397	0	204,586
A. Hippe	48,930	40,275	34,191	35,811	0	0	0	159,207
G.A. Keller	45,872	37,758	32,052	0	20,000	10,000	0	145,682
T. Schinecker	7,744	6,288	1,608	0	0	0	0	15,640
C.A. Wilbur	29,052	21,402	16,032	15,339	4,164	5,754	4,594	96,337
Total	**308,965**	**250,329**	**205,284**	**171,660**	**105,458**	**87,604**	**4,594**	**1,133,894**
Strike price (CHF)	271.65	220.80	251.90	251.50	256.10	263.20	214.00	
Expiry date	Mar. 2029	Mar. 2025	Mar. 2024	Mar. 2023	Mar. 2022	Mar. 2021	Mar. 2020	

At 31 December 2019 members of the Corporate Executive Committee held Restricted Stock Units (RSUs) as shown in the table below. The terms and vesting conditions of these awards are disclosed in Note 27 to the Roche Group Annual Financial Statements and additional supplementary information is in the Remuneration Report included in the Annual Report on pages 120 to 148. RSU awards granted to members of the Corporate Executive Committee vest after four years (awards granted before 2019 vest after three years). Thereafter, the non-voting equity securities and/or shares may remain blocked for up to ten years.

RSU awards held at 31 December 2019

Year of issue	2019	2018	2017	Total
S. Schwan	3,927	–	–	3,927
B. Anderson	1,767	5,270	4,449	11,486
A. Hippe	1,571	–	–	1,571
G.A. Keller	1,472	–	–	1,472
T. Schinecker	994	1,131	596	2,721
C.A. Wilbur	933	n/a	n/a	933
Total	**10,664**	**6,401**	**5,045**	**22,110**

At 31 December 2019 members of the Corporate Executive Committee held Performance Share Plan (PSP) awards as shown in the table below. The terms and vesting conditions of these awards are disclosed in Note 27 to the Roche Group Annual Financial Statements and additional supplementary information is in the Remuneration Report included in the Annual Report on pages 120 to 148. Each award will result in between zero and two non-voting equity securities or shares (before value adjustment), depending upon the achievement of the performance targets and the discretion of the Board of Directors. After vesting, the non-voting equity securities or shares may remain blocked for up to ten years. At the end of the 2017–2019 cycle the performance targets were achieved and accordingly the participants will receive 100% of the originally targeted non-voting equity securities. The total target number of awards for the PSP performance cycle 2018–2020 at 31 December 2019 are shown in the table below. In 2019 no new PSP awards were granted to members of the Corporate Executive Committee.

PSP awards held at 31 December 2019

	PSP 2018–2020
S. Schwan	11,076
B. Anderson	–
A. Hippe	4,430
G.A. Keller	4,153
T. Schinecker	–
C.A. Wilbur	2,353
Total	**22,012**
Allocation date	Feb. 2021

Information relating to the number and value of rights, options and awards granted to employees of the Roche Group and members of the Board of Directors and Corporate Executive Committee of the Company are disclosed in Note 27 and Note 32 to the Roche Group Annual Financial Statements.

Appropriation of Available Earnings

Proposals to the Annual General Meeting in CHF

	2019	2018
Available earnings		
Balance brought forward from previous year	1,067,627,859	918,813,395
Net profit for the year	7,837,384,924	7,653,109,954
Total available earnings	**8,905,012,783**	**8,571,923,349**
Appropriation of available earnings		
Distribution of an ordinary dividend of CHF 9.00 gross per share and non-voting equity security *(Genussschein)* as against CHF 8.70 last year	(7,763,064,300)	(7,504,295,490)
Total appropriation of available earnings	**(7,763,064,300)**	**(7,504,295,490)**
To be carried forward on this account	**1,141,948,483**	**1,067,627,859**

Statutory Auditor's Report

To the General Meeting of Roche Holding Ltd, Basel

Report on the Audit of the Financial Statements

Opinion

We have audited the financial statements of Roche Holding Ltd, which comprise the balance sheet as at 31 December 2019, the income statement for the year then ended, and notes to the financial statements, including a summary of significant accounting policies.

In our opinion the financial statements (pages 171–179) for the year ended 31 December 2019 comply with Swiss law and the company's articles of incorporation.

Basis for Opinion

We conducted our audit in accordance with Swiss law and Swiss Auditing Standards. Our responsibilities under those provisions and Standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are independent of the entity in accordance with the provisions of Swiss law and the requirements of the Swiss audit profession and we have fulfilled our other ethical responsibilities in accordance with these requirements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Report on Key Audit Matters based on the circular 1/2015 of the Federal Audit Oversight Authority

Key audit matters are those matters that, in our professional judgement, were of most significance in our audit of the financial statements of the current period. We have determined that there are no key audit matters to communicate in our report.

Responsibility of the Board of Directors for the Financial Statements

The Board of Directors is responsible for the preparation of the financial statements in accordance with the provisions of Swiss law and the company's articles of incorporation, and for such internal control as the Board of Directors determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Board of Directors is responsible for assessing the entity's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the Board of Directors either intends to liquidate the entity or to cease operations, or has no realistic alternative but to do so.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Swiss law and Swiss Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

KPMG

As part of an audit in accordance with Swiss law and Swiss Auditing Standards, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

— Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

— Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of internal control.

— Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made.

— Conclude on the appropriateness of the Board of Directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the entity's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the entity to cease to continue as a going concern.

We communicate with the Board of Directors or its relevant committee regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide the Board of Directors or its relevant committee with a statement that we have complied with relevant ethical requirements regarding independence, and communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

From the matters communicated with the Board of Directors or its relevant committee, we determine those matters that were of most significance in the audit of the financial statements of the current period and are therefore the key audit matters. We describe these matters in our auditor's report, unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

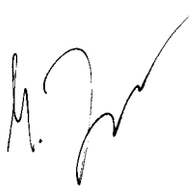
Report on Other Legal and Regulatory Requirements

In accordance with article 728a para. 1 item 3 CO and the Swiss Auditing Standard 890, we confirm that an internal control system exists, which has been designed for the preparation of financial statements according to the instructions of the Board of Directors.

We further confirm that the proposed appropriation of available earnings complies with Swiss law and the company's articles of incorporation. We recommend that the financial statements submitted to you be approved.

KPMG AG

Mark Baillache
Licensed Audit Expert
Auditor in Charge



Marc Ziegler
Licensed Audit Expert

Basel, 27 January 2020

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Next Annual General Meeting:
17 March 2020

Cautionary statement regarding forward-looking statements
This Finance Report contains certain forward-looking statements. These forward-looking statements may be identified by words such as 'believes', 'expects', 'anticipates', 'projects', 'intends', 'should', 'seeks', 'estimates', 'future' or similar expressions or by discussion of, among other things, strategy, goals, plans or intentions. Various factors may cause actual results to differ materially in the future from those reflected in forward-looking statements contained in this Annual Report, among others: (1) pricing and product initiatives of competitors; (2) legislative and regulatory developments and economic conditions; (3) delay or inability in obtaining regulatory approvals or bringing products to market; (4) fluctuations in currency exchange rates and general financial market conditions; (5) uncertainties in the discovery, development or marketing of new products or new uses of existing products, including without limitation negative results of clinical trials or research projects, unexpected side effects of pipeline or marketed products; (6) increased government pricing pressures; (7) interruptions in production; (8) loss of or inability to obtain adequate protection for intellectual property rights; (9) litigation; (10) loss of key executives or other employees; and (11) adverse publicity and news coverage.

The statement regarding earnings per share growth is not a profit forecast and should not be interpreted to mean that Roche's earnings or earnings per share for 2020 or any subsequent period will necessarily match or exceed the historical published earnings or earnings per share of Roche.

Links to third-party pages are provided for convenience only. We do not express any opinion on the content of any third-party pages and expressly disclaim any liability for all third-party information and the use of it.

The Roche Finance Report is published in German and English. In case of doubt or differences of interpretation, the English version shall prevail over the German text.

Our reporting consists of the actual Annual Report and of the Finance Report and contains the annual financial statements and the consolidated financial statements. With regards to content, the Management Report as per the Articles of Incorporation consists of both aforementioned reports with the exception of the Remuneration Report.

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