
UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 6-K

REPORT OF FOREIGN PRIVATE ISSUER
PURSUANT TO RULE 13a-16 OR 15d-16 OF
THE SECURITIES EXCHANGE ACT OF 1934
For the quarterly period ended March 31, 2023
Commission File Number 001-38332



QIAGEN N.V.
Hulsterweg 82
5912 PL Venlo
The Netherlands

Indicate by check mark whether the registrant files or will file annual reports under cover of Form 20-F or Form 40-F:

Form 20-F Form 40-F

Indicate by check mark whether the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(1):

Indicate by check mark whether the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(7):

QIAGEN N.V.

Form 6-K

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Other Information

For the three months ended March 31, 2023, QIAGEN N.V. prepared its quarterly report under United States generally accepted accounting principles (U.S. GAAP). This quarterly report is furnished herewith as Exhibit 99.1 and incorporated by reference herein.

Signatures

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

QIAGEN N.V.

BY: /s/ Roland Sackers
Roland Sackers
Chief Financial Officer

Date: May 4, 2023

Exhibit Index

Exhibit No.	Exhibit
99.1	U.S. GAAP Quarterly Report for the Period Ended March 31, 2023

QIAGEN N.V. and Subsidiaries
U.S. GAAP Quarterly Report for the Period Ended March 31, 2023
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Condensed Consolidated Financial Statements

QIAGEN N.V. and Subsidiaries Condensed Consolidated Balance Sheets

(in thousands)	Notes	March 31, 2023	December 31, 2022
		(unaudited)	
Assets			
Current assets:			
Cash and cash equivalents		\$359,180	\$730,669
Short-term investments		928,161	687,597
Accounts receivable, net of allowance for credit losses of \$23,700 and \$22,880, respectively		317,244	323,750
Inventories, net	(5)	380,824	357,960
Prepaid expenses and other current assets (of which \$0 and \$11,929 due from related parties, respectively)	(9)	265,909	293,976
Total current assets		2,251,318	2,393,952
Long-term assets:			
Property, plant and equipment, net of accumulated depreciation of \$531,924 and \$502,967, respectively		691,055	662,170
Goodwill	(6)	2,454,081	2,352,569
Intangible assets, net of accumulated amortization of \$745,200 and \$727,691, respectively	(6)	585,021	544,796
Fair value of derivative instruments - long-term	(9)	91,885	131,354
Other long-term assets	(7)	205,593	202,894
Total long-term assets		4,027,635	3,893,783
Total assets		\$6,278,953	\$6,287,735

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

QIAGEN N.V. and Subsidiaries Condensed Consolidated Balance Sheets

(in thousands, except par value)	Notes	March 31, 2023	December 31, 2022
		(unaudited)	
Liabilities and equity			
Current liabilities:			
Current portion of long-term debt	(8)	\$393,243	\$389,552
Accrued and other current liabilities	(4, 9, 10)	412,615	486,237
Accounts payable		84,386	98,734
Total current liabilities		890,244	974,523
Long-term liabilities:			
Long-term debt, net of current portion	(8)	1,486,706	1,471,898
Fair value of derivative instruments - long-term	(9)	119,019	156,718
Other long-term liabilities		221,808	217,985
Total long-term liabilities		1,827,533	1,846,601
Commitments and contingencies	(15)		
Equity:			
Preference shares, 0.01 EUR par value, authorized—450,000 shares, no shares issued and outstanding		—	—
Financing preference shares, 0.01 EUR par value, authorized—40,000 shares, no shares issued and outstanding		—	—
Common Shares, 0.01 EUR par value, authorized—410,000 shares, issued—230,829 shares	(13)	2,702	2,702
Additional paid-in capital		1,882,163	1,868,015
Retained earnings		2,215,427	2,160,173
Accumulated other comprehensive loss	(13)	(396,261)	(404,091)
Less treasury shares, at cost—2,794 and 3,113 shares, respectively		(142,855)	(160,188)
Total equity		3,561,176	3,466,611
Total liabilities and equity		\$6,278,953	\$6,287,735

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

QIAGEN N.V. and Subsidiaries Condensed Consolidated Statements of Income (Unaudited)

(in thousands, except per share data)	Notes	Three months ended	
		March 31, 2023	2022
Net sales	(4)	\$485,398	\$628,391
Cost of sales:			
Cost of sales		161,906	198,118
Acquisition-related intangible amortization		16,016	15,303
Total cost of sales		177,922	213,421
Gross profit		307,476	414,970
Operating expenses:			
Sales and marketing		114,641	118,504
Research and development		54,718	46,376
General and administrative		32,939	34,350
Acquisition-related intangible amortization		2,657	2,917
Restructuring, acquisition, integration and other, net		5,811	5,752
Total operating expenses		210,766	207,899
Income from operations		96,710	207,071
Other income (expense):			
Interest income		18,008	2,222
Interest expense		(14,454)	(13,536)
Other income (expense), net		8,523	(235)
Total other income (expense), net		12,077	(11,549)
Income before income tax expense		108,787	195,522
Income tax expense	(11)	23,752	40,210
Net income		\$85,035	\$155,312
Basic earnings per common share		\$0.37	\$0.68
Diluted earnings per common share		\$0.37	\$0.67
Weighted-average common shares outstanding:			
Basic		227,894	227,199
Diluted		230,602	230,164

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

QIAGEN N.V. and Subsidiaries Condensed Consolidated Statements of Comprehensive Income (Unaudited)

(in thousands)	Notes	Three months ended March 31,	
		2023	2022
Net income		\$85,035	\$155,312
Other comprehensive income (loss) to be reclassified to profit or loss in subsequent periods:			
Losses on cash flow hedges, net of \$511 tax benefit and \$333 tax benefit, respectively	(9)	(1,470)	(956)
Reclassification adjustments on cash flow hedges, net of tax of \$2,063 tax expense and \$1,045 tax benefit, respectively	(9)	5,933	(3,005)
Cash flow hedges, net of tax		4,463	(3,961)
Net investment hedge	(9)	(10,015)	4,963
Foreign currency translation adjustments, net of tax of \$0 and \$277 tax expense, respectively		13,382	(8,154)
Total other comprehensive income (loss)		7,830	(7,152)
Comprehensive income		\$92,865	\$148,160

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

QIAGEN N.V. and Subsidiaries Condensed Consolidated Statements of Changes in Equity (Unaudited)

(in thousands)	Notes	Common Shares		Additional Paid-In Capital	Retained Earnings	Accumulated Other Comprehensive Loss	Treasury Shares		Total Equity
		Shares	Amount				Shares	Amount	
Balance at December 31, 2022		230,829	\$2,702	\$1,868,015	\$2,160,173	(\$404,091)	(3,113)	(\$160,188)	\$3,466,611
Net income		—	—	—	85,035	—	—	—	85,035
Unrealized loss, net on hedging contracts	(9)	—	—	—	—	(11,485)	—	—	(11,485)
Realized loss, net on hedging contracts	(9)	—	—	—	—	5,933	—	—	5,933
Translation adjustment, net	(13)	—	—	—	—	13,382	—	—	13,382
Issuance of common shares in connection with stock plan		—	—	—	(29,781)	—	589	29,857	76
Tax withholding related to vesting of stock awards	(12)	—	—	—	—	—	(270)	(12,524)	(12,524)
Share-based compensation	(12)	—	—	14,148	—	—	—	—	14,148
Balance at March 31, 2023		230,829	\$2,702	\$1,882,163	\$2,215,427	(\$396,261)	(2,794)	(\$142,855)	\$3,561,176
Balance at December 31, 2021		230,829	\$2,702	\$1,818,508	\$1,791,740	(\$326,670)	(3,755)	(\$189,730)	\$3,096,550
Net income		—	—	—	155,312	—	—	—	155,312
Unrealized gain, net on hedging contracts	(9)	—	—	—	—	4,007	—	—	4,007
Realized gain, net on hedging contracts	(9)	—	—	—	—	(3,005)	—	—	(3,005)
Translation adjustment, net	(13)	—	—	—	—	(8,154)	—	—	(8,154)
Issuance of common shares in connection with stock plan		—	—	—	(33,392)	—	720	33,421	29
Tax withholding related to vesting of stock awards	(12)	—	—	—	—	—	(342)	(16,684)	(16,684)
Share-based compensation	(12)	—	—	12,083	—	—	—	—	12,083
Balance at March 31, 2022		230,829	\$2,702	\$1,830,591	\$1,913,660	(\$333,822)	(3,377)	(\$172,993)	\$3,240,138

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

QIAGEN N.V. and Subsidiaries Condensed Consolidated Statements of Cash Flows (Unaudited)

(in thousands)	Notes	Three months ended	
		March 31, 2023	2022
Cash flows from operating activities:			
Net income		\$85,035	\$155,312
Adjustments to reconcile net income to net cash provided by operating activities, net of effects of businesses acquired:			
Depreciation and amortization		52,061	52,998
Non-cash impairments		—	153
Amortization of debt discount and issuance costs	(8)	8,537	8,289
Share-based compensation expense	(12)	14,148	12,083
Deferred income taxes		(4,341)	615
Other items, net including fair value changes in derivatives		(9,362)	2,663
Net changes in operating assets and liabilities:			
Accounts receivable		7,882	(15,848)
Inventories		(22,671)	(3,786)
Prepaid expenses and other current assets		(2,349)	532
Other long-term assets		1,860	174
Accounts payable		(13,409)	(11,667)
Accrued and other current liabilities		(53,964)	(7,096)
Income taxes		6,620	12,346
Other long-term liabilities		1,879	642
Net cash provided by operating activities		71,926	207,410
Cash flows from investing activities:			
Purchases of property, plant and equipment		(33,220)	(29,334)
Purchases of intangible assets	(6)	(5,189)	(9,081)
Purchases of short-term investments	(7)	(534,488)	(396,315)
Proceeds from redemptions of short-term investments	(7)	295,816	119,878
Cash paid for acquisition, net of cash acquired	(3)	(148,382)	—
Cash (paid) received for collateral asset	(9)	(6,980)	9,600
Purchases of investments, net	(7)	(1,404)	(1,000)
Net cash used in investing activities		(433,847)	(306,252)

QIAGEN N.V. and Subsidiaries Condensed Consolidated Statements of Cash Flows (Unaudited)

(in thousands)	Notes	Three months ended March 31,	
		2023	2022
Cash flows from financing activities:			
Proceeds from issuance of common shares		75	29
Tax withholding related to vesting of stock awards	(12)	—	(7,702)
Cash (paid) received for collateral liability	(8)	(9,903)	1,587
Cash paid for contingent consideration	(10)	—	(4,572)
Net cash used in financing activities		(9,828)	(10,658)
Effect of exchange rate changes on cash and cash equivalents		260	(501)
Net decrease in cash and cash equivalents		(371,489)	(110,001)
Cash and cash equivalents, beginning of period		730,669	880,516
Cash and cash equivalents, end of period		\$359,180	\$770,515

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

Notes to the Condensed Consolidated Financial Statements (unaudited)

March 31, 2023

1. Corporate Information

QIAGEN N.V. (QIAGEN) is a public limited liability company (naamloze vennootschap) under Dutch law with registered office at Hulsterweg 82, 5912 PL Venlo, The Netherlands. QIAGEN N.V., a Netherlands holding company, and subsidiaries (we, our or the Company) is a leading global provider of Sample to Insight solutions that enable customers to gain valuable molecular insights from samples containing the building blocks of life. Our sample technologies isolate and process DNA, RNA and proteins from blood, tissue and other materials. Assay technologies make these biomolecules visible and ready for analysis. Bioinformatics software and knowledge bases interpret data to report relevant, actionable insights. Automation solutions tie these together in seamless and cost-effective workflows. We provide solutions to more than 500,000 customers around the world in Molecular Diagnostics (human healthcare) and Life Sciences (academia, pharma R&D and industrial applications, primarily forensics). As of March 31, 2023, we had more than 6,200 employees in over 35 locations worldwide.

2. Basis of Presentation and Accounting Policies

Basis of Presentation

The condensed consolidated financial statements include the accounts of QIAGEN and its wholly-owned subsidiaries. All significant intercompany accounts and transactions have been eliminated in consolidation. All amounts are presented in U.S. dollars, unless otherwise indicated. Investments in either common stock or in-substance common stock of companies where we exercise significant influence over the operations but do not have control, and where we are not the primary beneficiary, are accounted for using the equity method. All other investments are accounted for at our initial cost, minus any impairment, plus or minus changes from observable price changes in orderly transactions for the identical or a similar investment of the same issuer.

The accompanying unaudited condensed consolidated financial statements have been prepared in accordance with U.S. generally accepted accounting principles (U.S. GAAP) for interim financial information and generally in accordance with the instructions to Form 10-Q and Article 10 of Regulation S-X. Certain information and footnote disclosures normally included in financial statements prepared in accordance with U.S. GAAP have been condensed or omitted pursuant to the Securities and Exchange Commission (SEC) rules and regulations. In the opinion of management, all adjustments (which include only normal recurring adjustments) necessary for a fair presentation have been included.

As of April 1, 2022, the results of our subsidiary in Turkey are reported under highly inflationary accounting as the prior three-years cumulative inflation rate exceeded 100 percent.

On January 3, 2023, we acquired Verogen, Inc., a leader in the use of next-generation sequencing (NGS) technologies to drive the future of human identification (HID) and forensic investigation. Verogen, a privately held company founded in 2017 and based in San Diego, California, supports the global human identification community with NGS tools and professional services to help resolve criminal and missing-persons cases. The acquisition is not significant to the overall condensed consolidated financial statements.

In May 2022, we acquired BLIRT S.A., a supplier of standardized and customized solutions for proteins and enzymes as well as molecular biology reagents located in Gdańsk, Poland. Its offering includes proteins and enzymes that are critical to the life sciences industry and diagnostic kit manufacturers. The acquisition was not significant to the overall condensed consolidated financial statements.

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities and disclosure of contingencies at the date of the financial statements as well as the reported amounts of revenues and expenses during the reporting period. While changing conditions regarding the war in Ukraine and the COVID-19 pandemic present additional uncertainty, we continue to use the best information available to form our estimates. Actual results could differ from those estimates.

We operate as one operating segment in accordance with the Financial Accounting Standards Board (FASB) Accounting Standards Codification (ASC) Topic 280, Segment Reporting. We have a common basis of organization and our products and services are offered globally. Our chief operating decision maker (CODM) makes decisions based on the Company as a whole. Accordingly, we operate and make decisions as one reporting unit.

The results of operations for an interim period are not necessarily indicative of results that may be expected for any other interim period or for the full year. These unaudited condensed consolidated financial statements should be read in conjunction with the audited consolidated financial statements and notes thereto included in the Company's Annual Report on Form 20-F for the year ended December 31, 2022.

Summary of Significant Accounting Policies

The interim condensed consolidated financial statements were prepared based on the same accounting policies as those applied and described in the consolidated financial statements as of December 31, 2022.

Adoption of New Accounting Standards in 2023

As of March 31, 2023, there has been no adoption of new accounting standards in 2023.

New Accounting Standards Not Yet Adopted

As of March 31, 2023, there are no recently issued but not yet adopted accounting pronouncements that are expected to materially impact our consolidated financial statements.

3. Acquisitions

Business Combinations and Asset Acquisitions

For acquisitions which have been accounted for as business combinations, the acquired companies' results have been included in the accompanying consolidated statements of income from their respective dates of acquisition. Our acquisitions have historically been made at prices above the fair value of the acquired net assets, resulting in goodwill, due to expectations of synergies of combining the businesses. These synergies include use of our existing infrastructure, such as sales force, business service centers, distribution channels and customer relations, to expand sales of an acquired business' products; use of the infrastructure of the acquired businesses to cost-effectively expand sales of our products; and elimination of duplicative facilities, functions and staffing.

If the acquired net assets do not constitute a business under the acquisition method of accounting, the transaction is accounted for as an asset acquisition and no goodwill is recognized. In an asset acquisition, the amount allocated to acquired in-process research and development with no alternative future use is charged to expense at the acquisition date.

2023 Business Combinations

On January 3, 2023, we acquired 100% of the shares of Verogen, Inc., a leader in the use of next-generation sequencing (NGS) technologies to drive the future of human identification (HID) and forensic investigation. Verogen, a privately held company founded in 2017 and based in San Diego, California, supports the global human identification community with NGS tools and professional services to help resolve criminal and missing-persons cases. The cash consideration, net of cash acquired was \$148.4 million. The acquisition is not significant to the overall condensed consolidated financial statements. As of March 31, 2023, the allocation of the purchase price was preliminary as we continue to gather information about the fair value of all assets and liabilities, including intangible assets acquired, and the related deferred taxes. At the acquisition date, all the assets acquired and liabilities assumed were recorded at their respective fair values and our condensed consolidated results of operations include the operating results from the acquired company from the acquisition date. The acquisition did not have a material impact to net sales, net income or earnings per common share and therefore no pro forma information has been provided herein.

2022 Business Combinations

On May 11, 2022, we acquired BLIRT S.A., a supplier of standardized and customized solutions for proteins and enzymes as well as molecular biology reagents located in Gdańsk, Poland. Its offering includes proteins and enzymes that are critical to the life sciences industry and diagnostic kit manufacturers. The cash consideration, net of cash acquired was \$63.7 million. The acquisition was not significant to the overall condensed consolidated financial statements. As of March 31, 2023, the allocation of the purchase price was preliminary as we continue to gather information about the fair value of all assets and liabilities, other than intangible assets. At the acquisition date, all the assets acquired and liabilities assumed were recorded at their respective fair values and our condensed consolidated results of operations include the operating results from the acquired company from the acquisition date. The acquisition did not have a material impact to net sales, net income or earnings per common share and therefore no pro forma information has been provided herein.

4. Revenue

Contract Estimates

The majority of our revenue is derived from contracts (i) with an original expected length of one year or less and (ii) contracts for which we recognize revenue at the amount in which we have the right to invoice as product is delivered. We have elected, as a practical expedient, not to disclose the value of remaining performance obligations associated with these types of contracts.

However, we have certain companion diagnostic co-development contracts to provide research and development activities in which our performance obligations extend over multiple years. As of March 31, 2023, we had \$47.8 million of remaining performance obligations for which the transaction price is not constrained related to these contracts which we expect to recognize over the next 12 to 18 months.

Revenue expected to be recognized in any future year related to remaining performance obligations, excluding revenue pertaining to contracts that have an original expected duration of one year or less, contracts where revenue is recognized as invoiced and contracts with variable consideration related to undelivered performance obligations, is not material.

Contract Balances

The timing of revenue recognition, billings and cash collections can result in billed accounts receivable, unbilled receivables (contract assets), and customer advances and deposits (contract liabilities) in the condensed consolidated balance sheet.

Contract assets as of March 31, 2023 and December 31, 2022 totaled \$12.3 million and \$9.8 million, respectively, and are included in prepaid expenses and other current assets in the accompanying condensed consolidated balance sheets and relate to the companion diagnostic co-development contracts discussed above.

Contract liabilities primarily relate to non-cancellable advances or deposits received from customers before revenue is recognized and is primarily related to instrument service and Software as a Service (SaaS) arrangements. As of March 31, 2023 and December 31, 2022, contract liabilities totaled \$86.4 million and \$84.2 million, respectively, of which \$71.0 million and \$69.0 million, respectively, are included in accrued and other current liabilities and \$15.4 million and \$15.2 million, respectively, are included in other long-term liabilities. During the three months ended March 31, 2023 and 2022, we satisfied the associated performance obligations and recognized revenue of \$26.5 million and \$23.4 million, respectively, related to advance customer payments previously received.

Disaggregation of Revenue

We disaggregate our revenue based on product type and customer class, product category and geography as shown in the tables below for the three-month periods ended March 31, 2023 and 2022:

(in thousands)	Three Months Ended March 31,	
	2023	2022
Consumables and related revenues	\$231,224	\$326,265
Instruments	19,104	30,250
Total Molecular Diagnostics	\$250,328	\$356,515
Consumables and related revenues	\$199,411	\$234,694
Instruments	35,659	37,182
Total Life Sciences	\$235,070	\$271,876
Total	\$485,398	\$628,391

(in thousands)	Three Months Ended March 31,	
	2023	2022
Sample technologies	\$173,242	\$265,178
Diagnostic solutions	162,704	174,426
PCR / Nucleic acid amplification	76,858	115,801
Genomics / NGS	55,182	56,127
Other	17,412	16,859
Total	\$485,398	\$628,391

(in thousands)	Three Months Ended March 31,	
	2023	2022
Americas	\$246,679	\$253,055
Europe, Middle East and Africa	155,418	249,083
Asia Pacific and Rest of World	83,301	126,253
Total	\$485,398	\$628,391

5. Inventories

The components of inventories consist of the following as of March 31, 2023 and December 31, 2022:

(in thousands)	March 31,	December 31,
	2023	2022
Raw materials	\$100,288	\$97,613
Work in process	91,149	85,488
Finished goods	189,387	174,859
Total inventories, net	\$380,824	\$357,960

6. Intangible Assets

The following table sets forth the intangible assets by major asset class as of March 31, 2023 and December 31, 2022:

(in thousands)	March 31, 2023		December 31, 2022	
	Gross Carrying Amount	Accumulated Amortization	Gross Carrying Amount	Accumulated Amortization
Amortized Intangible Assets:				
Patent and license rights	\$227,267	(\$146,879)	\$203,549	(\$140,632)
Developed technology	822,600	(425,762)	780,233	(407,401)
Customer base, non-compete agreements and trademarks	218,692	(172,559)	227,171	(179,658)
Total amortized intangible assets	\$1,268,559	(\$745,200)	\$1,210,953	(\$727,691)
Unamortized Intangible Assets:				
In-process research and development	\$61,662		\$61,534	
Goodwill	2,454,081		2,352,569	
Total unamortized intangible assets	\$2,515,743		\$2,414,103	

During the three months ended March 31, 2023, certain fully amortized intangible assets totaling \$12.5 million were retired.

In-process research and development is from the acquisitions of NeuMoDx in 2020 and STAT-Dx in 2018. The estimated fair value of acquired in-process research and development projects which have not reached technological feasibility at the date of acquisition are capitalized and subsequently tested for impairment through completion of the development process, at which point the capitalized amounts are amortized over their estimated useful life. If a project is abandoned rather than completed, all capitalized amounts are written-off immediately.

The changes in intangible assets in 2023 are summarized as follows:

(in thousands)	Goodwill	Intangibles
Balance at December 31, 2022	\$2,352,569	\$544,796
Business combinations	95,136	58,000
Additions	—	2,426
Amortization	—	(23,319)
Foreign currency translation adjustments	6,376	3,118
Balance at March 31, 2023	\$2,454,081	\$585,021

The changes in the carrying amount of goodwill for the three months ended March 31, 2023 resulted from the acquisition of Verogen, Inc. in January 2023 and foreign currency translation adjustments driven by changes in the euro, Australian dollar and U.K. pound.

Cash paid for purchases of intangible assets in the accompanying condensed consolidated statement of cash flows during the three months ended March 31, 2023 totaled \$5.2 million, of which \$2.8 million is related to current year payments for assets that were accrued as of December 31, 2022 and \$2.4 million is related to current period cash payments for intangible assets.

For the three-month period ended March 31, 2023, amortization expense on intangible assets increased to \$23.3 million as compared to amortization expense of \$23.1 million in the same period of 2022. Amortization of intangibles for the next five years is expected to be approximately:

Year	Annual Amortization (in millions)
2024	\$89.9
2025	\$78.6
2026	\$71.1
2027	\$65.7
2028	\$48.5

7. Investments

The following discusses our non-marketable investments, marketable investments, and the realized and unrealized gains and losses on these investments.

Non-Marketable Investments

We have made strategic investments in certain privately-held companies without readily determinable market values.

Non-Marketable Investments Accounted for Under the Equity Method

As of March 31, 2023 and December 31, 2022, we had total non-marketable investments that were accounted for as equity method investments of \$20.7 million and \$18.2 million, respectively, included in other long-term assets.

Some of our equity method investments are variable interest entities. We are not considered the primary beneficiary of these investments as we do not hold the power to direct the activities that most significantly impact the economic performance of these entities, and therefore, these investments are not consolidated. As of March 31, 2023, these investments had a total net carrying value of \$10.4 million, of which \$10.7 million, representing our maximum exposure to loss, is included in other long-term assets and \$0.3 million, where we are committed to fund losses, is included in other long-term liabilities. As of December 31, 2022, these investments totaled a net \$8.4 million, of which \$8.7 million is included in other long-term assets and \$0.3 million is included in other long-term liabilities.

One of our investments, TVM Life Science Ventures III (TVM), is a limited partnership, and we account for our 3.1% investment under the equity method as we have the ability to exercise significant influence over the limited partnership. This investment is valued at net asset value (NAV) reported by the counterparty. During 2023 and 2022, we made additional cash payments of \$1.2 million and \$1.1 million, respectively to TVM. As of March 31, 2023, we have \$8.0 million of unfunded commitments through 2029 related to this investment. We do not have the right to redeem these funds under the normal course of operations of this partnership.

Non-Marketable Investments Not Accounted for Under the Equity Method

At March 31, 2023 and December 31, 2022, we had investments in non-publicly traded companies that do not have readily determinable fair values with carrying amounts that totaled \$7.0 million and \$5.3 million, respectively, which are included in other long-term assets. These investments are measured at cost, less any impairment, plus or minus changes resulting from observable price changes in orderly transactions for the identical or a similar investment of the same issuer. Changes resulting from impairment and observable price changes are recognized in the statements of income during the period the change is identified.

The changes in non-marketable investments not accounted for under the equity method during the three months ended March 31, 2023 and 2022 are as follows:

(in thousands)	2023	2022
Balance at beginning of year	\$5,329	\$3,945
Cash investments in equity securities, net	223	(104)
Shares received in exchange for services	1,285	—
Foreign currency translation adjustments	128	(67)
Balance at end of period	\$6,965	\$3,774

8. Debt

At March 31, 2023 and December 31, 2022, total long-term debt, net of debt issuance costs, consists of the following:

(in thousands)	March 31, 2023	December 31, 2022
0.500% Senior Unsecured Cash Convertible Notes due 2023	\$393,243	\$389,552
1.000% Senior Unsecured Cash Convertible Notes due 2024	468,920	464,331
0.000% Senior Unsecured Convertible Notes due 2027	497,470	497,336
German Private Placement (2017 Schuldschein)	119,007	116,699
German Private Placement (2022 Schuldschein)	401,309	393,532
Total long-term debt	1,879,949	1,861,450
Less: Current portion	393,243	389,552
Long-term portion	\$1,486,706	\$1,471,898

The notes are all unsecured obligations that rank pari passu.

No Contingent Conversion Conditions were triggered as of March 31, 2023.

The principal amount, carrying amount and fair values of long-term debt instruments are summarized below:

(in thousands)	As of March 31, 2023				
	Principal Amount	Unamortized debt discount and issuance costs	Carrying Amount	Fair Value	
				Amount	Leveling
Cash Convertible Notes due 2023	\$400,000	(\$6,757)	\$393,243	\$442,736	Level 1
Cash Convertible Notes due 2024	500,000	(31,080)	468,920	547,975	Level 1
Convertible Notes due 2027	500,000	(2,530)	497,470	450,390	Level 1
German Private Placement (2017 Schuldschein)	119,102	(95)	119,007	115,112	Level 2
German Private Placement (2022 Schuldschein)	402,372	(1,063)	401,309	388,590	Level 2
	\$1,921,474	(\$41,525)	\$1,879,949	\$1,944,803	

As of December 31, 2022

(in thousands)	Principal Amount	Unamortized debt discount and issuance costs	Carrying Amount	Fair Value	
				Amount	Leveling
Cash Convertible Notes due 2023	\$400,000	(\$10,448)	\$389,552	\$493,436	Level 1
Cash Convertible Notes due 2024	500,000	(35,669)	464,331	596,485	Level 1
Convertible Notes due 2027	500,000	(2,664)	497,336	471,545	Level 1
German Private Placement (2017 Schuldschein)	116,821	(122)	116,699	112,401	Level 2
German Private Placement (2022 Schuldschein)	394,638	(1,106)	393,532	378,302	Level 2
	\$1,911,459	(\$50,009)	\$1,861,450	\$2,052,169	

Interest expense related to the convertible notes for the three months ended March 31, 2023 and 2022 was comprised of the following:

(in thousands)	Three months ended March 31,	
	2023	2022
Coupon interest	\$1,750	\$1,750
Amortization of original issuance discount	7,754	7,418
Amortization of debt issuance costs	660	641
Total interest expense related to the convertible notes	\$10,164	\$9,809

Convertible Notes due 2027

On December 17, 2020, we issued zero coupon convertible notes in an aggregate principal amount of \$500.0 million with a maturity date of December 17, 2027 (2027 Notes). The 2027 Notes carry no coupon interest. The net proceeds of the 2027 Notes totaled \$497.6 million, after payment of debt issuance costs of \$3.7 million.

The effective interest rate of the 2027 Notes is 1.65%, which is imputed based on the amortization of the fair value of the embedded conversion option over the remaining term of the 2027 Notes.

The 2027 Notes are convertible into common shares based on an initial conversion rate, subject to adjustment, of 2,477.65 shares per \$200,000 principal amount of notes (which represents an initial conversion price of \$80.7218 per share, or 6.2 million underlying shares). At conversion, we will settle the 2027 Notes by repaying the principal portion in cash and any excess of the conversion value over the principal amount in common shares.

The 2027 Notes may be redeemed at the option of each noteholder at their principal amount on December 17, 2025 or in connection with a change of control or delisting event (as further described in the 2027 Notes).

The 2027 Notes are convertible in whole, but not in part, at the option of the noteholders on a net share settlement basis, at the prevailing conversion price, in the following circumstances beginning after January 27, 2021 through June 16, 2027:

- if the last reported sale price of our common shares for at least 20-consecutive trading days during a period of 30-consecutive trading days ending on the last trading day of the immediately preceding calendar quarter is greater than or equal to 130% of the conversion price on each applicable trading day; or
- if we undergo certain fundamental changes, including a change of control, as defined in the agreement; or
- if parity event or trading price unavailability event, as the case may be, occurs during the period of 10 days, including the first business day following the relevant trading price notification date; or
- if we distribute assets or property to all or substantially all of the holders of our common shares and those assets or other property have a value of more than 25% of the average daily volume-weighted average trading price of our common shares for the prior 20 consecutive trading days; or

- in case of early redemption in respect of the outstanding notes at our option, where the conversion date falls in the period from (and including) the date on which the call notice is published to (and including) the 45th business day prior to the redemption date; or
- if we experience certain customary events of default, including defaults under certain other indebtedness, until such event of default has been cured or waived.

The noteholders may convert their notes at any time, without condition, on or after June 17, 2027 until the 45th business day prior to December 17, 2027.

No Contingent Conversion Conditions were triggered for the 2027 Notes as of March 31, 2023 or December 31, 2022.

Cash Convertible Notes due 2023 and 2024

On September 13, 2017, we issued \$400.0 million aggregate principal amount of Cash Convertible Senior Notes due in 2023 (2023 Notes). The net proceeds of the 2023 Notes were \$365.6 million, after payment of transaction costs and the net cost of the Call Spread Overlay described below.

On November 13, 2018, we issued \$500.0 million aggregate principal amount of Cash Convertible Senior Notes due in 2024 (2024 Notes). The net proceeds of the 2024 Notes were \$468.9 million, after payment of transaction costs and the net cost of the Call Spread Overlay described below.

We refer to the 2023 Notes and 2024 Notes collectively as the “Cash Convertible Notes”.

Interest on the Cash Convertible Notes is payable semi-annually in arrears and will mature on the respective maturity dates unless repurchased or converted with their terms prior to such dates. The interest rate and corresponding maturity of each Cash Convertible Note are summarized in the table below. The Cash Convertible Notes are solely convertible into cash in whole, but not in part, at the option of noteholders under the circumstances described below and during the contingent conversion periods as shown in the table below.

Cash Convertible Notes	Annual Interest Rate	Date of Interest Payments	Maturity Date	Contingent Conversion Period	Conversion Rate per \$200,000 Principal Amount
2023 Notes	0.500%	March 13 and September 13	September 13, 2023	October 24, 2017 to March 13, 2023	4,829.7279
2024 Notes	1.000%	May 13 and November 13	November 13, 2024	December 24, 2018 to August 2, 2024	4,360.3098

Additionally, conversion may occur at any time following a Contingent Conversion Period through the fifth business day immediately preceding the applicable maturity date.

Upon conversion, noteholders will receive an amount in cash equal to the Cash Settlement Amount, calculated as described below. The Cash Convertible Notes are not convertible into shares of our common stock or any other securities.

Noteholders may convert the Cash Convertible Notes into cash at their option at any time during the Contingent Conversion Periods described above only under the following circumstances (Contingent Conversion Conditions):

- if the last reported sale price of our common shares for at least 20-consecutive trading days during a period of 30-consecutive trading days ending on the last trading day of the immediately preceding calendar quarter is greater than or equal to 130% of the conversion price on each applicable trading day; or
- if we undergo certain fundamental changes, including a change of control, as defined in the agreement; or
- if parity event or trading price unavailability event, as the case may be, occurs during the period of 10 days, including the first business day following the relevant trading price notification date; or
- if we elect to distribute assets or property to all or substantially all the holders of our common shares and those assets or other property have a value of more than 25% of the average daily volume-weighted average trading price of our common shares for the prior 20-consecutive trading days; or
- if we elect to redeem the Cash Convertible Notes; or

- if we experience certain customary events of default, including defaults under certain other indebtedness until such event has been cured or waived or the payment of the Cash Convertible Notes have been accelerated.

For the 2023 Notes, the Contingent Conversion Period expired on March 13, 2023 and, as of March 31, 2023, the Contingent Conversion Conditions for the 2023 Notes can no longer be triggered. No Contingent Conversion Conditions were triggered for the 2023 Notes as of December 31, 2022. No Contingent Conversion Conditions were triggered for the 2024 Notes as of March 31, 2023 or December 31, 2022.

The Contingent Conversion Conditions in the 2023 Notes and 2024 Notes noted above have been analyzed under ASC 815, *Derivatives and Hedging*, and, based on our analysis, we determined that each of the embedded features listed above are clearly and closely related to the 2023 Notes and 2024 Notes (i.e., the host contracts). As a result, pursuant to the accounting provisions of ASC 815, *Derivatives and Hedging*, these features noted above are not required to be bifurcated as separate instruments.

Upon conversion, holders are entitled to a cash payment (Cash Settlement Amount) equal to the average of the conversion rate multiplied by the daily volume-weighted average trading price for our common shares over a 50-day period. The conversion rate is subject to adjustment in certain instances but will not be adjusted for any accrued and unpaid interest. In addition, following the occurrence of certain corporate events that may occur prior to the applicable maturity date, we may be required to pay a cash make-whole premium by increasing the conversion rate for any holder who elects to convert Cash Convertible Notes in connection with the occurrence of such a corporate event.

We may redeem the Cash Convertible Notes in their entirety at a price equal to 100% of the principal amount of the applicable Cash Convertible Notes plus accrued interest at any time when 20% or less of the aggregate principal amount of the applicable Cash Convertible Notes originally issued remain outstanding.

Because the Cash Convertible Notes contain an embedded cash conversion option, we have determined that the embedded cash conversion option is a derivative financial instrument, which is required to be separated from the Cash Convertible Notes and accounted for separately as a derivative liability, with changes in fair value reported in our condensed consolidated statements of income until the cash conversion option transaction settles or expires. The initial fair value liability of the embedded cash conversion options was \$74.5 million for the 2023 Notes and \$98.5 million for the 2024 Notes, which simultaneously reduced the carrying value of the Cash Convertible Notes (effectively serving as an original issuance discount). For further discussion of the derivative financial instruments relating to the Cash Convertible Notes, refer to Note 9 "Derivatives and Hedging".

As noted above, the reduced carrying value on the Cash Convertible Notes resulted in a debt discount that is amortized to the principal amount through the recognition of non-cash interest expense using the effective interest method over the expected life of the debt, six years for both the 2023 Notes and 2024 Notes. This resulted in our recognition of interest expense on the Cash Convertible Notes at an effective rate approximating what we would have incurred had nonconvertible debt with otherwise similar terms been issued. The effective interest rate is 3.997% for the 2023 Notes and 4.782% for the 2024 Notes, which is imputed based on the amortization of the fair value of the embedded cash conversion option over the remaining term of the Cash Convertible Notes.

We incurred approximately \$6.2 million and \$5.7 million of transaction costs in connection with the issuance of the 2023 Notes and 2024 Notes, respectively. Such costs have been allocated to the Cash Convertible Notes and deferred and are being amortized to interest expense over the terms of the Cash Convertible Notes using the effective interest method.

Cash Convertible Notes Call Spread Overlay

Concurrent with the issuance of the Cash Convertible Notes, we entered into privately negotiated hedge transactions (Call Options) with, and issued warrants to purchase shares of our common stock (Warrants) to, certain financial institutions. We refer to the Call Options and Warrants collectively as the "Call Spread Overlay". The Call Options are intended to offset any cash payments payable by us in excess of the principal amount due upon any conversion of the Cash Convertible Notes. The Call Options are derivative financial instruments and are discussed further in Note 9 "Derivatives and Hedging." The Warrants are equity instruments and are further discussed in Note 13 "Equity".

Aside from the initial payment of a premium, we will not be required to make any cash payments under the Call Options, and will be entitled to receive an amount of cash, generally equal to the amount by which the market price per common share exceeds the exercise price of the Call Options during the relevant valuation period. The exercise price under the Call Options is initially equal to the conversion price of the Cash Convertible Notes.

The Warrants that were issued with our Cash Convertible Notes could have a dilutive effect to the extent that the price of our common shares exceeds the applicable strike price of the Warrants. For each Warrant that is exercised, we will deliver to the holder a number of common shares equal to the amount by which the settlement price exceeds the exercise price, plus cash in lieu of any fractional shares. We will not receive any proceeds if the Warrants are exercised.

German Private Placement (2017 Schuldschein)

In 2017, we completed a German private placement bond (2017 Schuldschein) which was issued in several tranches totaling \$331.1 million due in various periods through 2027. In the first quarter of 2021, we repaid \$41.1 million for two tranches that matured. In October 2022, we repaid \$153.0 million for the four tranches that matured. The 2017 Schuldschein consists of one U.S. dollar and several Euro denominated tranches. The euro tranches are designated as a foreign currency non-derivative hedging instrument that qualifies as a net investment hedge as described in Note 9 "Derivatives and Hedging." Based on the spot rate method, the change in the carrying value of the euro denominated tranches attributed to the net investment hedge as of March 31, 2023 totaled \$2.9 million of unrealized gain and is recorded in equity. We paid \$1.2 million in debt issuance costs which are being amortized through interest expense using the effective interest over the lifetime of the notes.

A summary of the tranches as of March 31, 2023 and December 31, 2022 is as follows:

Currency	Notional Amount	Interest Rate	Maturity	Carrying Value (in thousands) as of	
				March 31, 2023	December 31, 2022
EUR	€64.0 million	Fixed 1.09%	June 2024	\$69,564	\$68,215
EUR	€31.0 million	Floating EURIBOR + 0.7%	June 2024	33,695	33,041
EUR	€14.5 million	Fixed 1.61%	June 2027	15,748	15,443
				\$119,007	\$116,699

German Private Placement (2022 Schuldschein)

In July and August 2022, we completed another German private placement bond (2022 Schuldschein) which was issued in several tranches totaling €370.0 million due in various periods through 2035. The 2022 Schuldschein consists of only euro denominated tranches which have either a fixed or floating rate. All tranches except for the €70.0 million fixed 3.04% tranche due August 2035 are ESG-linked wherein the interest rate is subject to adjustment of +/- 0.025% if our ESG rating changes. The euro tranches are designated as a foreign currency non-derivative hedging instrument that qualifies as a net investment hedge as described in Note 9 "Derivatives and Hedging". Based on the spot rate method, the change in the carrying value of the euro denominated tranches attributed to the net investment hedge as of March 31, 2023 totaled \$29.8 million of unrealized loss and is recorded in equity. We paid \$1.2 million in debt issuance costs which are being amortized through interest expense using the effective interest method over the lifetime of the notes.

A summary of the tranches issued is as follows:

Currency	Notional Amount	Interest Rate	Maturity	Carrying Value (in thousands) as of	
				March 31, 2023	December 31, 2022
EUR	€51.5 million	Floating 6M EURIBOR + 0.55%	July 2025	\$55,891	\$54,803
EUR	€62.0 million	Fixed 2.741%	July 2027	67,271	65,967
EUR	€29.5 million	Floating 6M EURIBOR + 0.70%	July 2027	32,008	31,388
EUR	€37.0 million	Fixed 3.044%	July 2029	40,142	39,365
EUR	€103.0 million	Floating 6M EURIBOR + 0.85%	July 2029	111,747	109,585
EUR	€9.5 million	Fixed 3.386%	July 2032	10,306	10,107
EUR	€7.5 million	Floating 6M EURIBOR + 1.0%	July 2032	8,137	7,979
EUR	€70.0 million	Fixed 3.04%	August 2035	75,807	74,338
				\$401,309	\$393,532

Revolving Credit Facility

Our credit facilities available and undrawn at March 31, 2023 total €427.0 million (approximately \$464.4 million). This includes a €400.0 million syndicated ESG-linked revolving credit facility expiring December 2025 and three other lines of credit amounting to €27.0 million with no expiration date. The €400.0 million facility can be utilized in euro and bears interest of 0.550% to 1.500% above EURIBOR, and is offered with interest periods of one, three or six months. The commitment fee is calculated based on 35% of the applicable margin. The revolving facility agreement contains certain financial and non-financial covenants, including but not limited to, restrictions on the encumbrance of assets and the maintenance of certain financial ratios. We were in compliance with these covenants at March 31, 2023. The credit facilities are for general corporate purposes and no amounts were utilized at March 31, 2023.

9. Derivatives and Hedging

Objective and Strategy

In the ordinary course of business, we use derivative instruments, including swaps, forwards and/or options, to manage potential losses from foreign currency exposures and interest bearing assets or liabilities. The principal objective of such derivative instruments is to minimize the risks and/or costs associated with our global financial and operating activities. We do not utilize derivative or other financial instruments for trading or other speculative purposes. We recognize all derivatives as either assets or liabilities on the balance sheet on a gross basis, measure those instruments at fair value and recognize the change in fair value in earnings in the period of change, unless the derivative qualifies as an effective hedge that offsets certain exposures. We have agreed with almost all of our counterparties with whom we had entered into cross-currency swaps, interest rate swaps or foreign exchange contracts, to enter into bilateral collateralization contracts under which we will receive or provide cash collateral, as the case may be, for the net position with each of these counterparties. As of March 31, 2023, cash collateral positions consisted of \$11.9 million recorded in accrued and other current liabilities and \$28.1 million recorded in prepaid expenses and other current assets in the accompanying condensed consolidated balance sheet. As of December 31, 2022, we had cash collateral positions consisting of \$21.8 million recorded in accrued and other current liabilities and \$21.1 million recorded in prepaid expenses and other current assets in the accompanying condensed consolidated balance sheet.

Non-Derivative Hedging Instrument

Net Investment Hedge

We are party to a foreign currency non-derivative hedging instrument that is designated and qualifies as net investment hedge. The objective of the hedge is to protect part of the net investment in foreign operations against adverse changes in the exchange rate between the euro and the functional currency of the U.S. dollar. The non-derivative hedging instrument is the German private corporate bond (2017 Schuldschein) which was issued in 2017 in the total amount of \$331.1 million as described in Note 8 "Debt". Of the \$331.1 million, which is held in both U.S. dollars and Euros, €255.0 million was designated as the hedging instrument against a

portion of our Euro net investments in our foreign operations. As further described in Note 8 "Debt", four tranches of the 2017 Schuldschein matured and were paid in October 2022 and two tranches of the 2017 Schuldschein matured and were paid during 2021. As a result, €109.5 million remained designated as a hedging instrument as of March 31, 2023. In July 2022, we issued an additional €370.0 million German private corporate bond (2022 Schuldschein) as described in Note 8 "Debt", and it is designated in its entirety as the hedging instrument against a portion of our euro net investments in our foreign operations. The relative changes in both the hedged item and hedging instrument are calculated by applying the change in spot rate between two assessment dates against the respective notional amount. The effective portion of the hedge is recorded in the cumulative translation adjustment account within other accumulated comprehensive loss. Based on the spot rate method, the unrealized loss recorded in equity as of March 31, 2023 and December 31, 2022 is \$32.6 million and \$22.6 million, respectively. Since we are using the debt as the hedging instrument, which is also remeasured based on the spot rate method, there is no hedge ineffectiveness related to the net investment hedge as of March 31, 2023 and December 31, 2022.

Derivatives Designated as Hedging Instruments

Cash Flow Hedges

As of March 31, 2023 and December 31, 2022, we held derivative instruments that are designated and qualify as cash flow hedges, where the effective portion of the gain or loss on the derivative is reported as a component of other comprehensive loss and reclassified into earnings in the same period or periods during which the hedged transaction affects earnings. Gains and losses on the derivative representing either hedge ineffectiveness or hedge components excluded from the assessment of effectiveness are recognized in current earnings. To date, we have not recorded any hedge ineffectiveness related to any cash flow hedges in earnings. Based on their valuation as of March 31, 2023, we expect approximately \$5.7 million of derivative losses included in accumulated other comprehensive loss will be reclassified into income during the next 12 months. The cash flows derived from derivatives are classified in the condensed consolidated statements of cash flows in the same category as the condensed consolidated balance sheet accounts of the underlying items.

We use interest rate derivative contracts to align our portfolio of interest bearing assets and liabilities with our risk management objectives. Since 2015, we have been a party to five cross currency interest rate swaps through 2025 for a total notional amount of €180.0 million which qualify for hedge accounting as cash flow hedges. In September 2022, we entered into five new cross currency interest rate swaps through 2025 for a total notional amount of CHF 542.0 million which qualify for hedge accounting as cash flow hedges. We determined that no ineffectiveness exists related to these swaps. As of March 31, 2023 and December 31, 2022, interest receivables of \$4.1 million and \$5.5 million, respectively, are recorded in prepaid expenses and other current assets in the accompanying condensed consolidated balance sheets.

Derivatives Not Designated as Hedging Instruments

Call Options

We entered into Call Options which, along with the sale of the Warrants, represent the Call Spread Overlay entered into in connection with the Cash Convertible Notes and which are more fully described in Note 8 "Debt". In these transactions, the Call Options are intended to address the equity price risk inherent in the cash conversion feature of each instrument by offsetting cash payments in excess of the principal amount due upon any conversion of the Cash Convertible Notes. Accordingly, the derivative is presented as either current or long-term based upon the classification of the related debt. As of December 31, 2022, the 2023 Notes and the related call options have been reclassified as current.

Aside from the initial payment of premiums for the Call Options, we will not be required to make any cash payments under the Call Options. We will, however, be entitled to receive under the terms of the Call Options, an amount of cash generally equal to the amount by which the market price per common share exceeds the exercise price of the Call Options during the relevant valuation period. The exercise price under the Call Options is equal to the conversion price of the Cash Convertible Notes.

The Call Options, for which our common shares are the underlying security, are derivative assets that require mark-to-market accounting treatment. The Call Options are measured and reported at fair value on a recurring basis, within Level 2 of the fair value hierarchy. The change in fair value is recognized immediately in our condensed consolidated statements of income in other income (expense), net.

Cash Convertible Notes Embedded Cash Conversion Option

The embedded cash conversion option within the Cash Convertible Notes discussed in Note 8 "Debt" is required to be separated from the Cash Convertible Notes and accounted for separately as a derivative liability, with changes in fair value reported in our condensed consolidated statements of income in other income (expense), net until the cash conversion option settles or expires. The embedded cash conversion option is measured and reported at fair value on a recurring basis, within Level 2 of the fair value hierarchy.

Because the terms of the Cash Convertible Notes' embedded cash conversion option are substantially similar to those of the Call Options, discussed above, we expect the effect on earnings from these two derivative instruments to mostly offset each other.

Foreign Exchange Contracts

As a globally active enterprise, we are subject to risks associated with fluctuations in foreign currencies in our ordinary operations. This includes foreign currency-denominated receivables, payables, debt, and other balance sheet positions including intercompany items. We manage balance sheet exposure on a group-wide basis using foreign exchange forward contracts, foreign exchange options and cross-currency swaps.

We are party to various foreign exchange forward, option and swap arrangements which had an aggregate notional value of \$571.1 million at March 31, 2023, which expire at various dates through November 2023. At December 31, 2022, these arrangements had an aggregate notional value of \$466.0 million, which expired at various dates through July 2023. The transactions have been entered into to offset the effects from short-term balance sheet exposure to foreign currency exchange risk. Changes in the fair value of these arrangements have been recognized in other income (expense), net.

Fair Values of Derivative Instruments

The following table summarizes the fair value amounts of derivative instruments as of March 31, 2023 and December 31, 2022. The current assets are included in prepaid expenses and other current assets and the current liabilities are included in accrued and other current liabilities in the accompanying condensed consolidated balance sheets.

(in thousands)	As of March 31, 2023		As of December 31, 2022	
	Current Asset	Long-Term Asset	Current Asset	Long-Term Asset
Assets:				
Derivative instruments designated as hedges				
Interest rate contracts - cash flow hedge ⁽¹⁾	\$—	\$9,112	\$—	\$12,256
Total derivative instruments designated as hedges	\$—	\$9,112	\$—	\$12,256
Undesignated derivative instruments				
Equity options	\$61,314	\$82,773	\$102,671	\$119,098
Foreign exchange forwards and options	8,501	—	8,946	—
Total undesignated derivative instruments	\$69,815	\$82,773	\$111,617	\$119,098
Total Derivative Assets	\$69,815	\$91,885	\$111,617	\$131,354

(in thousands)	As of March 31, 2023		As of December 31, 2022	
	Current Liability	Long-Term Liability	Current Liability	Long-Term Liability
Liabilities:				
Derivative instruments designated as hedges				
Interest rate contracts - cash flow hedge ⁽¹⁾	\$—	(\$35,818)	\$—	(\$36,982)
Total derivative instruments designated as hedges	\$—	(\$35,818)	\$—	(\$36,982)
Undesignated derivative instruments				
Equity options	(\$61,405)	(\$83,201)	(\$102,896)	(\$119,736)
Foreign exchange forwards and options	(5,309)	—	(8,356)	—
Total undesignated derivative instruments	(\$66,714)	(\$83,201)	(\$111,252)	(\$119,736)
Total Derivative Liabilities	(\$66,714)	(\$119,019)	(\$111,252)	(\$156,718)

⁽¹⁾ The fair value amounts for the interest rate contracts do not include accrued interest.

Gains and Losses on Derivative Instruments

The following tables summarize the gains and losses on derivative instruments for the three-month periods ended March 31, 2023 and 2022:

(in thousands)	Three months ended March 31,	
	2023	2022
Total amounts presented in the Condensed Consolidated Statements of Income in which the effects of cash flow and fair value hedges are recorded	Other income (expense), net	Other income (expense), net
	\$8,523	(\$235)
Gains (Losses) on Derivatives in Cash Flow Hedges		
Interest rate contracts		
Amount of gain (loss) reclassified from accumulated other comprehensive loss	\$7,996	(\$4,050)
Amounts excluded from effectiveness testing	—	—
Gains (Losses) on Derivatives in Fair Value Hedges		
Interest rate contracts		
Hedged item	—	1,248
Derivatives designated as hedging instruments	—	(1,248)
Gains (Losses) Derivatives Not Designated as Hedging Instruments		
Equity options	(77,683)	(81,519)
Cash convertible notes embedded cash conversion option	78,026	81,551
Foreign exchange forwards and options	3,346	13,255
Total gains	\$11,685	\$9,237

10. Financial Instruments and Fair Value Measurements

Assets and liabilities are measured at fair value according to a three-tier fair value hierarchy which prioritizes the inputs used in measuring fair value as follows:

- *Level 1.* Observable inputs, such as quoted prices in active markets;
- *Level 2.* Inputs, other than the quoted price in active markets, that are observable either directly or indirectly; and
- *Level 3.* Unobservable inputs in which there is little or no market data, which require the reporting entity to develop its own assumptions.

The following table presents our fair value hierarchy for our financial assets and liabilities measured at fair value on a recurring basis. There were no transfers between levels during the three months ended March 31, 2023.

(in thousands)	As of March 31, 2023				As of December 31, 2022			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
Financial assets:								
Cash equivalents	\$145,891	\$—	\$—	\$145,891	\$289,394	\$94,828	\$—	\$384,222
Short-term investments	187,023	451,138	—	638,161	79,600	592,997	—	672,597
Non-marketable equity securities	—	—	6,965	6,965	—	—	5,329	5,329
Equity options	—	144,087	—	144,087	—	221,769	—	221,769
Foreign exchange forwards and options	—	8,501	—	8,501	—	8,946	—	8,946
Interest rate contracts - cash flow hedge	—	9,112	—	9,112	—	12,256	—	12,256
Total financial assets	\$332,914	\$612,838	\$6,965	\$952,717	\$368,994	\$930,796	\$5,329	\$1,305,119
Financial liabilities:								
Foreign exchange forwards and options	\$—	(\$5,309)	\$—	(\$5,309)	\$—	(\$8,356)	\$—	(\$8,356)
Interest rate contracts - cash flow hedge	—	(35,818)	—	(35,818)	—	(36,982)	—	(36,982)
Cash convertible notes embedded cash conversion option	—	(144,606)	—	(144,606)	—	(222,632)	—	(222,632)
Contingent consideration	—	—	(18,072)	(18,072)	—	—	(18,088)	(18,088)
Total financial liabilities	\$—	(\$185,733)	(\$18,072)	(\$203,805)	\$—	(\$267,970)	(\$18,088)	(\$286,058)

The carrying values of financial instruments, including accounts receivable, accounts payable and other accrued liabilities, approximate their fair values due to their short-term maturities.

In determining fair value for Level 2 instruments, we apply a market approach, using quoted active market prices relevant to the particular instrument under valuation, giving consideration to the credit risk of both the respective counterparty to the contract and the Company. To determine our credit risk, we estimated our credit rating by benchmarking the price of outstanding debt to publicly-available comparable data from rated companies. Using the estimated rating, our credit risk was quantified by reference to publicly-traded debt with a corresponding rating. The Level 2 derivative financial instruments include the Call Options asset and the embedded cash conversion option liability. See Note 8 "Debt" and Note 9 "Derivatives and Hedging" for further information. The derivatives are not actively traded and are valued based on an option pricing model that uses observable market data for inputs. Significant market data inputs used to determine fair values included our common share price, the risk-free interest rate, and the implied volatility of our common shares. The Call Options asset and the embedded cash conversion option liability were designed with the intent that changes in their fair values would substantially offset, with limited net impact to our earnings. Therefore, the sensitivity of changes in the unobservable inputs to the option pricing model for such instruments is substantially mitigated.

Our Level 3 instruments include non-marketable equity security investments. Under the measurement alternative, the carrying value is measured at cost, less any impairment, plus or minus changes resulting from observable price changes in orderly transactions for identical or similar investments of the same issuer. Adjustments are determined primarily based on a market approach as of the transaction date.

Our Level 3 instruments also include contingent consideration liabilities. We value contingent consideration liabilities using unobservable inputs, applying the income approach, such as the discounted cash flow technique, or the probability-weighted scenario method. Contingent consideration arrangements obligate us to pay the sellers of an acquired entity if specified future events occur or conditions are met such as the achievement of technological or revenue milestones. We use various key assumptions, such as the probability of achievement of the milestones (0% to 100%) and the discount rate (between 6.5% and 6.6%), to represent the non-performing risk factors and time value when applying the income approach. We regularly review the fair value of the contingent consideration, and reflect any change in the accrual in the condensed consolidated statements of income in the line items commensurate with the underlying nature of milestone arrangements.

Refer to Note 7 "Investments" for the change in non-marketable equity securities with Level 3 inputs during the three-month periods ended March 31, 2023 and 2022. For contingent consideration liabilities with Level 3 inputs, the following table summarizes the activity for the three-month periods ended March 31, 2023 and 2022, all of which is related to the 2018 acquisition of STAT-Dx:

(in thousands)	2023	2022
Balance at beginning of year	(\$18,088)	(\$24,100)
Changes in fair value	16	(151)
Payments	—	5,900
Balance at end of period	(\$18,072)	(\$18,351)

As of March 31, 2023, \$18.1 million was accrued for contingent consideration, of which \$8.3 million is included in accrued and other current liabilities and \$9.8 million is included in other long-term liabilities in the accompanying condensed consolidated balance sheet.

The estimated fair value of long-term debt as disclosed in Note 8 "Debt" was based on current interest rates for similar types of borrowings. The estimated fair values may not represent actual values of the financial instruments that could be realized as of the balance sheet date or that will be realized in the future.

The fair values of the financial instruments are presented in Note 8 "Debt" and were determined as follows:

Cash Convertible Notes and Convertible Notes: Fair value is based on an estimation using available over-the-counter market information on the Cash Convertible Notes due in 2023 and 2024 as well as the Convertible Notes due in 2027.

German Private Placements: Fair value is based on an estimation using changes in the euro swap rates.

There were no adjustments in the three-month periods ended March 31, 2023 and 2022 for nonfinancial assets or liabilities required to be measured at fair value on a nonrecurring basis.

11. Income Taxes

The quarterly provision for income taxes is based upon the estimated annual effective tax rate for the year, applied to the current period ordinary income before tax plus the tax effect of any discrete items. Our operating subsidiaries are exposed to statutory tax rates ranging from zero to 35%. Fluctuations in the distribution of pre-tax loss or income among our operating subsidiaries can lead to fluctuations of the effective tax rate in the condensed consolidated financial statements. In the first quarters of 2023 and 2022, our effective tax rates were 21.8% and 20.6%, respectively. We record partial tax exemptions on foreign income primarily derived from operations in Germany and the Netherlands. These foreign tax benefits are due to a combination of favorable tax laws and exemptions in these jurisdictions, including intercompany foreign royalty income in Germany which is statutorily exempt from trade tax. Further, we have intercompany financing arrangements in which the intercompany income is nontaxable in Dubai.

We assess uncertain tax positions in accordance with ASC 740 (ASC 740-10 Accounting for Uncertainties in Tax). At March 31, 2023, our gross unrecognized tax benefits totaled approximately \$83.0 million which, if recognized, would favorably impact our effective tax rate in the periods in which they are recognized. We estimate that approximately \$17.7 million of the unrecognized tax benefits may be released during the next 12 months due to lapse of statutes of limitations or settlements with taxing authorities. However, various events could cause our current expectations to change in the future. While we believe our income tax contingencies are adequate, the final resolution of these issues, if unfavorable, could have a material impact on the consolidated financial statements. We cannot reasonably estimate the range of the potential outcomes of these matters.

We conduct business globally and, as a result, file numerous consolidated and separate income tax returns in the Netherlands, Germany, and the U.S. federal jurisdiction, as well as in various other state and foreign jurisdictions. In the normal course of business, we are subject to examination by taxing authorities throughout the world. Tax years in the Netherlands are potentially open back to 2010 for income tax examinations by taxing authorities. The U.S. consolidated group is open to federal and most state income tax examinations by the taxing authorities beginning with the 2019 tax year. Our subsidiaries, with few exceptions, are no longer open to income tax examinations by taxing authorities for years before 2018. The German taxing authorities have commenced an audit for the 2017-2019 tax years.

As of March 31, 2023, residual Netherlands income taxes have not been provided on the undistributed earnings of the majority of our foreign subsidiaries as these earnings are considered to be either permanently reinvested or can be repatriated tax free under the Dutch participation exemption.

12. Share-Based Compensation

Stock Units

Stock units represent rights to receive our common shares at a future date and include restricted stock units which are subject to time-based vesting only and performance stock units which include performance conditions in addition to time-based vesting. Shares are issued on the vesting dates net of the applicable statutory tax withholding to be paid by us on behalf of our employees. As a result, fewer shares are issued than the number of stock units outstanding. We record a liability for the tax withholding to be paid by us as a reduction to treasury shares.

During the three-month period ended March 31, 2023, we granted 0.4 million stock awards compared to 0.3 million stock awards granted for the three-month period ended March 31, 2022.

At March 31, 2023, there was \$84.4 million remaining in unrecognized compensation expense, less estimated forfeitures, related to stock awards which will be recognized over a weighted-average period of 1.75 years.

Share-Based Compensation Expense

For the three-month periods ended March 31, 2023 and 2022, share-based compensation expense was as follows:

(in thousands)	Three months ended	
	March 31, 2023	2022
Cost of sales	\$867	\$743
Research and development	2,006	1,273
Sales and marketing	3,811	3,873
General and administrative	7,464	6,194
Share-based compensation expense before taxes	14,148	12,083
Less: Income tax benefit	3,159	2,738
Net share-based compensation expense	\$10,989	\$9,345

13. Equity

Issuance and Conversion of Warrants

In connection with the issuance of the Cash Convertible Notes as described in Note 8 "Debt", we issued Warrants as summarized in the table below. The number of warrants and exercise prices are subject to customary adjustments under certain circumstances. The proceeds, net of issuance costs, from the sale of the Warrants are included as additional paid-in capital in the accompanying condensed consolidated balance sheets.

The Warrants are exercisable only upon expiration. For each Warrant that is exercised, we will deliver to the holder a number of common shares equal to the amount by which the settlement price exceeds the exercise price, divided by the settlement price, plus cash in lieu of any fractional shares. The Warrants could separately have a dilutive effect on common shares to the extent that the market value per common share exceeds the applicable exercise price of the Warrants (as measured under the terms of the Warrants).

Cash convertible notes	Issued on	Number of share warrants issued (in millions)	Weighted Average Exercise price per share	Proceeds from issuance of warrants, net of issuance costs (in millions)	Warrants expire over a period of 50 trading days beginning on
2023	September 13, 2017	9.7	\$49.9775	\$45.3	June 26, 2023
2024	November 13, 2018	10.9	\$50.2947	\$72.4	August 27, 2024

Accumulated Other Comprehensive Loss

The following table is a summary of the components of accumulated other comprehensive loss as of March 31, 2023 and December 31, 2022:

(in thousands)	March 31, 2023	December 31, 2022
Net unrealized loss on hedging contracts, net of tax	(\$21,189)	(\$15,637)
Net unrealized gain on pension, net of tax	645	645
Foreign currency effects from intercompany long-term investment transactions, net of tax benefits of \$13.2 million and \$13.2 million, respectively	(33,424)	(33,311)
Foreign currency translation adjustments	(342,293)	(355,788)
Accumulated other comprehensive loss	(\$396,261)	(\$404,091)

14. Earnings per Common Share

We present basic and diluted earnings per common share. Basic earnings per common share is calculated by dividing the net income by the weighted average number of common shares outstanding. Diluted earnings per common share reflect the potential dilution of earnings that would occur if all "in the money" securities to issue common shares were exercised.

The following table for the three-month periods ended March 31, 2023 and 2022 summarizes the information used to compute earnings per common share:

(in thousands, except per share data)	Three months ended March 31,	
	2023	2022
Net income	\$85,035	\$155,312
Weighted average number of common shares used to compute basic earnings per common share	227,894	227,199
Dilutive effect of outstanding stock options and restricted stock units	2,708	2,950
Dilutive effect of outstanding warrants	—	15
Weighted average number of common shares used to compute diluted earnings per common share	230,602	230,164
Outstanding stock options and awards having no dilutive effect, not included in above calculation	—	142
Outstanding warrants having no dilutive effect, not included in above calculation	20,560	20,545
Basic earnings per common share	\$0.37	\$0.68
Diluted earnings per common share	\$0.37	\$0.67

For purposes of considering the 2027 Notes, as discussed further in Note 8 "Debt", in determining diluted earnings per common share, only an excess of the conversion value over the principal amount would have a dilutive impact using the treasury stock method. Since the 2027 Notes were out of the money and anti-dilutive during the period from January 1, 2022 through March 31, 2023, they were excluded from the diluted earnings per common share calculations in 2022 and 2023.

15. Commitments and Contingencies

Contingent Consideration Commitments

We could be required to make additional contingent cash payments for a previous business combination based on the achievement of certain FDA approval milestones. Potential milestone payments total \$20.7 million, of which \$8.9 million may be triggered by the end of 2023 and \$11.8 million by the end of 2024. Of the total milestone payments, \$8.3 million is included in accrued and other current liabilities and \$9.8 million is included in other long-term liabilities in the accompanying condensed consolidated balance sheet as of March 31, 2023.

Contingencies

In the ordinary course of business, we provide a warranty to customers that our products are free of defects and will conform to published specifications. Generally, the applicable product warranty period is one year from the date of delivery of the product to the customer or of site acceptance, if required. Additionally, we typically provide limited warranties with respect to our services. We provide for estimated warranty costs at the time of the product sale. Product warranty obligations are included in accrued and other current liabilities in the accompanying condensed consolidated balance sheets. We believe our warranty reserves of \$4.9 million as of March 31, 2023 and December 31, 2022 appropriately reflect the estimated cost of such warranty obligations.

Litigation

From time to time, we may be party to legal proceedings incidental to our business. As of March 31, 2023, certain claims, suits or legal proceedings arising out of the normal course of business have been filed or were pending against QIAGEN or our subsidiaries. These matters have arisen in the ordinary course and conduct of business as well as through acquisition. Because litigation is inherently unpredictable and unfavorable resolutions could occur, assessing litigation contingencies is highly subjective and requires judgments about future events. Although it is not possible to predict the outcome of such litigation, we assess the degree of probability and evaluate the reasonably possible losses that we could incur as a result of these matters. We accrue for any estimated loss when it is probable that a liability has been incurred and the amount of probable loss can be estimated. Litigation accruals totaled \$11.1 million and \$11.2 million as of March 31, 2023 and December 31, 2022, respectively, as further described below.

We are not party to any material legal proceeding as of the date of this report except for the matters listed below.

Patent Litigation

Archer DX

In 2018, ArcherDX (a company which spun out as an independent company in conjunction with QIAGEN's acquisition of Enzymatics in 2015 and was later acquired by Invitae in 2021) and Massachusetts General Hospital (MGH) sued QIAGEN for patent infringement. In August 2021, a federal jury ruled that QIAGEN infringed two patents owned by ArcherDX and awarded damages of \$4.7 million which were accrued in 2021 and remain accrued as of March 31, 2023 in other long-term liabilities in the accompanying condensed consolidated balance sheet. We plan to appeal the verdict as soon as the final verdict is entered.

Bio-Rad Laboratories, Inc.

In April 2022, QIAGEN filed a lawsuit in a U.S. federal court against Bio-Rad Laboratories, Inc. (Bio-Rad) seeking a declaratory judgment of non-infringement of certain Bio-Rad patents related to digital PCR technology. We are seeking judgment that we have not infringed and do not infringe any claims of the Bio-Rad patents, and have not made, used, sold, offered for sale, or imported any products that infringe any of the patents' claims, directly or indirectly. We are also seeking attorneys' fees, costs, and expenses and any other relief determined by the court.

Other litigation matters

For all other matters, a total of \$6.4 million and \$6.5 million remained accrued as of March 31, 2023 and December 31, 2022, respectively, in accrued and other current liabilities. The estimated range of possible losses for these other matters as of March 31, 2023 is between zero and \$8.0 million.

Based on the facts known to QIAGEN and after consultation with legal counsel, management believes that such litigation will not have a material adverse effect on our financial position or results of operations above the amounts accrued. However, the outcome of these matters is ultimately uncertain, thus any settlements or judgments against us in excess of management's expectations could have a material adverse effect on our financial position, results of operations or cash flows.

Operating and Financial Review and Prospects

This section contains a number of forward-looking statements. These statements are based on current management expectations, and actual results may differ materially. Among the factors that could cause actual results to differ from management's expectations are those described in "Risk Factors" and "Forward-looking and Cautionary Statements" below.

Forward-looking and Cautionary Statements

This report contains forward-looking statements that are subject to risks and uncertainties. These statements can be identified by the use of forward-looking terminology, such as "believe," "hope," "plan," "intend," "seek," "may," "will," "could," "should," "would," "expect," "anticipate," "estimate," "continue" or other similar words. Such statements are based on management's current expectations and are subject to a number of factors and uncertainties that could cause actual results to differ materially from those described in the forward-looking statements. We caution investors that there can be no assurance that actual results or business conditions will not differ materially from those projected or suggested in such forward-looking statements as a result of various factors, including, but not limited to, the following: risks associated with our expansion of operations, including the acquisition of new businesses; variability in our operating results from quarter to quarter; management of growth, international operations, and dependence on key personnel; intense competition; technological change; our ability to develop and protect proprietary products and technologies and to enter into and maintain collaborative commercial relationships; our future capital requirements; general economic conditions and capital market fluctuations; and uncertainties as to the extent of future government regulation of our business. As a result, our future success involves a high degree of risk. For further information, refer to the more specific risks and uncertainties discussed in Part 1, Item 3 "Key Information" of our Annual Report on Form 20-F for the year ended December 31, 2022 and under the heading "Risk Factors" below.

Results of Operations

Selected Operating Performance

- While net sales from non-COVID product portfolio grew 8% in the first quarter of 2023, total net sales declined 23% in the first quarter of 2023 over the year-ago period, reflecting a 77% decline in net sales from COVID-19 products. Total net sales were adversely impacted by about three percentage points from unfavorable currency movements against the U.S. dollar in the first quarter of 2023.
- Operating income margin declined to 19.9% in the first quarter of 2023 from 33% in year-ago period. The decreased operating income margin reflects lower sales contributions as well as higher expenses from recent production capacity expansion projects, investments in research and development including at BLIRT S.A. and Verogen Inc which we acquired in May 2022 and January 2023, respectively.
- Net cash provided by operating activities declined by 65% to \$71.9 million in the first three months of 2023 from \$207.4 million in the year-ago period.

On January 3, 2023, we acquired Verogen, Inc., a leader in the use of next-generation sequencing (NGS) technologies to drive the future of human identification (HID) and forensic investigation. Verogen, a privately held company founded in 2017 and based in San Diego, California, supports the global human identification community with NGS tools and professional services to help resolve criminal and missing-persons cases. The acquisition is not significant to the overall consolidated financial statements.

Outlook and COVID-19

The growth in our non-COVID portfolio in 2023 is expected to be driven by opportunities in the research environment amid increases in national governmental funding programs as well as a resumption in regular clinical testing for molecular diagnostics. However, we expect an ongoing significant decline in COVID-19 product group sales amid a sharp slowdown in demand for testing. The total outlook for sales, which implies an overall decline from 2022, takes a prudent view on current macro trends and ongoing volatility in certain regions (e.g., China) while still expecting positive trends in a number of our end-markets. Currency movements against the U.S. Dollar are expected to have an overall neutral impact on a full-year basis, despite an adverse impact in the first half of the year. We continue to implement our strategy based on "focus" and "balance." Focus involves our Five Pillars of Growth strategy to make significant investments in the commercialization and development of (1) Sample technologies, (2) QuantiFERON, (3) QiAcuity, (4) NeuMoDx and (5) QiAcuity. Balance involves developing our portfolio to address more than 500,000 customers across the Life Sciences and Molecular Diagnostics, as well as to build out our global presence in markets around the world offering growth potential.

Three-Month Period Ended March 31, 2023 compared to Three-Month Period Ended March 31, 2022

Net Sales

In the tables presented below, results may not sum and percentages may not recalculate due to rounding.

(in millions)	First quarter		
	2023	2022	
Product type	Net sales	Net sales	% change
Consumables and related revenues	\$430.6	\$561.0	-23%
Instruments	54.8	67.4	-19%
Net Sales	\$485.4	\$628.4	-23%
Customer class			
Molecular Diagnostics	\$250.3	\$356.5	-30%
Life Sciences	235.1	271.9	-14%
Net Sales	\$485.4	\$628.4	-23%
Non-COVID and COVID-19 product groups			
Non-COVID product groups	\$433.6	\$399.7	+8%
COVID-19 product groups	51.8	228.7	-77%
Net Sales	\$485.4	\$628.4	-23%

Consumables and related revenues declined by 23% for the three months ended March 31, 2023, respectively, as compared to the prior year period, as lower COVID-19 sales impacted solid trends in the non-COVID portfolio. Instrument sales also declined by 19% for the three months ended March 31, 2023, as compared to the strong results in the year-ago periods. Net sales were adversely impacted by about three percentage points from unfavorable currency movements against the U.S. dollar in the first quarter of 2023.

Product group (in millions)	First quarter		
	2023	2022	
	Net sales	Net sales	% change
Sample technologies	\$173.2	\$265.2	-35%
Diagnostic solutions	162.7	174.4	-7%
PCR / Nucleic acid amplification	76.9	115.8	-34%
Genomics / NGS	55.2	56.1	-2%
Other	17.4	16.9	+3%
Net Sales	\$485.4	\$628.4	-23%

Sample technologies represent products, including both COVID-19 and non-COVID products, involved in the first step in any molecular lab process. In the first quarter of 2023, sales of sample technologies declined by 35% compared to the prior year period due to the sharp decline in COVID-19 testing demand. Sales in the non-COVID product groups rose with the vast majority of sales related to DNA-based technologies. Sales of sample technologies were adversely impacted by unfavorable currency movements against the U.S. dollar by three percentage points in the first three months of 2023.

Diagnostic solutions include molecular testing platforms and products as well as Precision Medicine and companion diagnostic co-development revenues. Sales of diagnostic solutions during the first quarter of 2023 were 7% lower than the year-ago period, despite higher QuantiFERON-TB latent TB sales. NeuMoDx sales grew

outside of COVID-19 testing, while overall NeuMoDx sales declined against COVID-19 headwinds. Sales of diagnostic solutions were adversely impacted by three percentage points from unfavorable currency movements against the U.S. dollar in the first quarter of 2023.

PCR / Nucleic acid amplification involves research and applied PCR solutions and components. Sales of PCR / Nucleic acid amplification declined 34% in the first quarter of 2023 on the decline in COVID-19 product group sales and included unfavorable currency movements against the U.S. dollar by two percentage points in the first quarter of 2023.

Genomics / NGS includes universal NGS solutions as well as the full QIAGEN Digital Insights portfolio. Sales in Genomics / NGS declined 2% in the first quarter of 2023 primarily due to the adverse impact of unfavorable currency movements against the U.S. dollar by four percentage points in the first quarter of 2022.

Geographic region (in millions)	First quarter		
	2023	2022	% change
	Net sales	Net sales	
Americas	\$246.7	\$253.1	-3 %
Europe, Middle East and Africa	155.4	249.1	-38 %
Asia Pacific, Japan and Rest of World	83.3	126.3	-34 %
Net Sales	\$485.4	\$628.4	-23%

The 3% decrease in the Americas region compared to the prior year reflects the drop in COVID-19 product group sales which more than offset non-COVID product group sales. The U.S. had largely unchanged sales in the first quarter of 2023, but sales declined in Mexico and Brazil compared to the year-ago period.

Net sales in the Europe, Middle East and Africa (EMEA) region were 38% lower than the prior periods partially due to the adverse impact of unfavorable currency movements against the U.S. dollar of four percentage points in the three months ended March 31, 2023. Lower sales were seen in Germany and Austria compared to the year-ago period.

Net sales in the Asia Pacific, Japan and Rest of World region during the first quarter of 2023 were 34% lower than the prior period due to the comparison with high COVID-19 product sales in various countries in the year-ago period. Sales in this region were adversely impacted by five percentage points from unfavorable currency movements against the U.S. dollar in the first quarter of 2023.

Gross Profit

(in millions)	First quarter		
	2023	2022	% change
Gross Profit	\$307.5	\$415.0	-26%
Gross Margin	63.3 %	66.0 %	

The gross margin in 2023 reflects the changes in individual product sales. In 2023, the gross margin included lower margin consumables, notably the QuantiFERON latent TB test, and lower margin instruments, such as NeuMoDx, which experienced increased sales during the quarter. The decline in gross margin also reflects the lower contribution from lower sales of higher margin consumables, namely QIAprep&. Generally, our consumables and related products have a higher gross margin than our instrumentation products and service arrangements and fluctuations in the sales levels of these products and services can result in fluctuations in gross margin between periods.

In the first quarter of 2023, the amortization expense on acquisition-related intangibles within cost of sales increased to \$16.0 million compared to \$15.3 million in the same period of 2022 and includes amortization related to Verogen acquired in January 2023. Our acquisition-related intangible amortization will increase in the event of future acquisitions.

Sales and Marketing

(in millions)	First quarter		
	2023	2022	% change
Sales and marketing	\$114.6	\$118.5	-3%
% of net sales	23.6 %	18.9 %	

Sales and marketing expenses decreased by 3% during the three months ended March 31, 2023 compared to the prior year period. The overall decrease in sales and marketing expenses primarily reflects favorable currency exchange impacts of \$4.4 million in the three months ended March 31, 2023. Sales and marketing expenses are primarily associated with personnel, commissions, advertising, trade shows, publications, freight and logistics expenses, and other promotional expenses. The increased use of digital customer engagement capabilities efforts initiated during the COVID-19 pandemic continue to build on the new habits of customers. We continue to increase the use of digital customer engagement capabilities that were built up during the COVID-19 pandemic to enhance customer engagement with a focus on greater efficiency and effectiveness.

Research and Development

(in millions)	First quarter		
	2023	2022	% change
Research and development	\$54.7	\$46.4	+18%
% of net sales	11.3 %	7.4 %	

Research and development expense increased 18% during the three months ended March 31, 2023 compared to the prior year period. Research and development expense in the three months ended March 31, 2023 include \$2.1 million of favorable currency exchange impact and reflects our continued focus on our Five Pillars of Growth, including investments in NeuMoDx, QIAstat-Dx and QIAcuity. These investments are targeting new applications within our Five Pillars of Growth to drive sustainable post-pandemic expansion. As we continue to discover, develop and acquire new products and technologies, we expect to incur additional expenses related to facilities, licenses and employees engaged in research and development. Overall, research and development costs are expected to increase as a result of seeking regulatory approvals, including U.S. FDA Pre-Market Approval (PMA), U.S. FDA 510(k) clearance and EU CE approval of certain assays or instruments. Further, business combinations, along with the acquisition of new technologies, may increase our research and development costs in the future. We have a strong commitment to innovation and expect to continue to make investments in our research and development efforts.

General and Administrative

(in millions)	First quarter		
	2023	2022	% change
General and administrative	\$32.9	\$34.4	-4%
% of net sales	6.8 %	5.5 %	

General and administrative expenses decreased by 4% during the three months ended March 31, 2023 compared to the prior year period. These results reflect efficiency gains across many administrative functions as well as investments into our information technology systems (including an upgrade of the SAP enterprise resource planning system) and into cybersecurity measures. General and administrative costs include favorable currency impacts of \$0.6 million in the three months ended March 31, 2023. We expect to maintain this level of spending in the coming years due to higher licensing and information technology costs as well as increased cybersecurity costs.

Acquisition-Related Intangible Amortization

(in millions)		First quarter	
		2023	2022
Acquisition-related intangible amortization	\$2.7	\$2.9	-9%
% of net sales	0.5 %	0.5 %	

Amortization expenses related to acquisition-related intangibles decreased by 9% during the three months ended March 31, 2023 compared to the prior year period. The decrease reflects the full amortization of certain previously acquired assets. Amortization expense related to developed technology and patent and license rights acquired in business combinations are included in cost of sales. Amortization of trademarks and customer base acquired in business combinations are recorded in operating expense under the caption "acquisition-related intangible amortization." Amortization expenses of intangible assets not acquired in business combinations are recorded within cost of sales, research and development, or sales and marketing line items based on the use of the asset. Our acquisition-related intangible amortization recorded in operating expenses will increase in the event of future acquisitions.

Restructuring, Acquisition, Integration and Other, net

(in millions)		First quarter	
		2023	2022
Restructuring, acquisition, integration and other, net	\$5.8	\$5.8	+1%
% of net sales	1.2 %	0.9 %	

Restructuring, acquisition, integration and other, net expenses included costs related to our acquisitions of Verogen Inc. in January 2023, BLIRT S.A. in May 2022 and impairments and charges related to our business in Russia, Ukraine and Belarus in the first quarter of 2022.

Other (Expense) Income, net

(in millions)		First quarter	
		2023	2022
Interest income	\$18.0	\$2.2	+710%
Interest expense	(14.4)	(13.5)	+7%
Other income (expense), net	8.5	(0.2)	
Total other (expense) income, net	\$12.1	(\$11.5)	-205%

Interest income includes interest earned on cash, cash equivalents and short-term investments, income related to certain interest rate derivatives as discussed in Note 9 "Derivatives and Hedging" and other components including the interest portion of operating lease transactions. The increase in 2023 compared to the year-ago periods is attributable to increasing interest rates and the duration and level of short-term investments held during the period.

Interest expense primarily relates to debt, discussed in Note 8 "Debt" in the accompanying notes to the condensed consolidated financial statements. The increase in 2023 compared to the year-ago periods reflects the issuance of German private placement bonds in July and August 2022 totaling €370.0 million.

For the three months ended March 31, 2023, other income (expense), net includes \$7.1 million gain on foreign currency transactions and \$1.3 million of income from equity method investments.

Provision for Income Taxes

(in millions)	First quarter		
	2023	2022	% change
Income before income taxes	\$108.8	\$195.5	-44%
Income tax expense	\$23.8	\$40.2	-41%
Net income	\$85.0	\$155.3	
Effective tax rate	21.8 %	20.6 %	

Our effective tax rate differs from the Netherlands statutory tax rate of 25.8% due in part to our operating subsidiaries being exposed to statutory tax rates ranging from zero to 35%. Fluctuations in the distribution of pre-tax (loss) income among our operating subsidiaries can lead to fluctuations of the effective tax rate in the consolidated financial statements. We record partial tax exemptions on foreign income primarily derived from operations in Germany and the Netherlands. These foreign tax benefits are due to a combination of favorable tax laws and exemptions in these jurisdictions, including intercompany foreign royalty income in Germany which is statutorily exempt from trade tax. Further, we have intercompany financing arrangements in which the intercompany income is nontaxable in Dubai.

In future periods, our effective tax rate may fluctuate from similar or other factors as discussed in "Changes in tax laws or their application of the termination or reduction of certain government tax incentives, could adversely impact our overall effective tax rate, results of operations or financial flexibility" in Item 3 Risk Factors of the Annual Report on Form 20-F for the year ended December 31, 2022.

Liquidity and Capital Resources

To date, we have funded our business primarily through internally generated funds, debt and private and public sales of equity. Our primary use of cash has been to support continuing operations and our investing activities, including capital expenditure requirements and acquisitions.

(in millions)	March 31, 2023	December 31, 2022
Cash and cash equivalents	\$359.2	\$730.7
Short-term investments	928.2	687.6
Total cash and cash equivalents and short term investments	\$1,287.4	\$1,418.3
Working capital	\$1,361.1	\$1,419.4

Cash and cash equivalents are primarily held in U.S. dollars and euros, other than those cash balances maintained in the local currency of subsidiaries to meet anticipated local working capital needs. At March 31, 2023, cash and cash equivalents had decreased by \$371.5 million from December 31, 2022, primarily as a result of net cash used in investing activities of \$433.8 million and financing activities of \$9.8 million partially offset by net cash provided by operating activities of \$71.9 million as discussed in the Cash Flow Summary below. Short-term investments increased at March 31, 2023 to take advantage of higher interest rates.

Cash Flow Summary

(in millions)	First three months	
	2023	2022
Net cash provided by operating activities	\$71.9	\$207.4
Net cash used in investing activities	(\$433.8)	(\$306.3)
Net cash used in financing activities	(\$9.8)	(\$10.7)
Effect of exchange rate changes on cash and cash equivalents	\$0.3	(\$0.5)
Net decrease in cash and cash equivalents	(\$371.5)	(\$110.0)

Operating Activities

For the three months ended March 31, 2023 and March 31, 2022, we generated net cash from operating activities of \$71.9 million and \$207.4 million, respectively. The decrease in net cash provided by operating activities is primarily the result of lower net income adjustments and increased working capital payments. While net income was \$85.0 million for the three months ended March 31, 2023, non-cash components in income included \$52.1 million of depreciation and amortization, \$14.1 million of share-based compensation expense, and \$8.5 million of amortization of debt discount. Operating cash flows include a net increase in operating assets primarily due to increased inventories to meet the increase in demand and decreased accrued and other liabilities and accounts payable. Because we rely heavily on cash generated from operating activities to fund our business, a decrease in demand for our products, longer collection cycles or significant technological advances of competitors would have a negative impact on our liquidity.

Investing Activities

\$433.8 million of cash was used in investing activities during the three months ended March 31, 2023 compared to \$306.3 million for the same period in 2022. Cash used in investing activities includes \$0.5 billion in purchases of short-term investments, \$33.2 million paid for purchases of property, plant and equipment, \$5.2 million for the purchases of intangible assets, and \$148.4 million net cash paid for the acquisition of Verogen Inc, partially offset by \$295.8 million from the sale of short-term investments. Cash used in investing activities during the three months ended March 31, 2022 includes \$396.3 million in purchases of short-term investments, \$29.3 million paid for purchases of property, plant and equipment and \$9.1 million for the purchases of intangible assets partially offset by \$119.9 million from the sale of short-term investments and \$9.6 million returned to us from our derivative counterparties in connection with cash we had provided to collateralize our derivative liabilities with them.

Financing Activities

Net cash used in financing activities totaled \$9.8 million for the three months ended March 31, 2023 and includes \$9.9 million paid to our derivative counterparties to collateralize derivative assets that we hold with them. Net cash used in financing activities was \$10.7 million for the three months ended March 31, 2022 and includes \$7.7 million paid in connection with net share settlement for tax withholding related to the vesting of stock awards and \$4.6 million paid for contingent consideration.

Other Factors Affecting Liquidity and Capital Resources

As of March 31, 2023, we carry a total of \$1.9 billion of long-term debt, of which \$393.2 million is current and \$1.5 billion is long-term.

In July and August 2022, we completed another German private placement bond (2022 Schuldschein), which was issued in several tranches totaling €370.0 million due in various periods through 2032 as described more fully in Note 8 "Debt". The interest rate is linked to our environmental, social and governance (ESG) performance. As of March 31, 2023, a total of \$401.3 million is outstanding.

In December 2020, we issued \$500.0 million aggregate principal amount of zero coupon Convertible Notes due 2027 (2027 Notes). The 2027 Notes will mature on December 17, 2027, unless converted in accordance with their terms prior to such date as described more fully in Note 8 "Debt".

In November 2018, we issued \$500.0 million aggregate principal amount of Cash Convertible Senior Notes due 2024 (2024 Notes). Interest on the 2024 Notes is payable semiannually in arrears at a rate of 1.000% per annum. The 2024 Notes will mature on November 13, 2024 unless repurchased or converted in accordance with their terms prior to such date.

In September 2017, we issued \$400.0 million aggregate principal amount of Cash Convertible Senior Notes due 2023 (2023 Notes). Interest on the 2023 Notes is payable semiannually in arrears at a rate of 0.500% per annum. The 2023 Notes will mature on September 13, 2023 unless repurchased or converted in accordance with their terms prior to such date.

In 2017, we completed a German private placement consisting of several tranches denominated in either U.S. dollars or euro at either floating or fixed rates and due at various dates through June 2027. As of March 31, 2023, a total of \$119.0 million is outstanding.

In December 2020, we obtained a €400 million syndicated revolving credit facility with a contractual life of three years with the ability to extend by one year two times. No amounts were utilized at March 31, 2023. The facility can be utilized in euro and bears interest of 0.550% to 1.500% above EURIBOR, and is offered

with interest periods of one, three or six months. The interest rate is linked to our ESG performance. We have additional credit lines totaling €27.0 million with no expiration date, none of which were utilized as of March 31, 2023.

In connection with certain acquisitions, we could be required to make additional contingent cash payments totaling up to \$20.7 million based on the achievement of certain revenue and operating results milestones as further discussed in Note 15 "Commitments and Contingencies".

We expect that cash from financing activities will continue to be impacted by issuances of our common shares in connection with our equity compensation plans and that the market performance of our stock will impact the timing and volume of the issuances. Additionally, we may make future acquisitions or investments requiring cash payments, the issuance of additional equity or debt financing.

We believe that funds from operations, existing cash and cash equivalents, together with the proceeds from any public and private sales of equity, and availability of financing facilities, will be sufficient to fund our planned operations and expansion during the coming year. However, any global economic downturn may have a greater impact on our business than currently expected, and we may experience a decrease in the sales of our products, which could impact our ability to generate cash. If our future cash flows from operations and other capital resources are not adequate to fund our liquidity needs, we may be required to obtain additional debt or equity financing or to reduce or delay our capital expenditures, acquisitions or research and development projects. If we could not obtain financing on a timely basis or at satisfactory terms, or implement timely reductions in our expenditures, our business could be adversely affected.

Quantitative and Qualitative Disclosures about Market Risk

Our market risk relates primarily to interest rate exposures on cash, marketable securities, and borrowings and foreign currency exposures on intercompany and third-party transactions. The overall objective of our risk management strategy is to reduce the potential negative earnings effects from changes in interest and foreign currency exchange rates. Exposures are managed through operational methods and financial instruments. We do not use financial instruments for trading or speculative purposes. Our exposure to market risk from changes in interest rates and currency exchange rates has not changed materially from our exposure as discussed in Item 11 of our Annual Report on Form 20-F for the year ended December 31, 2022.

Foreign Currency Risk

QIAGEN's functional currency is the U.S. dollar and most of our subsidiaries' functional currencies are the local currencies of the countries in which they are headquartered. All amounts in the financial statements of entities whose functional currency is not the U.S. dollar are translated into U.S. dollar equivalents at exchange rates as follows: (1) assets and liabilities at period-end rates, (2) income statement accounts at average exchange rates for the period, and (3) components of shareholders' equity at historical rates. Translation gains or losses are recorded in shareholders' equity, and transaction gains and losses are reflected in net income. Foreign currency transactions in the three-month period ended March 31, 2023 resulted in a net gain of \$7.1 million compared to net loss of \$0.5 million in the same period of 2022, and are included in other income (expense), net.

As a globally active enterprise, we are subject to risks associated with fluctuations in foreign currencies in our ordinary operations. This includes foreign currency-denominated receivables, payables, debt, and other balance sheet positions including intercompany items. We manage balance sheet exposure on a group-wide basis using foreign exchange forward contracts, foreign exchange options and cross-currency swaps. At March 31, 2023, we were party to various foreign exchange forward, option and swap arrangements which had an aggregate notional value of \$571.1 million which expire at various dates through November 2023. Additional information on our foreign exchange contracts is included in Note 9 "Derivatives and Hedging".

We are exposed to currency risks from foreign exchange contracts. If each of the respective currency pairs for derivatives which do not qualify for hedge accounting varied from the rates used for the preparation of the condensed consolidated financial statements, this would have had an effect which would have been almost fully off-set by corresponding valuation adjustments in the positions which economically had been hedged by these foreign exchange derivatives. Accordingly, the net effect of such variance in currency rates would not have been material.

As of April 1, 2022, we began accounting for our operations in Turkey as highly inflationary as the prior three-years cumulative inflation rate exceeded 100 percent.

Interest Rate Risk

We are exposed to interest rate risk on our short-term investments and our debt. This exposure is managed in the aggregate with a focus on immediate and intermediate liquidity needs.

Interest income earned on our cash investments is affected by changes in the relative levels of market interest rates. We only invest in high-grade investment instruments. A hypothetical adverse 10% movement in market interest rates would not have materially impacted our financial statements.

At March 31, 2023, we have \$1.9 billion in current and long-term debt, of which \$241.5 million is floating rate debt. We use interest rate derivative contracts to align our portfolio of interest bearing assets and liabilities with our risk management objectives. At March 31, 2023, we are party to cross currency interest rate swaps through 2025 for a total notional amount of €180.0 million under which we exchange, at specified intervals, the difference between the euro and USD interest amounts calculated on their respective fixed rates by reference to an agreed-upon euro and USD notional principal amounts. Also at March 31, 2023, we are party to cross currency interest rate swaps through 2025 for a total notional amount of CHF 542.0 million under which we exchange, at specified intervals, the difference between the CHF and USD interest amounts calculated on their respective fixed rates by reference to an agreed-upon CHF and USD notional principal amounts. A hypothetical adverse 10% movement in market interest rates would not have materially impacted our financial statements.

We also make use of economic hedges. Further details of our derivative and hedging activities can be found in Note 9 "Derivatives and Hedging" to the accompanying condensed consolidated financial statements.

Recent Authoritative Pronouncements

For information on recent accounting pronouncements impacting our business, see Note 2 "Basis of Presentation and Accounting Policies" in the accompanying condensed consolidated financial statements.

Application of Critical Accounting Policies, Judgments and Estimates

The preparation of our financial statements in accordance with accounting principles generally accepted in the United States requires management to make assumptions that affect the reported amounts of assets and liabilities and disclosure of contingencies as of the date of the financial statements, as well as the reported amounts of revenues and expenses during the reporting period. Critical accounting policies are those that require the most complex or subjective judgments, often as a result of the need to make estimates about the effects of matters that are inherently uncertain. Thus, to the extent that actual events differ from management's estimates and assumptions, there could be a material impact on the financial statements. In applying our critical accounting policies, at times we used accounting estimates that either required us to make assumptions about matters that were highly uncertain at the time the estimate was made or were reasonably likely to change from period to period, having a material impact on the presentation of our results of operations, financial position or cash flows. While changing conditions regarding the war in Ukraine and the COVID-19 pandemic present additional uncertainty, we continue to use the best information available to form our estimates. Our critical accounting policies are those related to revenue recognition, income taxes, investments, goodwill and other intangible assets, acquisitions and fair value measurements.

Our critical accounting policies are discussed further in Item 5 of our Annual Report on Form 20-F for the year ended December 31, 2022. Actual results in these areas could differ from management's estimates.

Off-Balance Sheet Arrangements

We did not use special purpose entities and did not have off-balance-sheet financing arrangements as of March 31, 2023 and December 31, 2022.

Legal Proceedings

For information on legal proceedings, see Note 15 "Commitments and Contingencies" to the accompanying condensed consolidated financial statements.

While no assurances can be given regarding the outcome of the proceedings described in Note 15, based on information currently available, we believe that the resolution of these matters is unlikely to have a material adverse effect on our financial position or results of future operations for QIAGEN as a whole. However, because of the nature and inherent uncertainties of litigation, should the outcomes be unfavorable, certain aspects of our business, financial condition, and results of operations and cash flows could be materially adversely affected.

Risk Factors

Material risks that may affect our results of operations and financial position appear in Part 1, Item 3 "Key Information" of the Annual Report on Form 20-F for the year ended December 31, 2022. There have been no material changes from the risk factors disclosed in Item 3 of our Form 20-F.
