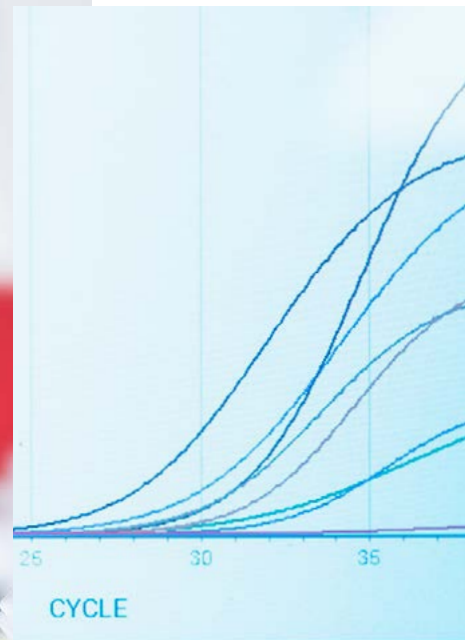


2018

QIAGEN N.V. FINANCIAL REPORT



As the innovative market and technology leader, QIAGEN creates Sample to Insight solutions that enable access to valuable molecular insights from any biological sample.

Our mission is to make improvements in life possible by enabling our customers to achieve outstanding success and breakthroughs in life sciences, applied testing, pharma and molecular diagnostics.

Our commitment to customers, patients, investors and other stakeholders drives our innovation and leadership in all areas where our Sample to Insight technologies are required. The exceptional talent, skill and passion of our employees are key to QIAGEN's excellence, success and value.

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Overview

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OVERVIEW

Report of the Supervisory Board

The 5,000 employees of QIAGEN – known as QIAGENers – are the reason for our success. The members of the Supervisory Board wish to thank all QIAGENers for their contributions during 2018 toward achieving our vision of making improvements in life possible. We would also like to thank our shareholders, customers, business partners and other stakeholders for honoring QIAGEN with their continued collaboration and trust.

2018 performance achieves full-year goals

A key role of the Supervisory Board is to monitor the performance and progress of QIAGEN's business on a regular basis, and this was done during the course of 2018 with detailed written and oral reports from the Managing Directors, members of the Executive Committee and other senior leaders.

We were pleased with the achievements of QIAGEN in 2018, delivering a performance in line with our outlook for net sales growth and exceeding our target for adjusted earnings per share. Our teams made outstanding progress on creating what we believe is one of the most dynamic and disruptive portfolios of Sample to Insight solutions for molecular testing. QIAGEN's growth initiatives are moving ahead well, and the efforts of our employees in 2018 have created a solid foundation for further growth in 2019 and the coming years. We support the strategy of QIAGEN to deliver on growth plans and expand the leadership position in molecular testing across the continuum from life sciences research to clinical healthcare.

Composition of the Supervisory Board and Managing Board

The composition of the Supervisory Board changed during 2018 with the retirement of Prof. Dr. Manfred Karobath. As announced in early 2018, Dr. Håkan Björklund was chosen by the Supervisory Board as the new Chairman after the Annual General Meeting in June 2018.

The members of the Supervisory Board would like to express their deepest appreciation for the contributions of Prof. Karobath to QIAGEN during his 18 years on the Supervisory Board, having served as a source of wisdom and insight, as well as contributing his extensive experience in the pharmaceuticals and life sciences industries. He was an essential contributor in helping QIAGEN to develop truly innovative products and solutions that have helped QIAGEN make progress toward achieving its vision of making improvements in life possible.

All current members of the Supervisory Board are expected to stand for re-election at the upcoming Annual General Meeting in June 2019. All members, with the exception of Dr. Metin Colpan and Ms. Elizabeth E. Tallett have served in the Supervisory Board for less than eight years as recommended by the Dutch Corporate Governance Code. QIAGEN values the profound industry experience of Dr. Colpan and Ms. Tallett for their in-depth knowledge, and supports their reappointments.

The target profile of the Supervisory Board can be found on QIAGEN's website, and the current composition fully complies with this profile. Further information on the individual members of the Supervisory Board, such as gender, age, nationality and other positions relevant to the performance of its duties as Supervisor Board member, date of initial appointment and current term of office is set forth in the Corporate Governance and Compensation overview.

QIAGEN has a commitment to developing a diverse leadership team, with a broad range of backgrounds, experience, skills and capabilities. In nominating candidates, QIAGEN is committed to increasing diversity while pursuing individuals to join QIAGEN with a unique blend of scientific and commercial expertise and experience that will contribute to our future business success. Management development programs support the career advancement of leaders regardless of gender and other factors. As a result, a number of women are in key leadership roles around the world, and QIAGEN currently has 28% of management roles held by women. In line with this commitment, the Supervisory Board continues to take diversity into account when proposing members for election or re-election without compromising QIAGEN's commitment to hiring the best individuals for positions without any discrimination. The current governance structure has led to the size of the Managing Board of two members, so achieving a diversity goal as measured solely by a percentage of overall membership is difficult to achieve. At the same time, QIAGEN has significantly increased the diversity of its senior leadership team and will continue to do so in the future.

Principal topics discussed by the Supervisory Board

As empowered by the Dutch Corporate Governance Code, the Supervisory Board devoted considerable time during 2018 to discussing and assessing QIAGEN's corporate strategy, main risks and opportunities, and an annual assessment by the Managing Board of the design and effectiveness of internal risk management and control systems as well as any significant changes in them. In addition, the Supervisory Board discussed and reviewed the functioning of its committees and individual members, its current composition, competence, succession schedule and desired profile in various meetings and through written surveys.

The Supervisory Board met five times during 2018 with attendance of all Supervisory Board members in all meetings and regular attendance of the members of the Managing Board for certain agenda items. The Supervisory Board also met to review and discuss agenda items in the absence of the Managing Board members, such as performance and strategy as well as to discuss compensation matters. Information about the Supervisory Board members, including positions held on other boards, is included in the Corporate Governance and Compensation overview. All members of the Supervisory Board had adequate time available to give sufficient attention to the concerns of the company. The Supervisory Board further discussed the performance of the Managing Board and concluded that it and the Managing Board were functioning properly.

Committees of the Supervisory Board

The Supervisory Board has established an Audit Committee (Chair Mr. Lawrence Rosen), a Compensation Committee (Chair Ms. Elizabeth Tallett), a Selection and Appointment Committee (Chair Dr. Björklund), and a Science and Technology Committee (Chair Dr. Metin Colpan) from among its members. The Supervisory Board reserves the right to establish other committees as deemed beneficial, and has approved charters under which each of these committees operates (charters are available on our website at www.QIAGEN.com). The deliberations and findings of the committees were reported by the committee chairs to the Supervisory Board in its meetings on a regular basis. All committee members attended all committee meetings in 2018 physically or by phone. Further detailed information on the composition of the Supervisory Board and its committees, the number of committee meetings held in 2018 and the main topics of discussion, the remuneration of its members, as well as other information on the Supervisory Board, can be found in the Corporate Governance and Compensation overview, which is an integral part of this Annual Report.

Through its Compensation Committee, the Supervisory Board executed and monitored compliance with the Remuneration Policy approved at the Annual General Meeting held on June 25, 2014. Compensation of Managing Board members consists of a fixed salary and variable components. Variable compensation includes one-time and annual payments linked to business performance (bonuses) as well as long-term incentives, such as share-based compensation, and pension plans. The Remuneration Policy and the various aspects of compensation, including the detailed remuneration of individual Managing Board members, are described in the Remuneration Report, which is available on QIAGEN's website. Information on QIAGEN's activities was communicated by the Managing Board to the Supervisory Board through regular meetings and business reports.

Corporate governance

All members of the Supervisory Board fulfill the independence criteria as defined by the Dutch Corporate Governance Code. The Supervisory Board follows the principle of increasing shareholder value as the members represent the interests of all stakeholders, including shareholders, and has always pursued the highest standards in Corporate Governance.

QIAGEN is committed to a corporate governance structure that best suits its business and stakeholders, and that complies with relevant rules and regulations. QIAGEN has endorsed since 1997 the recommendations made in the report of the Netherlands Committee on Corporate Governance, which was replaced by the Dutch Corporate Governance Code effective January 1, 2004. The Dutch Code was last amended on December 8, 2016 and is applicable as from January 1, 2017. Our policy is to follow the guidelines of Good Practice of Corporate Governance as described in the Dutch Corporate Governance Code, although some minor deviations may result from the impact of factors such as legal requirements imposed on QIAGEN or industry standards.

QIAGEN's common shares are registered and traded in the U.S. on the New York Stock Exchange as of January 2018 (formerly on the NASDAQ Global Select Market) and in Germany on the Frankfurt Stock Exchange in the Prime Standard segment. Shareholders in Europe and the U.S. hold the majority of common shares. As a result of these listings for its Global Shares, QIAGEN is subject to the rules regarding Corporate Governance set by the NYSE. Additionally, QIAGEN provides detailed disclosure in the Corporate Governance and Compensation overview regarding compliance with the Dutch Corporate Governance Code.

QIAGEN believes all of its operations are carried out in accordance with legal frameworks, including Dutch Corporate Law, U.S. laws and regulations, EU regulations and laws of the German capital market.

Financial statements and audits

In this Annual Report, the financial statements for 2018 are presented as prepared by the Managing Board, audited by KPMG (Independent Registered Public Accounting Firm). We examined the financial statements, the proposal for the use of the distributable profit, the consolidated financial statements and the management report. We have no objections, thus we concur with the results of the audit, and it has been approved by the Supervisory Board. In closing, the Supervisory Board would like to again thank all QIAGEN employees for the outstanding performance and commitment during 2018.

Venlo, the Netherlands, March 2019

The Supervisory Board:

Dr. Håkan Björklund

Chairman of the Supervisory Board

OVERVIEW

The Executive Committee



Peer M. Schatz
Chief Executive Officer



Thierry Bernard
Senior Vice President Molecular
Diagnostics Business Area



Dr. Barthold Piening
Senior Vice President, Head of Global
Operations



Dr. Annette Koch
Senior Vice President and Chief
Human Resources Officer



Manuel O. Méndez
Senior Vice President Global
Commercial Operations



Roland Sackers
Chief Financial Officer



Dr. Thomas Schweins
Senior Vice President, Life Science
Business Area



Dr. Jonathan Sheldon
Senior Vice President, Bioinformatics
Business Area

Peer M. Schatz

Chief Executive Officer, Managing Director

Joined QIAGEN in 1993, and has been Chief Executive Officer since January 1, 2004. He was Chief Financial Officer between 1993 and 2003 and became a member of the Managing Board in 1998. Mr. Schatz was previously a partner in a private management buyout group in Switzerland, worked in finance and systems positions at Sandoz AG and Computerland, and participated in the founding of start-up companies in the computer and software trading industry in Europe and the United States.

Mr. Schatz graduated from the University of St. Gallen, Switzerland, with a Master's degree in Finance in 1989 and obtained an M.B.A. in Finance from the University of Chicago Graduate School of Business in 1991. Mr. Schatz served as a member of the German Corporate Governance Commission from 2002 to 2012. He is a board member of AdvaMedDx, a U.S. trade association that leads the effort to advance medical technology in order to achieve healthier lives and healthier economies around the world and ALDA (the Analytical, Life Science and Diagnostics Association), a trade association of developers and suppliers in these fields. He is also Managing Director of PS Capital Management GmbH.

Thierry Bernard

Senior Vice President Molecular Diagnostics Business Area

Joined QIAGEN in February 2015 to lead QIAGEN's growing presence in Molecular Diagnostics, the application of Sample to Insight solutions for molecular testing in human healthcare. Mr. Bernard previously worked at bioMérieux, where he served in roles of increasing responsibility for 15 years, most recently as Corporate Vice President, Global Commercial Operations, Investor Relations and the Greater China Region. Prior to joining bioMérieux, he served in management roles in multiple international environments. Mr. Bernard is a member of the Boards of Directors of three privately held U.S. companies, First Light Biosciences, HepatoChem and more recently, Daktari Diagnostics, where he also served as CEO. He has earned degrees from Sciences Po (Paris), Harvard Business School, London School of Economics and the College of Europe and is a member of French Foreign Trade Advisors.

Dr. Barthold Piening

Senior Vice President, Head of Global Operations

Joined QIAGEN in December 2018 as Senior Vice President, Head of Global Operations, and a member of the Executive Committee. Dr. Piening has more than 30 years of experience in strategy and operations in the pharmaceutical, life science and medical device industries. Prior to joining QIAGEN, he was Executive Board member in charge of production and technology for the German pharma company STADA. Dr. Piening had previously served as Chief Operating Officer and EC member of Acino Pharma, and before that as Head of Global Operations for Takeda Pharmaceuticals International. Earlier, he had roles of increasing responsibility at Byk Gulden, ALTANA Pharma and Nycomed. After studying pharmaceutical sciences at the University of Kiel in Germany and the University of Wales in Cardiff, U.K., he earned a degree in Pharmaceutics with Approbation and a Ph.D. in Pharmaceutical Chemistry from the University of Kiel. He also earned an MBA at WHU-Vallendar in Germany and Northwestern University in the United States.

Dr. Annette Koch

Senior Vice President and Chief Human Resources Officer

Joined QIAGEN in 2018 as Senior Vice President and Chief Human Resources Officer, overseeing all aspects of QIAGEN's global Human Resources function. She came to QIAGEN from Eppendorf AG, where she had been Vice President Human Resources since 2013, supporting about 3,200 employees in 26 countries. Previously, she held roles of increasing responsibility from 2003 to 2013 with Boehringer Ingelheim. Dr. Koch started her career at The Boston Consulting Group in Düsseldorf, working on projects in the pharmaceutical and chemical industries. She earned a Ph.D. in Organic Chemistry from the University of Hannover, and during her graduate studies also worked in the University of Southern California laboratory of Prof. George Andrew Olah, who had won the Nobel Prize in Chemistry in 1994.

Manuel O. Méndez

Senior Vice President Global Commercial Operations

Joined QIAGEN in October 2014 as Senior Vice President, Global Commercial Operations, leading sales and marketing worldwide. Mr. Méndez has 25 years of experience in diagnostics and life sciences, most recently as Executive Vice President Americas for bioMérieux from 2010 – 2014. Previously he served in sales, marketing and general management roles with Abbott Laboratories, Thermo Fisher Scientific and OraSure Technologies – with leadership positions in the United States, Latin America, Europe and Asian markets. He is on the advisory board of 908 Devices, a maker of point-of-need chemical analyzers. Mr. Méndez received a B.S. in biomedical Engineering from Boston University and an M.B.A. from Northwestern University Kellogg School of Management.

Roland Sackers

Chief Financial Officer

Joined QIAGEN in 1999 as Vice President Finance and has been Chief Financial Officer since 2004. In 2006, Mr. Sackers became a member of the Managing Board. Between 1995 and 1999, he served as an auditor with Arthur Andersen Wirtschaftsprüfungsgesellschaft Steuerberatungsgesellschaft. Mr. Sackers earned his Master Degree in Business Administration (Diplom-Kaufmann) from the University of Münster, Germany. He is a former member of the Supervisory Board and Audit Committee of IBS AG and a former member of the board of directors of Operon Biotechnologies, Inc. Mr. Sackers is a board member of the industry association BIO Deutschland. He was previously a non-executive director and chair of the audit committee of Immunodiagnostic Systems Holdings PLC (IDS) from 2011 - 2018, a publicly listed producer of immunological tests for research and diagnostic applications in the United Kingdom.

Dr. Thomas Schweins

Senior Vice President, Life Science Business Area

Joined QIAGEN in 2004 as Vice President Corporate Strategy and was appointed Vice President Marketing & Strategy in 2005, where he was deeply involved in managing the global business toward Life Science customers. In late 2011, Dr. Schweins has assumed responsibility for Human Resources, and took over the leadership of the Life Science Business Area in 2017. Dr. Schweins came to QIAGEN from The Boston Consulting Group. He previously worked as Technology Manager, and later as an Assistant to the Management Board at Hoechst / Aventis. Dr. Schweins earned an M.Sc. Degree in Biochemistry from the University of Hanover. He obtained his Ph.D. at the Max Planck Society and received an M.Sc. from the University of Southern California in Los Angeles, where he studied Business Administration and Chemistry.

Dr. Jonathan Sheldon

Senior Vice President, Bioinformatics Business Area

Joined QIAGEN in 2018 as Senior Vice President, Bioinformatics Business Area. He leads QIAGEN's growing presence in bioinformatics, enabling customers to transform raw data from biological samples into valuable molecular insights. Dr. Sheldon came to QIAGEN from Oracle, where he was Global Vice President leading Oracle's Healthcare business globally in the Health Sciences Global Business Unit and served on the executive committee. Previously, he established the bioinformatics group and served as Head of Bioinformatics at Roche (UK) Pharmaceuticals, as well as providing leadership in software firms serving the life science and healthcare sectors. He serves on the Board of Directors of the Drug Information Association (DIA). He received his B.Sc. in Biochemistry and Molecular Biology from the University of Manchester, and his Ph.D. in Biochemistry and Molecular Biology from the University of Cambridge.

OVERVIEW

Common Shares

QIAGEN's common shares significantly appreciated in U.S. and European markets in 2018, outperforming broad markets and industry peers on average. Strategic initiatives to accelerate growth and profitability with a dynamic and disruptive portfolio of Sample to Insight solutions delivered improved results. We thank shareholders for their support. QIAGEN's senior executives and Investor Relations team are recognized for proactive, transparent communications with the financial community.

Market Environment

Stock markets globally stumbled in 2018 after a strong year in 2017. During 2018, investors reacted to concerns about global trade relationships, including U.S.-China trade talks and the United Kingdom's negotiations to exit the European Union. Economic indicators in key regions including Europe and emerging markets pointed to slowdowns, while geopolitical developments and a shift toward normalizing monetary policy also were concerns in 2018.

As benchmarks, the S&P 500 index in the United States finished down 6.2% in 2018. The DAX index of the 30 largest companies in Germany fell 18.3% during the year, and Germany's TecDAX, of which QIAGEN is a member, declined 3.1% for the year.

Meanwhile, the molecular diagnostics and life science tools segment continued to grow in 2018. Expanding use of new molecular testing applications such as next-generation sequencing, liquid biopsies and epigenetics helped drive the market for instruments and consumables in research. Adoption of molecular technologies in healthcare continued to grow for precision medicine in oncology, infectious disease detection and diagnosis of rare diseases. Funding for academic research remained cautious, and healthcare faced continued uncertainty in reimbursement and government policies. QIAGEN delivered net sales growth at a solid single-digit growth at constant exchange rates (CER) in 2018 and improved profitability. QIAGEN's sales grew across all regions in 2018 and were led by sales in the Molecular Diagnostics, Academia and Pharma customer classes, fueled by differentiated solutions including the QuantiFERON latent TB test, next-generation sequencing technologies, the QIASymphony automation system and QIAGEN's Precision Medicine portfolio of companion diagnostic partnerships with pharma companies. QIAGEN continues to invest in its differentiated portfolio, allocating resources to sustain sales growth while improving profitability, enhancing shareholder value and maintaining flexibility.

Global shares listed in the U.S. and Europe

QIAGEN's global shares have been registered and traded in the United States since 1996, and were transferred to the New York Stock Exchange effective January 10, 2018, after trading on NASDAQ markets since the initial public offering (IPO). These global shares have also traded in Germany on the Frankfurt Stock Exchange since 1997, and

the Prime Standard segment since its launch in 2003. The dual listing of global shares on NYSE and the Frankfurt exchange offers advantages for QIAGEN, our shareholders and employees since this global presence increases the potential market opportunity to attract investors, particularly those in the U.S. that can only invest in U.S. dollar-denominated investments, and enhances liquidity. Unlike American Depositary Receipts (ADRs), QIAGEN's global shares provide equal rights for all shareholders and can be traded on either exchange, in U.S. dollars or euros.

Share Price and Liquidity

QIAGEN's common share price gained in 2018, climbing more than 11% in U.S. dollars to \$34.45 on the NYSE and nearly 13% in euros to EUR 29.68 on the Frankfurt Stock Exchange. Our common shares continued to offer high liquidity, with average daily trading volume during 2018 of approximately 1.5 million shares (0.99 million on the NYSE and other U.S. trading venues, and 0.53 million on the Frankfurt Stock Exchange (XETRA) and other German exchanges). QIAGEN continued its commitment to disciplined capital allocation. Under a commitment announced in January 2018 to return \$200 million to shareholders, a total of 3.4 million shares had been repurchased through January 2019 on the Frankfurt Stock Exchange at a volume-weighted average price of EUR 31.37 per share for EUR 108.0 million (approximately \$124 million at current exchange rates). As of December 31, 2018, the free float, which affects weighting of QIAGEN shares in various indices, was approximately 97%.

Index Membership

QIAGEN is a constituent in various European, U.S. and global stock indices, some of which serve as benchmarks or investment universes for mutual funds and exchange traded funds. QIAGEN ranks as one of the leading components by market capitalization in Germany's TecDAX index, which includes the 30 largest German technology companies not in the benchmark DAX index. In September 2018, QIAGEN shares were added to Germany's MDAX index, which tracks the next 60 largest companies on the German stock market after the 30 largest stocks in the DAX index. QIAGEN also is a member of the Russell 3000 index, which measures performance of the 3,000 largest U.S. companies, and the Russell 1000, a subset with the largest 1,000 U.S. securities. QIAGEN shares also are included in other stock market indexes such as the MSCI Europe, EMU and EAFE indexes.

Shareholder Structure

QIAGEN has a truly global investor base comprised of more than 400 identified institutional investors distributed around the world, including about one half in North America, about one-third in Europe and the remaining shares in the Asia-Pacific/Japan region. Members of the Managing Board and the Supervisory Board in total held about 3% of QIAGEN's outstanding common shares at the end of 2018.

Annual Shareholders' Meeting

At the 2018 Annual Shareholder Meeting on June 19, 2018, in Venlo, the Netherlands, shareholders voted in favor of all resolutions proposed by the Board of Directors, in many cases with majorities above 95% of shares present at the meeting. Shareholders present or represented at the meeting held approximately 157.4 million shares, or 68% of the approximately 230.8 million issued shares of QIAGEN as of the record date for the meeting. Details of attendance and voting results are available at <https://corporate.QIAGEN.com>.

Investor Relations and Engagement with Shareholders

QIAGEN is committed to offering shareholders, analysts and communities around the world transparent, comprehensive and readily accessible information on our vision, mission and strategy, as well as performance and future prospects.

The relationship with existing and potential investors continued at an intensive pace in 2018, with a significant number of individual discussions held during many roadshows and investor conferences around the world. Many investors and analysts made use during 2018 of the opportunity to inform themselves about QIAGEN in personal meetings at our sites in Hilden, Germany; Germantown, Maryland; Redwood City, California; and Singapore.

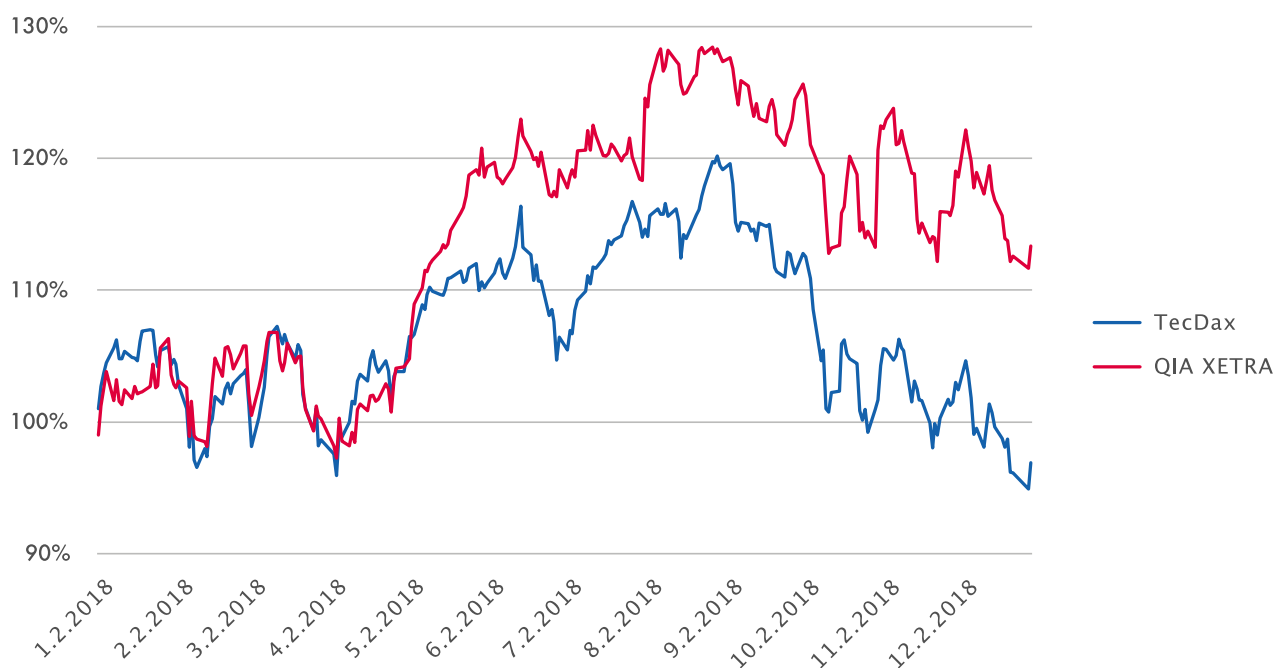
In 2018, QIAGEN's efforts to address the needs of the financial community were recognized by DIRK (the association for Investor Relations in Germany) and Extel, ranking QIAGEN among the top companies, senior executives and IR professionals compared with all TecDAX companies, as well as among European medtech sector companies.

Approximately 25 analysts from international brokerages followed QIAGEN in 2018, with analysts based in the United States, France, Germany and the United Kingdom.

QIAGEN Share Price Development and Average Trading Volume – NYSE 2018⁽¹⁾

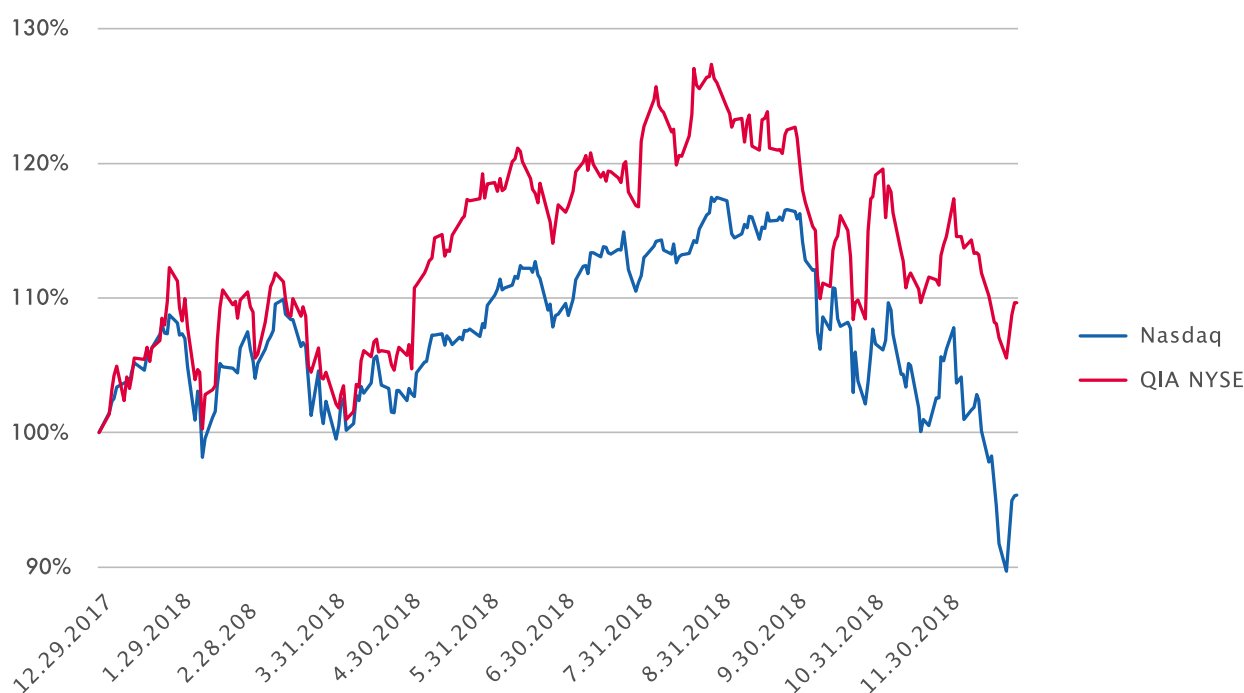
| | 2018 |
|--|----------|
| Year-end price | \$ 34.45 |
| High | \$ 39.45 |
| Low | \$ 30.78 |
| Average daily trading volume (in million shares) | 0.99 |

⁽¹⁾ QIAGEN was traded on the NASDAQ market through January 9, 2018



QIAGEN Share Price Development and Average Trading Volume – Frankfurt Stock Exchange (XETRA) 2018

| | 2018 |
|--|---------|
| Year-end price | € 29.68 |
| High | € 34.05 |
| Low | € 25.22 |
| Average daily trading volume (in million shares) | 0.53 |



Key Share Data

| | 2018 |
|--|-------|
| Year-end market capitalization (in \$ million) | 7,769 |
| Year-end market capitalization (in € million) | 6,693 |

Source: QIAGEN Shareholder ID

| | |
|-------------------|-----|
| United States | 48% |
| Germany | 8% |
| France | 7% |
| England | 10% |
| Other | 2% |
| Non-Institutional | 25% |

Source: QIAGEN Shareholder ID

Source: QIAGEN Shareholder ID

| | |
|-------------------|-----|
| GARP | 23% |
| Value | 13% |
| Index | 19% |
| Growth | 14% |
| Other | 5% |
| Non-Institutional | 25% |

Source: QIAGEN Shareholder ID

Management Report

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MANAGEMENT REPORT

Business and Operating Environment

QIAGEN is a global leader in Sample to Insight solutions that transform biological samples into valuable molecular insights. Our mission is to enable our customers in four broad classes - Molecular Diagnostics, Applied Testing, Pharma and Academia - to achieve outstanding success and breakthroughs, all in keeping with our goal of making improvements in life possible.

QIAGEN's solutions integrate sample and assay technologies, bioinformatics and automation systems into workflows that support more than 500,000 customers worldwide in generating insights into the molecular building blocks of life. Our proven solutions and content are providing answers in hospitals and laboratories worldwide, helping make sense of the increasing volumes and complexity of biological information.

As we move deeper into "the Century of Biology," knowledge of the molecular basis of life has been growing exponentially, along with greater understanding of diseases and biological mechanisms. Dramatic acceleration in the speed of analyzing DNA - and reduction in cost - is generating new discoveries and vast quantities of genomic data. This revolution in the life sciences is transforming healthcare and influencing other areas of everyday life. QIAGEN's innovative technologies enable and accelerate this ongoing wave of discovery and its wide-ranging applications.

QIAGEN began operations in 1986 as a pioneer in the emerging biotechnology sector, introducing a novel method that standardized and accelerated extraction and purification of nucleic acids from biological samples. As molecular biology has grown to influence many areas of life, QIAGEN has expanded to serve the full spectrum of market needs. We believe our sample technologies are unmatched in quality for isolating and preparing DNA (deoxyribonucleic acid), RNA (ribonucleic acid) and proteins from blood or other liquids, tissue, plants or other materials. Our assay technologies amplify, enrich and make these biomolecules accessible for analysis, such as identifying the genetic information of a pathogen or a gene mutation in a tumor. QIAGEN's industry-leading bioinformatics solutions allows users to analyze and interpret data to provide relevant, actionable insights. Our automation systems for polymerase chain reaction (PCR), next-generation sequencing (NGS) and other technologies tie these together in seamless and cost-effective molecular testing workflows - from Sample to Insight.

Net sales of \$1.50 billion in 2018 consisted of consumable kits and other revenues (88% of sales) and automation systems and instruments (12% of sales). Approximately 49% of net sales in 2018 were in Molecular Diagnostics, and 51% in Life Sciences customer classes in the Academia, Pharma and Applied Testing markets.

QIAGEN has grown by developing new platforms, consumables and bioinformatics to meet growing needs in the market, partnering with researchers and Pharma companies, and acquiring companies or technologies to complement our portfolio. We believe the addressable global market for QIAGEN's portfolio of molecular testing products for customers across the continuum of life science research and molecular diagnostics totals more than \$8 billion.

We have funded our growth through internally generated funds, debt offerings, and private and public sales of equity securities. QIAGEN has global shares that are listed on the New York Stock Exchange under the ticker symbol “QGEN” and on the Frankfurt Prime Standard as “QIA.”

The company is registered under its commercial and legal name QIAGEN N.V. with the trade register (kamer van koophandel) of the Dutch region Limburg Noord under file number 12036979. QIAGEN N.V. is a public limited liability company (naamloze vennootschap) under Dutch law as a holding company. Our principal executive office is located at Hulsterweg 82, 5912 PL Venlo, The Netherlands, and our telephone number is +31-77-355-6600.

As a holding company, QIAGEN conducts business through subsidiaries located throughout the world. Further information about QIAGEN can be found at www.qiagen.com. By referring to our website, we do not incorporate the website or any portion of the website by reference into this Annual Report.

Operating Environment in 2018

Economic Environment

Global economic growth decelerated in 2018 amid trade tensions, cooling momentum in emerging markets and financial-market uncertainties, providing a mixed environment for QIAGEN operations. Real Gross Domestic Product (GDP) for the world grew an estimated 3.0% in 2018, down from 3.1% in 2017 but above the 2.4% rate in 2016, the World Bank reported. Advanced economies delivered mixed results in 2018: Expansion in the United States accelerated, while growth slowed in the Euro area and Japan. Emerging markets also diverged, with growth rates easing in China and Turkey but stepping up in India, Brazil and Russia. Growth in international trade slowed after a surge in 2017. Financing costs remained low, despite moves toward monetary normalization. The U.S. dollar strengthened against other currencies in 2018, but with negligible impact on QIAGEN results, reported in dollars.

Industry Environment

As genomic knowledge grows exponentially, molecular testing is unlocking valuable insights to meet needs in diagnostics, life science research, pharmaceutical R&D and public safety. Sales of instruments, reagents and other consumables, and bioinformatics solutions sustained their growth momentum in 2018. Technologies for next-generation sequencing (NGS) and polymerase chain reaction (PCR) continued to disseminate worldwide, as well as adapting to meet needs in different applications. Molecular diagnostics kept growing dynamically and expanding into new areas of medicine – enabling clinicians to evaluate and monitor cancers, infectious diseases, immune status, and prenatal or neonatal health. In 2018, 25 of the 59 new drugs approved by the FDA were targeted with biomarker testing. The FDA also modernized its framework to accelerate availability of advanced diagnostics. Reimbursement for precision medicine, however, remained a challenge. In Academia, spending on NGS and other molecular technologies grew on improving customer sentiment, despite concerns about research funding. The Pharma industry increasingly guides drug discovery and clinical trials with molecular testing, although R&D spending varied with companies’ circumstances. Molecular testing for public safety also continued to grow, led by human identification and forensics. The migration of genomic technologies from basic research into the mainstream remains a powerful driver for long-term growth of the industry, increasing the need for scalable, user-friendly and efficient workflows from beginning to end in molecular testing.

Recent Developments

QIAGEN has recently achieved a number of milestones by continuing to focus on strategic growth initiatives:

Driving the rapid growth of our QuantiFERON-TB franchise:

- › QIAGEN's QuantiFERON-TB tests play an increasingly central role in the global fight against tuberculosis (TB), a contagious bacterial infection that strikes more than 10 million new patients and kills about 1.7 million annually. As many as one out of three people worldwide have latent TB infection, in which the bacterium infects the body but produces no symptoms. About 5-10% of those individuals, if untreated, will progress to active TB disease, so screening high-risk individuals and treating the infected ones to prevent active disease is critical to TB control.
- › Sales of the QuantiFERON-TB franchise, including the fourth-generation QuantiFERON-TB Gold Plus (QFT-Plus) and third-generation QuantiFERON-TB Gold (QFT), grew 21% in 2018 to \$223 million. QIAGEN continues to innovate, and the franchise is on track toward a target of \$300 million in sales by 2020.
- › QuantiFERON-TB Gold Plus, now adopted in more than 75 countries, continues to ramp up after launching in the United States in October 2017 and Japan in February 2018. The fourth-generation test adds clinical insights by measuring cell-mediated immune response to TB infection from both CD4+ and CD8+ T cells, a feature cited by experts for its potential to identify adults at greater risk of progressing to active TB.
- › In October 2018, QIAGEN and DiaSorin introduced a state-of-the-art automation option for QuantiFERON-TB Gold Plus customers, embedding QFT-Plus in DiaSorin's broad assay menu for LIAISON-family analyzers. More than 7,000 LIAISON analyzers are in use worldwide. Laboratories in Europe and other markets can now use this CE-marked solution to process QFT-Plus tests with DiaSorin's flexible, efficient automation. Availability is planned for the United States in 2019 and China in 2020.
- › QIAGEN also partnered with Hamilton Robotics beginning in July 2018 to improve the automation of sample processing for QFT-Plus with Hamilton's best-in-class liquid handling technology.
- › In January 2019, QIAGEN announced plans to develop QuantiFERON-TB Access, a simplified, low-cost test tailored to the needs of low-resource regions with a high burden of tuberculosis, including parts of Asia, Africa and South America. The new product will advance global TB control efforts with ultrasensitive digital detection in a workflow designed for cost-efficiency and ease of use in areas lacking laboratory infrastructure. QIAGEN is developing QuantiFERON-TB Access in a new partnership with Ellume, an Australian developer of high-performance digitally-enabled diagnostics. Clinical trials are planned to start in 2019, and commercialization is expected to begin in 2020.
- › Support is growing for latent TB testing and treatment of high-risk individuals as a preventive component of global TB control programs. In 2018, world leaders at the first-ever high-level United Nations meeting on tuberculosis agreed to provide \$13 billion a year by 2022 for preventive testing and treatment, targeting 30 million people. New guidelines from the World Health Organization (WHO) recommended scale-up of latent TB testing in countries with a high disease burden, as well as low-burden countries. Also in 2018 the UN International Organization for Migration adopted QFT-Plus for use in screening immigrants, and the International Panel Physicians Association endorsed QFT-Plus over skin tests. The U.S. Centers for Disease Control required use of FDA-approved blood tests such as ours for testing immigrants, and guidelines from the American Academy of Pediatrics also supported the tests.
- › In addition to tuberculosis control, QIAGEN continues to expand its immune-monitoring pipeline for the future, developing new applications and content for QuantiFERON technology and other emerging platforms.

Extending QIAGEN's reach in next-generation sequencing:

- › QIAGEN continues to expand our global presence in the fast-growing market for next-generation sequencing (NGS). We are a leader in "universal" technologies for preparing samples, analyzing genomic variations and interpreting data with any NGS system. The GeneReader NGS System, the world's first Sample to Insight NGS solution enabling any laboratory to deliver actionable sequencing results, is growing in placements and establishing a broad content menu. Our diversified NGS franchise produced more than \$140 million in sales in 2018.
- › In 2018, QIAGEN continued to partner with customers to add universal solutions to deliver faster, better NGS insights. In immuno-oncology, the new QIAseq TMB Panel offers in-depth analysis of biomarkers such as tumor mutational burden, with potential to predict responses to immunotherapy in advanced cancers. In the growing RNA sequencing field, the new QIAseq FastSelect RNA Removal Kit addresses a major bottleneck for researchers. Our industry-leading solutions for preparation of liquid biopsy samples, along with a diverse offering of off-the-shelf and customized QIAseq panels, continued to expand to new applications across research fields.
- › Adding value to the GeneReader system, we continue to expand the Sample to Insight content menu. In June 2018, we launched customizable QIAact panels for research in hereditary diseases, including inherited cancers, cystic fibrosis, inherited cardiovascular diseases, universal carrier screening and other conditions. In October 2018, we introduced the GeneRead QIAact Actionable Insights Tumor DNA UMI panel, targeting 30 genes influencing the most widespread cancers including lung, melanoma, prostate and other solid tumors, and the GeneRead QIAact BRCA Advanced UMI panel, for deep-dive analysis in breast, ovarian and other cancers. In December 2018, we launched the QIAact Myeloid DNA UMI Panel covering 25 highly relevant genes for onco-hematology research. The panels run with the GeneReader system and integrate seamlessly with our QCI software for analysis and interpretation.
- › We have actively incorporated the GeneReader NGS System into collaborations with pharmaceutical companies for co-development of companion diagnostics, aiming to build a pipeline of future content for the platform.
- › In March 2018, QIAGEN launched a partnership with Natera Inc., a leader in cell-free DNA genetic testing, to develop NGS assays for non-invasive prenatal testing for use on our GeneReader NGS System, which will expand the future offering beyond the current focus on oncology.
- › QIAGEN solutions, including both platform-agnostic technologies and integrated solutions for the GeneReader, featured in numerous studies presented at scientific meetings in 2018, including the American Association for Cancer Research (AACR), American Society of Clinical Oncology (ASCO), American Society of Human Genetics (ASHG), Association for Molecular Pathology (AMP) and American Society for Hematology (ASH). QIAGEN executives and customer-focused teams meet with many customers at these meetings, including academic researchers, pharmaceutical R&D experts and clinicians, to build relationships and demonstrate our Sample to Insight offering of NGS solutions.

Reaping the value of genomic insights for Precision Medicine:

- › In 2018, QIAGEN continued to build its leading position in Precision Medicine (formerly referred to as Personalized Healthcare), collaborating with more than 25 pharmaceutical and biotech companies to develop companion and complementary diagnostics to guide clinical decision-making. These partnerships feed a deep pipeline of molecular tests for use in clinical trials and, following regulatory approval, in patient care. QIAGEN offers a full range of Sample to Insight technologies in these programs, including our PCR and NGS platforms and universal solutions. We employ established and newly discovered biomarkers in our Pharma partnerships and have robust relationships in emerging therapeutic approaches such as immuno-oncology.

- › QIAGEN received the second and third FDA approvals in 2018 for our theascreen EGFR RGQ PCR Kit in lung cancer, for use as a companion diagnostic to guide selection of patients for targeted therapies being launched by Pfizer and Boehringer Ingelheim. The test is registered in more than 40 countries globally.
- › In February 2018 we launched the CE-IVD marked theascreen PITX2 RGQ PCR Kit as the first clinically validated DNA methylation assay to help predict the response of high-risk breast cancer patients to anthracycline-based chemotherapy. The assay is QIAGEN's first epigenetic test in breast cancer.
- › Our ipsogen JAK2 RGQ PCR Kit also received FDA clearance in early 2018 for two additional uses. The test now covers the diagnosis of all myeloproliferative neoplasms, a group of cancers in which immature blood cells in the bone marrow do not mature and become healthy blood cells.
- › In 2018, we created a Day-One Lab Readiness initiative, a network of collaborations with CLIA-certified laboratories to ensure immediate patient access to QIAGEN companion diagnostics upon regulatory approval of new oncology drugs. Based on the FDA's modernized approach to advanced diagnostics, we are partnering with labs to allow pre-approval validation and setup of tests. An agreement with NeoGenomics, a leading U.S. provider of cancer-related genetic testing, will ensure immediate availability of QIAGEN companion diagnostics upon FDA approval of drugs and tests. A collaboration with SRL, Inc., Japan's largest clinical testing company, will enable rapid availability there. The initiative will support synchronized launches with Pharma partners and benefit patients in need of new therapies.
- › A collaboration with Novartis, announced in December 2018, aims to bring to market a QIAGEN companion diagnostic to guide the use of the Novartis compound BYL719 (alpelisib) as a combination therapy for certain patients with PIK3CA-mutated, hormone receptor-positive, human epidermal growth factor receptor-2 negative (HR+/HER2-) advanced or metastatic breast cancer. The drug candidate is in late-stage development, and QIAGEN expects to provide its PIK3CA test to partners who will be ready to offer immediate access to the test upon potential regulatory approvals of BYL719 and QIAGEN's test.
- › As one of the world's leading independent developers of molecular tests, with a diverse portfolio of platforms and solutions, QIAGEN is a preferred partner for creating and commercializing diagnostics in Precision Medicine.

Expanding QIAGEN automation solutions to serve growing market needs:

- › QIAGEN has strategically expanded our offering of automation solutions to enter emerging segments of the life science and molecular diagnostics markets, as well as to meet rapidly evolving needs of customers in a variety of applications. Diversifying the automation portfolio offers opportunities for QIAGEN to leverage our molecular content on multiple platforms in growing markets.
- › The flagship QIASymphony automation solution, a cost-effective modular system that integrates PCR molecular testing workflows from initial sample processing to final insights, surpassed QIAGEN's 2018 goal of 2,300 cumulative placements. The platform's rapid dissemination and growing content menu fueled solid single-digit growth in consumables for QIASymphony. The system serves laboratories around the world, with the broadest test menu of any platform in its category in Europe and other markets, plus the unique ability to handle laboratory-developed tests. Nearly 30 diagnostic tests in infectious disease, oncology and transplant care are marketed for use on the Rotor-Gene Q, a component of the modular QIASymphony workflow. In the United States, eight FDA-approved diagnostic tests, including three companion diagnostics to guide treatment decisions in cancer, are marketed for this detection platform. The sample processing module, QIASymphony SP, is a market-leading "front end" solution for reliable automated handling of samples, including liquid biopsies, for molecular testing such as next-generation sequencing.
- › The GeneReader NGS System, initially launched in 2015, continued to gain acceptance worldwide in 2018. QIAGEN again expanded the content menu of commercial and customized DNA panels to meet changing needs in clinical research and fields such as forensics. (See section on next-generation sequencing.)

- › In April 2018, QIAGEN entered the rapidly growing syndromic testing market by launching QIAstat-Dx for one-step, fully integrated molecular analysis of hard-to-diagnose syndromes. The European launch followed acquisition of STAT-Dx, developer of the unique cartridge-based PCR technology for multiplex molecular testing. QIAstat-Dx enables fast, cost-effective and easy-to-use syndromic testing with novel Sample to Insight solutions. QIAGEN expects a U.S. launch for QIAstat-Dx, following regulatory approvals, in 2019. QIAstat-Dx was launched initially with two CE-IVD marked syndromic tests, enabling clinicians to differentiate among pathogens that cause respiratory and gastrointestinal infections. In 2019, QIAGEN is launching CE-marked panels for hepatitis B and hepatitis C. The pipeline of planned assays for QIAstat-Dx spans infectious diseases, oncology, companion diagnostics and other areas.
- › In September 2018, QIAGEN partnered with NeuMoDx Molecular, Inc. to commercialize two new fully integrated automation systems for higher-throughput PCR testing in clinical laboratories that are processing increasing molecular test volumes. In late 2018 QIAGEN began distributing the high-throughput NeuMoDx 288 and mid-throughput NeuMoDx 96 in Europe and other major non-U.S. markets. NeuMoDx will distribute these instruments within the United States. An initial assay menu offers CE-IVD marked assays for Group B Streptococcus (GBS) and Chlamydia trachomatis/Neisseria gonorrhoeae (CT/NG) infections. Additional diagnostic tests are under development, and the NeuMoDx platforms also offer the ability to efficiently process laboratory-developed tests. The companies also entered into an agreement under which QIAGEN can acquire all NeuMoDx shares not currently owned at a predetermined price (see Item 5).
- › In January 2019, we announced plans to develop next-generation systems for digital PCR, combining QIAGEN technologies with assets acquired from Formulatrix, Inc. QIAGEN expects to leverage our worldwide presence in labs using our quantitative PCR solutions to enter the emerging market for digital PCR. We are targeting a 2020 launch with fully-integrated solutions that simplify workflows compared to current digital PCR systems, offer higher throughput and multiplexing, and provide customers with favorable costs for instruments and consumables. We are developing a broad content menu of QIAGEN assays for use in digital PCR.

Using bioinformatics to transform raw data into valuable insights:

- › QIAGEN's broad offering of content-enabled bioinformatics continues to drive growth, turning vast amounts of genomic data into actionable insights for customers. Our bioinformatics, marketed both as standalone products and integrated into Sample to Insight QIAGEN workflows, address critical bottlenecks in next-generation sequencing, especially for clinical research and diagnostics.
- › We continually seek opportunities to upgrade QIAGEN solutions for analysis and interpretation, and we pursue collaborations across the genomics and bioinformatics community to offer customers the richest possible insights for research and diagnostics in support of Precision Medicine. We launched major enhancements to QIAGEN Clinical Insight (QCI) in October 2018 to deliver expanded Sample to Insight workflows for clinical NGS. QIAGEN introduced QCI Analyze Universal for full end-to-end workflow support of all major clinical sequencing platforms and assay types, along with expanded QCI capabilities for interpretation of biomarkers in immunology.
- › In February 2019, we announced an agreement with Ares Genetics to develop innovative bioinformatics and assay solutions to accelerate research targeting the global health challenges posed by antibiotic-resistant bacteria. QIAGEN acquired an exclusive license to leverage the industry-leading ARESdb antimicrobial resistance database, as well as Ares bioinformatics tools and workflows, in QIAGEN bioinformatics products and services. QIAGEN also obtained a non-exclusive worldwide license to develop and commercialize NGS and PCR assays using the Ares content.
- › In January 2019, QIAGEN acquired N-of-One, Inc., a pioneer in molecular oncology decision support services, to strengthen our leadership in clinical NGS interpretation. N-of-One's services and proprietary database will be integrated into QCI, adding medical interpretation and real-world evidence insights and offering robust decision

support. N-of-One's somatic cancer database, with more than 125,000 anonymized patient samples, will expand our already industry-leading genomics knowledge base.

- › In November 2018, we introduced a new QCI Interpret solution for blood cancers, to provide actionable information for sub-classification and prognostic assessment of hematological malignancies such as leukemia, Non-Hodgkin lymphoma, Hodgkin lymphoma and multiple myeloma. QCI Interpret is a web-based decision support platform that draws on the industry-leading QIAGEN Knowledge Base to evaluate genomic variants in the context of published biomedical literature, professional guidelines, publicly and privately available databases, drug labels and clinical trials.
- › Also in November 2018, QIAGEN launched new CLC Genomics Workbench software to serve more customers, reinforcing a strategic push to expand the utility of QIAGEN's analysis tools beyond the current core market of bioinformaticians. The new tool combines the best of two previous products, CLC Biomedical Genomics Workbench and CLC Genomics Workbench. Improvements include a streamlined, easy-to-use interface useful for scientists with any bioinformatics skill level, a dramatically reduced data footprint to accommodate computing resources in virtually any lab, and in-depth reference tools to get users started quickly for many species and genomic panels.

Pioneering liquid biopsy solutions and other differentiated sample technologies:

- › As a world leader in sample technologies enabling laboratories to obtain highest-quality DNA and RNA for molecular testing, QIAGEN's differentiated solutions for front-end challenges continued to drive growth in 2018. QIAGEN technologies process an estimated 50,000 biological samples a day. Our strategic focus is on rapidly growing applications in research and clinical diagnostics, such as "liquid biopsies" for efficient, and less-invasive diagnosis and soil, liquid and plant samples for analyzing microbiomes.
- › In January 2019, QIAGEN launched QIAcube Connect, a next-generation solution for automated sample processing. Building on over 8,000 placements of the first-generation QIAcube instrument, QIAcube Connect delivers a new level of digitization and ease of use to process samples with thousands of protocols, while assuring full standardization and freeing researchers from repetitive manual processing.
- › Innovative liquid biopsy technologies increasingly enable QIAGEN customers to unlock molecular insights from blood or other fluids as alternatives to surgical biopsies and tissue samples. In April 2018 we launched two novel liquid biopsy panels to evaluate circulating tumor cells (CTCs): The AdnaTest ProstateCancerPanel AR-V7 Kit and the AdnaTest LungCancer Kit both deliver unique insights for the growing field of research into molecular mechanisms. QIAGEN solutions based on several different technologies for isolation and stabilization of nucleic acids are used in an estimated 80% of liquid biopsy testing.
- › As a pioneer in sample technologies, QIAGEN partners with leading microbiome researchers to provide cutting-edge tools for the study of microbial communities in the body and the environment. In 2018, QIAGEN launched the new DNeasy PowerSoil Pro Kit and DNeasy Plant Pro Kit as innovative tools for extracting fungal and bacterial DNA from a variety of soil and plant samples. We also introduced QIAseq 16S/ITS Panels and UCP Multiplex PCR Kit for next-generation sequencing to enable the most accurate microbial community profiling from complex samples. QIAGEN supports research initiatives worldwide, and our solutions are used and recommended by international consortia like the Human Microbiome Project, the Earth Microbiome Project and the MetaSUB Consortium.
- › In Applied Testing, QIAGEN's efficient, highly accurate sample and assay technologies for forensics and human identification helped drive our growth again in 2018. QIAGEN partners with public agencies and international organizations in a variety of initiatives for investigation of crimes, identification of missing persons and forensic research. For example, QIAGEN won a tender in 2018 from one government to manage creation of a national DNA database, scaling up over three years to process and load 500,000 DNA samples, and to provide Sample to Insight forensic capabilities to aid in law enforcement, disaster relief and other public safety applications.

- › QIAGEN's Custom Solutions business, started in 2017, serves life science and molecular diagnostics customers with the tools and expertise to quickly build and commercialize products that meet unique workflow requirements. The unit offers custom and OEM sample technologies, oligo and enzyme product options for PCR, qPCR and NGS product development, as well as a range of other platform technologies.

Products

QIAGEN's leadership in Sample to Insight solutions for molecular testing leverages our position across a wide range of applications and customer classes. We provide more than 500 core consumable products (sample and assay "kits"), as well as instruments and automation systems. Our bioinformatics solutions connect laboratory workflows and process genomic data, reporting relevant insights to enable scientists or clinicians to decide on further action.

These diverse revenue streams can be seen in two main categories: consumables and related revenue, and automation platforms and instruments.

Consumables and related revenues

Consumable products, accounting for approximately 78-80% of net sales, typically include sample technologies to extract and purify molecules of interest from biological samples and assay technologies that make information from these samples available for analysis and interpretation. To maximize customer convenience and reduce user error, these kits contain all necessary reagents and a manual of protocols and background information. Reliability, standardization, ease of use and cost-effectiveness are keys to the success of molecular testing products.

QIAGEN's sample technologies ensure that each biological sample is processed in a highly reproducible, standardized method with the highest quality. A broad range of kits support applications such as plasmid DNA purification, RNA purification and stabilization, genomic and viral nucleic acid purification, DNA cleanup after PCR and sequencing, target enrichment, and library preparation for sequencing. We continue to expand our portfolio for applications such as preparing DNA and RNA from minimally-invasive liquid biopsies for cancer and processing difficult samples for research into the microbiome and metagenomics.

Our assay technologies contain all the needed reagents to enable customers to target molecules of interest for detection on platforms supporting PCR, NGS or multimodal analysis. Each assay kit is sufficient to support a number of applications, varying from a single application to kits containing more than 1,000 applications each. Applications include open, general-purpose PCR reagents, as well as kits and panels for detection of viral or bacterial pathogens and parasites, pharmacogenomic testing and genotyping. In PCR, examples are our theascreen family of companion diagnostics, artus line for profiling infectious diseases, and investigator assays for forensics and human identification. A growing portfolio of Digital NGS panels enable sequencing to target DNA or RNA variants for clinical research in cancer or other diseases.

Related revenues, accounting for approximately 7-9% of our net sales, include bioinformatics solutions, sold as freestanding software or cloud-based solutions and also integrated into many QIAGEN consumables and instruments for seamless Sample to Insight workflows.

Related revenues also include royalties, milestone payments from co-development agreements with pharmaceutical companies, payments from technology licenses and patent sales, and custom services, such as whole genome amplification services, DNA sequencing, and non-cGMP DNA production on a contract basis.

Automation platforms and instruments

Our instrumentation systems, contributing approximately 12-13% of net sales together with related services and contracts, automate the use of consumables into efficient workflows for a broad range of laboratory needs. QIAGEN platforms are designed to carry our customers from Sample to Insight - handling and preparation of biological samples, analysis using sequencing technologies, and interpretation that delivers valuable insights. These instruments enable laboratories to perform reliable and reproducible processes, including nucleic acid sample preparation, assay setup, target detection, and interpretation of genomic information. Often several of these instruments are integrated into end-to-end workflows.

Among the automation platforms that contribute to QIAGEN's business:

- › QIASymphony is a user-friendly automation system that drives integrated workflows for molecular testing, making laboratories more efficient and helping disseminate standardized, clinically proven molecular diagnostics. The platform includes three modules - QIASymphony SP for sample preparation, QIASymphony AS for assay setup, and Rotor-Gene Q, our rotary real-time PCR cycler system, which makes sequences of DNA and RNA visible through amplification and quantifiable. The fully integrated system with all three modules is QIASymphony RGQ. In 2018, our installed base surpassed 2,300 QIASymphony systems in a wide variety of applications and laboratories worldwide. The platform enhances workflows through continuous loading, random access and the ability to process an almost unlimited range of sample types. QIASymphony has the broadest content menu in its category in Europe and other markets, and QIAGEN is developing more regulator-approved assays to add value for customers.
- › GeneReader NGS System, introduced in late 2015, continues to gain acceptance as the first complete Sample to Insight next-generation sequencing (NGS) solution designed for any laboratory to deliver actionable results. This end-to-end platform provides a simpler, more cost-effective way for basic and translational research to take advantage of NGS technology for improved outcomes. The benchtop GeneReader workflow offers the flexibility of scalable batch sizes and continuous loading of multiple flow cells, and customers can achieve relevant insights using QIAGEN's proven gene panels and bioinformatics. In 2018, we continued to add new content, including QIAact panels covering the most widespread cancers and deep-dive panels for myeloid malignancies and breast and ovarian cancers, as well as customizable panels for research in inherited diseases. GeneReader's digital sequencing integrates seamlessly with QIAGEN bioinformatics solutions for interpretation.
- › QIAstat-Dx enables fast, cost-effective and easy-to-use syndromic testing with novel Sample to Insight solutions. Launched in Europe in April 2018, QIAstat-Dx provides a one-step, fully integrated molecular analysis of common syndromes with a small laboratory footprint. The first two tests differentiate hard-to-diagnose respiratory and gastrointestinal infections, and QIAGEN is developing an extensive pipeline of additional content. QIAGEN expects a 2019 U.S. launch of QIAstat-Dx following regulatory approvals.
- › NeuMoDx 288 and NeuMoDx 96 are fully integrated systems for automation of higher-throughput PCR testing in clinical laboratories with increasing molecular test volumes. QIAGEN began distributing the systems in Europe and other major non-U.S. markets in late 2018, with an initial test menu in infectious diseases and a broad pipeline under development. The platforms' developer, NeuMoDx Molecular, Inc., is distributing these instruments within the United States. Under a merger agreement, QIAGEN can acquire all NeuMoDx shares not currently owned at a predetermined price.
- › QIAcube workstations provide highly versatile solutions for automated sample processing, and we are now launching the next-generation QIAcube Connect with advanced digital capabilities and full connectivity. These solutions assure standardization of sample preparation and save laboratory staff time by eliminating repetitive manual procedures.

Customers

With a growing portfolio of innovative products for molecular testing, QIAGEN has built deep customer relationships across the entire value chain of the life sciences. Discoveries often surface in universities and research institutes and are published, then are licensed for development by pharmaceutical and biotech companies, and finally move into widespread commercial use in healthcare and other areas of life. We serve the needs of four major customer classes:

- › Molecular Diagnostics - healthcare providers engaged in patient care including hospitals, public health organizations, reference laboratories and physician practices
- › Applied Testing - government or industry customers using molecular technologies in non-healthcare fields such as forensics and human identification
- › Pharma - pharmaceutical and biotechnology companies using molecular testing to support drug discovery, translational medicine and clinical development efforts
- › Academia - researchers exploring the secrets of life such as disease mechanisms and pathways, in some cases translating findings into drug targets or other products

Molecular Diagnostics

The ability of advanced diagnostic technologies to unlock molecular information for patients is changing the practice of medicine, creating a large and growing market for sample preparation, assay kits and bioinformatics in clinical care. Dissemination of PCR and other amplification technologies has brought molecular diagnostics into routine use in healthcare around the world, and next-generation sequencing is disseminating rapidly to further transform healthcare. Technologies for molecular diagnostics enable clinicians and labs to identify and profile microorganisms, cancer cells, bacteria and viruses by detecting specific nucleic acid sequences or characterizing newly discovered genomic sequences related to diseases. Commercial applications are multiplying as researchers identify new biological markers for disease and develop novel technologies to decipher these diagnostic clues.

The molecular diagnostics market generates total sales estimated by industry experts at approximately \$7 billion in 2018, including about \$4-5 billion potentially addressable with QIAGEN's product portfolio. Molecular diagnostics is the most dynamic segment of the global in vitro diagnostics market and is growing at a compound annual rate estimated in the high single-digits or low double-digits. Given the advantages of precise genetic information over traditional tests, QIAGEN expects the healthcare market to continue to provide significant growth opportunities.

In QIAGEN's robustly growing Molecular Diagnostics business we focus on three priorities for fighting disease:

- › Oncology - accurately diagnosing cancer, enabling prevention or early detection, and guiding selection of therapies with individualized molecular insights. QIAGEN offers a broad portfolio of companion diagnostic kits and panels to detect mutations of genes such as KRAS, EGFR, BRAF, BRCA1/2 and others that influence the development of cancers and the efficacy and safety of medicines. We also provide industry-leading tests to screen for human papillomavirus (HPV) and protect women from cervical cancer.
- › Infectious diseases - detecting and differentiating a broad range of viral and bacterial infections, including diseases such as HIV, hepatitis, influenza and healthcare-associated infections, as well as common respiratory and gastrointestinal syndromes. Use of molecular testing to differentiate among pathogens can be useful in guiding treatment, such as selection of antibiotic or antiviral therapies.

- › Immune monitoring - using advanced technologies that detect immune-system markers as a preventive strategy, such as screening patients for latent TB infection to guard against active TB disease, as well as for monitoring immune function, such as in transplantation patients.

QIAGEN offers one of the broadest portfolios of molecular technologies for healthcare. Success in Molecular Diagnostics depends on the ability to accurately analyze purified nucleic acid samples from sources such as blood, tissue, body fluids and stool, on automated systems that process these samples reliably and efficiently, often handling hundreds of samples concurrently. Other success factors are the range of assays for diseases and biomarkers, convenience and ease of laboratory workflow, and reliability and standardization of lab procedures.

The immune monitoring portfolio, using sensitive QuantiFERON technology, accurately detects infection and measures immune response in patients. Our lead products in this field, QuantiFERON-TB Gold and QuantiFERON-TB Gold Plus, are used in tuberculosis (TB) control efforts worldwide to detect latent TB infection (LTBI) by screening vulnerable populations, such as close contacts of patients with active TB disease, immunocompromised persons or patients on immunosuppressive drugs. Individuals with LTBI can then be treated, preventing the infection from becoming active and contagious. As modern blood tests analyzed in a laboratory, the QuantiFERON-TB assays are faster, less labor-intensive and more accurate than the century-old tuberculin skin test. The potential global market for latent TB infection testing is estimated at up to \$1 billion.

QIAGEN's oncology test portfolio includes a broad range of technologies and biomarkers for Precision Medicine, including regulator-approved companion diagnostics for oncogenes such as KRAS, EGFR and JAK2, as well as comprehensive gene panels for research applications in next-generation sequencing. In 2018, we broadened the use of our theascreen EGFR RGQ PCR Kit with its second and third FDA approvals as a companion diagnostic in lung cancer, launched the theascreen PITX2 RGQ PCR Kit as the first clinically validated DNA methylation assay to help predict the response of high-risk breast cancer patients to chemotherapy, and added two new FDA-cleared uses for our ipsogen JAK2 RGQ PCR Kit. We have a deep pipeline of oncology tests for PCR and NGS analysis under development. In addition to our broad portfolio of molecular technologies and automation systems, QIAGEN offers Pharma partners a full infrastructure for co-development programs, intellectual property on platforms and content, regulatory experience, global marketing reach, and independence as a company focusing exclusively on these types of technologies.

QIAGEN also offers an extensive range of kits for diagnosing infectious diseases, including a broad menu of reliable tests on the QIASymphony platform, plus the new QIAstat-Dx panels for respiratory and gastrointestinal syndromes. We are expanding this portfolio by seeking regulatory approvals of new tests in additional markets.

QIAGEN is one of the global leaders in screening technologies for HPV, a viral infection that is the primary cause of cervical cancer, which kills about 270,000 women a year. Our "gold standard" digene HC2 HPV Test and our careHPV Test for use in low-resource regions lead the market in HPV screening around the world. In the United States, QIAGEN vigorous price competition has reduced that business to about 1% of total sales.

Applied Testing

Use of molecular technologies is expanding in more areas of life as industry and government organizations apply standardized Sample to Insight solutions to diverse needs. Applied Testing is our term for applications outside of human healthcare and research. The value of genetic "fingerprinting" has been shown for criminal investigations or clarification of paternity or ancestry, as well as for food safety and veterinary diagnostics. In 2018, we took steps to streamline QIAGEN's Applied Testing business by divesting our portfolio of veterinary assays to a new animal health company funded by a private capital firm.

QIAGEN's forensics franchise delivered solid growth in 2018. We are a leader in standardizing solutions for reliable forensic testing, and we have built strong relationships with law enforcement and other organizations engaged in human identification. QIAGEN also provides industry-leading solutions for studies of microbiomes and their effect on health and the environment.

Pharma

QIAGEN has deep relationships with pharmaceutical and biotechnology companies. Drug discovery and translational research efforts increasingly employ genomic information, both to guide research in diseases and to differentiate patient populations most likely to respond to particular therapies. We estimate that about half of QIAGEN sales in this customer class support research, while the other half supports clinical development, including stratification of patient populations based on genetic information. QIAGEN's bioinformatics solutions also are widely used to guide pharmaceutical research.

We have built a position as the preferred partner for pharmaceutical and biotech companies to co-develop companion diagnostics paired with targeted drugs. A wave of newly discovered biomarkers and molecular tests indicating the likely efficacy and safety of associated drugs is now transforming the treatment of cancer and other diseases. Our more than 25 master collaboration agreements with Pharma, some with multiple co-development projects, have created a rich pipeline of molecular tests that can move, along with the drugs, through clinical trials and regulatory approvals for marketing to healthcare providers. Several new companion diagnostics are currently in the registration process.

Academia

QIAGEN provides Sample to Insight solutions to leading research institutions around the world. While many academic laboratories continue to use manual, labor-intensive methods or create their own in-house technologies, QIAGEN has focused on enabling labs to replace time-consuming traditional methods and internal development efforts with reliable, fast, highly reproducible, and high-quality technologies. QIAGEN often partners with leading institutions in research projects and develops customized solutions such as NGS panels for digital sequencing of multiple gene targets needed for a researcher's study.

As academic institutions increasingly embrace translational research, bridging from discoveries to practical applications in medicine, our relationships in Academia also support our presence in the Molecular Diagnostics, Pharma and Applied Testing customer classes. Research in university settings often helps in development of technologies for targeted biomolecules, and academic research also can result in scientific publications that validate the usefulness of QIAGEN solutions.

Global Presence by Category of Activity and Geographic Market

Product Category Information

Net sales for the product categories are attributed based on those revenues related to sample and assay products and similarly related revenues including bioinformatics solutions, and revenues derived from instrumentation sales.

| (in thousands) | 2018 | 2017 | 2016 |
|----------------------------------|---------------------|---------------------|---------------------|
| Net Sales | | | |
| Consumables and related revenues | \$ 1,315,459 | \$ 1,242,715 | \$ 1,166,131 |
| Instrumentation | 186,389 | 174,821 | 171,860 |
| Total | \$ 1,501,848 | \$ 1,417,536 | \$ 1,337,991 |

Geographical Information

QIAGEN currently markets products in more than 130 countries. The following table shows total revenue by geographic market for the past three years (net sales are attributed to countries based on the location of the customer, as certain subsidiaries have international distribution):

| (in thousands) | 2018 | 2017 | 2016 |
|--------------------------------|---------------------|---------------------|---------------------|
| Net Sales | | | |
| Americas: | | | |
| United States | \$ 632,660 | \$ 579,906 | \$ 555,676 |
| Other Americas | 60,359 | 73,478 | 71,797 |
| Total Americas | 693,019 | 653,384 | 627,473 |
| Europe, Middle East and Africa | 490,301 | 462,980 | 428,055 |
| Asia Pacific and Rest of World | 318,528 | 301,172 | 282,463 |
| Total | \$ 1,501,848 | \$ 1,417,536 | \$ 1,337,991 |

QIAGEN has built an increasing presence in key emerging markets as a growth strategy. In 2018, the top seven emerging markets - Brazil, Russia, India, China, South Korea, Mexico and Turkey - contributed approximately 16% of net sales.

Research and Development

We are committed to expanding our global leadership in Sample to Insight solutions for molecular testing in healthcare and the life sciences. Our strategy for managing innovation focuses on addressing the most significant unmet medical and scientific needs. We target our resources to develop promising technologies for use by our customers in Molecular Diagnostics, Applied Testing, Pharma and Academia - and to meet the needs of clinicians and scientists in key geographic markets.

Innovation at QIAGEN follows parallel paths:

- Creating new systems for automation of workflows - platforms for laboratories, hospitals and other users of these novel molecular technologies.
- Expanding our broad portfolio of novel “content” - including assays to detect and measure biomarkers for disease or genetic identification.
- Integrating bioinformatics with the testing process - software and cloud-based resources to interpret and transform raw molecular data into useful insights.

As a percentage of sales, our research and development investments are among the highest in our industry. Almost 1,100 employees in research and development work in QIAGEN centers of excellence on three continents.

Strengthening our leadership in automation is a key to driving dissemination of molecular testing in healthcare and other laboratories, as well as generating increased demand for our consumable products. We continue to expand the applications of all of our automation systems. QIAGEN is developing and commercializing a deep pipeline of assays for preventive screening and diagnostic profiling of diseases, detection of biomarkers to guide Precision Medicine in cancer and other diseases, and other molecular targets. Our assay development program aims to commercialize tests that will add value to our QIASymphony, QIAstat-Dx, NeuMoDx and GeneReader NGS automation systems in the coming years. In 2018, we launched novel diagnostic tests running on the QIASymphony platform for lung, breast and blood cancers, as well as *Trichomonas vaginalis* and human papillomavirus. In early 2019, we added tests for hepatitis B and hepatitis C to the menu of diagnostics for QIAstat-Dx.

Our bioinformatics teams are also developing new software solutions and adding proprietary cloud-based content to support the latest research and clinical trends in molecular testing, especially the interpretation of large volumes of data from next-generation sequencing. In addition, we are integrating these digital technologies with instruments and molecular content to provide our customers seamless Sample to Insight workflows.

Sales and Marketing

We market our products in more than 130 countries, mainly through subsidiaries in markets that we believe have the greatest sales potential in the Americas, Europe, Australia and Asia. Experienced marketing and sales staff, many of them scientists with academic degrees in molecular biology or related areas, sell our products and provide direct support to customers. Key accounts are overseen by business managers to ensure that we serve customers’ commercial needs, such as procurement processes, financing, data on costs and value of our systems, and collaborative relationships. In many markets, we have specialized independent distributors and importers.

Our marketing strategy focuses on providing differentiated, high-quality products across the value chain from Sample to Insight, integrating components into end-to-end solutions when possible, and enhancing relationships with commitment to technical excellence and customer service. Our “omni-channel” approach seeks to engage customers through their preferred channels - online, by phone, in person, etc. – and to optimize investment in different customer types.

QIAGEN has initiated actions to drive the growth of our digital marketing channels - including our website (www.qiagen.com), product-specific sites and social media. Our eCommerce team works with clients to provide automated processes supporting a variety of electronic transactions and all major eProcurement systems. Information contained on our website, or accessed through it, is not part of this Annual Report.

Our GeneGlobe web portal (www.geneglobe.com) is a valuable outreach to scientists in Pharma and Academia, enabling researchers to search and order from approximately 25 million pre-designed and custom PCR assay kits, NGS assay panels and other products. We have integrated GeneGlobe with our bioinformatics solutions, linking biological interpretation with ordering of relevant assays to accelerate research.

QIAGEN uses a range of tools to provide customers with direct access to technical support, inform them of new product offerings, and enhance our reputation for technical excellence, high-quality products and commitment to service. For example, our technical service hotline allows existing or potential customers to discuss a wide range of questions about our products and molecular biology procedures, online or via phone, with Ph.D. and M.Sc. scientists at QIAGEN. Frequent communication with customers enables us to identify market needs, learn of new developments and opportunities, and respond with new products.

We also distribute publications, including our catalog, to existing and potential customers worldwide, providing new product information, updates, and articles about existing and new applications. In addition, we hold numerous scientific seminars at clinical, academic and industrial research institutes worldwide and at major scientific and clinical meetings. We conduct direct marketing campaigns to announce new products and special promotions, and we offer personalized electronic newsletters highlighting molecular biology applications.

For laboratories that frequently rely on our consumables, the QIAstock program maintains inventory on-site to keep up with their requirements. QIAGEN representatives make regular visits to replenish the stock and help with other needs, and we are automating this process with digital technologies. Easy-to-use online ordering, inventory monitoring and customer-driven changes make QIAstock an efficient system for providing ready access to our products for the hundreds of customers worldwide who use this program.

Seasonality

Our business does not experience significant, predictable seasonality. Historically, a significant portion of our sales have been to researchers, universities, government laboratories and private foundations whose funding is dependent upon grants from government agencies, such as the National Institutes of Health and similar bodies. To the extent that our customers experience increases, decreases or delays in funding arrangements and budget approvals, and to the extent that any of our customers' activities are slowed, such as during times of higher unemployment, vacation periods or delays in the approval of government budgets, we may experience fluctuations in sales volumes during the year or delays from one period to the next in the recognition of sales.

Intellectual Property, Proprietary Rights and Licenses

We have made and expect to continue to make investments in intellectual property. In 2018, our purchases of intangible assets totaled \$41.0 million. While we do not depend solely on any individual patent or technology, we are significantly dependent in the aggregate on technology that we own or license. Therefore, we consider protection of proprietary technologies and products one of the major keys to our business success. We rely on a combination of patents, licenses and trademarks to establish and protect proprietary rights. As of December 31, 2018, we owned 340 issued patents in the United States, 277 issued patents in Germany and 1,786 issued patents in other major industrialized countries. We had 576 pending patent applications. Our policy is to file patent applications in Western Europe, the United States and Japan. U.S. patents have a term of 17 years from the date of issue (for patents issued from applications submitted prior to June 8, 1995), or 20 years from the date of filing (in the case of patents issued from applications submitted on or after June 8, 1995). Patents in most other countries have a term of 20 years from the date of filing the patent application. We intend to aggressively prosecute and enforce patents and to otherwise protect our proprietary technologies. We also rely on trade secrets, know-how, continuing technological innovation and licensing opportunities to develop and maintain our competitive position.

Our practice is to require employees, consultants, outside scientific collaborators, sponsored researchers and other advisers to execute confidentiality agreements upon commencement of their relationships with us. These agreements provide that all confidential information developed by or made known to the individual during the course of the relationship is to be kept confidential and not disclosed to third parties, subject to a right to publish certain information in scientific literature in certain circumstances and to other specific exceptions. In the case of our employees, the agreements provide that all inventions conceived by individuals in the course of their employment will be our exclusive property.

See “Risk Factors” included in section “Opportunities and Risks” for details regarding risks related to our reliance on patents and proprietary rights.

Competition

In the Academic and Pharma markets, we believe our primary competition in sample technology products involves traditional separation and purification methods, such as phenol extraction, cesium chloride density gradient centrifugation, and precipitation. These methods utilize widely available reagents and other chemicals supplied by companies in these markets. We compete with these methods through innovative technologies and products, offering a comprehensive solution for nucleic acid collection, pre-treatment, separation and purification needs and providing significant advantages in speed, reliability, convenience, reproducibility and ease of use.

We also experience competition in various markets from other companies providing sample preparation products in kit form and assay solutions. These competitors include, but are not limited to, companies with a focus on nucleic acid separation and purification, assay solutions and for transfection reagents and protein fractionation products. We believe our proprietary technologies and products offer significant advantages over competitors' products with regard to purity, speed, reliability and ease-of-use.

Some of our other products within our molecular diagnostics customer class, such as tests for Chlamydia, Gonorrhea, hepatitis B virus, herpes simplex virus and CMV, compete against existing screening, monitoring and diagnostic technologies, including tissue culture and antigen-based diagnostic methodologies. We believe the primary competitive factors in the market for gene-based probe diagnostics and other screening devices are clinical validation, performance and reliability, ease of use, standardization, cost, proprietary position, competitors' market shares, access to distribution channels, regulatory approvals and reimbursement.

We do not believe our competitors typically have the same comprehensive approach to sample to insight solutions as we do or the ability to provide the broad range of technologies and depth of products and services that we offer. With our complete range of manual and fully automated solutions, we believe we offer the value of standardization of procedures and, therefore, more reliable results. We also believe our integrated strategic approach gives us a competitive advantage. The quality of sample technologies—an area in which we have a unique market and leadership position—is a key prerequisite for reliable molecular assay solutions, which increasingly are being applied in emerging markets such as Molecular Diagnostics and Applied Testing.

Current and potential competitors may be in the process of seeking FDA or foreign regulatory approvals for their respective products. Our continued future success will depend in large part on our ability to maintain our technological advantage over competing products, expand our market presence and preserve customer loyalty. There can be no assurance that we will be able to compete effectively in the future or that development by others will not render our technologies or products non-competitive.

Suppliers

As part of our supplier assessment procedures, we evaluate on a monthly basis the performance of our raw material and component suppliers, potential new alternative sources of such materials and components, and the risks and benefits of reliance on our existing suppliers. We buy materials for our products from many suppliers, and are not dependent on any one supplier or group of suppliers for our business as a whole. Raw materials generally include chemicals, raw separation media, biologics, plastics, electronics and packaging. Raw materials are generally readily available at competitive, stable prices from a number of suppliers. Certain raw materials are produced under our specifications, so we closely monitor stock levels to maintain adequate supplies. We believe we maintain inventories at a sufficient level to ensure reasonable customer service levels and to guard against normal volatility in availability.

Government Regulations

We are subject to a variety of laws and regulations in the European Union, the United States and other countries. The level and scope of the regulation varies depending on the country or defined economic region, but may include, among other things, the research, development, testing, clinical trials, manufacture, storage, recordkeeping, approval, labeling, promotion and commercial sales and distribution, of many of our products.

European Union Regulations

In the European Union, *in vitro* diagnostic medical devices (IVDs) have been regulated under EU-Directive 98/79/EC (IVD Directive) and corresponding national provisions, however, this Directive will be replaced by the In Vitro Diagnostic Device Regulation (IVDR) in May 2022. The IVD Directive requires that medical devices meet the essential requirements set out in an annex of the directive. These requirements include the safety and efficacy of the devices. According to the IVD Directive, the Member States presume compliance with these essential requirements in respect of devices which are in conformity with the relevant national standards transposing the harmonized standards of which the reference numbers have been published in the Official Journal of the European Communities. These harmonized standards include ISO 13485:2003, the quality standard for medical device manufacturers.

IVD medical devices, other than devices for performance evaluation, must bear the CE marking of conformity when they are placed on the market. The CE mark is a declaration by the manufacturer that the product meets all the appropriate provisions of the relevant legislation implementing the relevant European Directive. As a general rule, the manufacturer must follow the procedure of the EC Declaration of conformity to obtain this CE marking.

Each European country must adopt its own laws, regulations and administrative provisions necessary to comply with the IVD Directive. Member States may not create any obstacle to the placing on the market or the putting into service within their territory of devices bearing the CE marking according to the conformity assessment procedures.

Under the IVDR, which was enacted by the European Commission (EC) on May 25, 2017, *in vitro* diagnostics will be subject to additional legal regulatory requirements after the IVDR comes into full effect on May 26, 2022. Once implemented, the entire EU IVD industry will have to comply with these new requirements, which will bring the EU regulatory landscape on par with other highly regulated markets such as the US. Many Guidance Documents and other regulatory mechanisms will need to be established during this transition period and it is anticipated that it will be late in 2019 before the infrastructure is established to begin the new approvals process.

U.S. Regulations

In the United States, in vitro diagnostic products are subject to regulation by the FDA as medical devices to the extent that they are intended for use in the diagnosis, treatment, mitigation or prevention of disease or other conditions. They are subject to premarket review and postmarket controls which will differ depending on how the FDA classifies a specific IVD. Certain types of tests like some that we manufacture and sell for research use only in the United States have not been subject to FDA's premarket review and controls because we do not promote these tests for clinical diagnostic use, and they are labeled "For Research Use Only," or RUO, as required by the FDA. Other tests, known as laboratory developed tests (LDTs) which are in vitro diagnostic tests that are designed, manufactured and used within a single laboratory, have been subject to enforcement discretion, which means that FDA generally has not enforced premarket review and other applicable FDA requirements. However, as LDTs have increased in complexity, the FDA has begun to take a risk-based approach to their regulation. Failure to comply with applicable U.S. requirements may subject a company to a variety of administrative or judicial sanctions, such as FDA refusal to approve pending PMAs, warning letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, civil penalties and criminal prosecution.

In Vitro Diagnostics

The FDA regulates the sale or distribution of medical devices, including in vitro diagnostic test kits and some LDTs. The information that must be submitted to the FDA in order to obtain clearance or approval to market a new medical device varies depending on how the medical device is classified by the FDA. Medical devices are classified into one of three classes on the basis of the controls deemed by the FDA to be necessary to reasonably ensure their safety and effectiveness. Class I devices are subject to general controls, including labeling, pre-market notification and adherence to the FDA's quality system regulations, which are device-specific good manufacturing practices. Class II devices are subject to premarket notification, general controls and sometimes special controls, including performance standards and post-market surveillance. Class III devices are subject to most of the previously identified requirements as well as to pre-market approval. All Class I devices are exempt from premarket review; most Class II devices require 510(k) clearance, and all Class III devices must receive premarket approval before they can be sold in the United States. The payment of a fee, that is typically adjusted annually, to the FDA is usually required when a 510(k) notice or premarket approval application is submitted.

510(k) Premarket Notification. A 510(k) notification requires the sponsor to demonstrate that a medical device is substantially equivalent to another marketed device, termed a "predicate device", that is legally marketed in the United States and for which a premarket approval application (PMA) was not required. A device is substantially equivalent to a predicate device if it has the same intended use and technological characteristics as the predicate; or has the same intended use but different technological characteristics, where the information submitted to the FDA does not raise new questions of safety and effectiveness and demonstrates that the device is at least as safe and effective as the legally marketed device.

The FDA generally issues a decision letter within 90 days of receipt of the 510(k) if it has no additional questions or sends a first action letter requesting additional information within 75 days. Most 510(k)s do not require clinical data for clearance, but a minority will. Requests for additional data, including clinical data, will increase the time necessary to review the notice. If the FDA believes that the device is not substantially equivalent to a predicate device, it will issue a "Not Substantially Equivalent" letter and designate the device as a Class III device, which will require the submission and approval of a PMA before the new device may be marketed. Under certain circumstances, the sponsor may request the FDA to make a risk-based determination of the new device and reclassify the new device as a Class I or Class II device. The FDA continues to reevaluate the 510(k) pathway and process and the de novo process, and has taken what it describes as a risk-based approach to develop innovative regulatory policy to propose a more "contemporary" approach. We cannot predict what if any changes will occur or how they will affect our current or future products.

Premarket Approval. The PMA process is more complex, costly and time consuming than the 510(k) process. A PMA must be supported by more detailed and comprehensive scientific evidence, including clinical data, to demonstrate the safety and efficacy of the medical device for its intended purpose. If the device is determined to present a “significant risk,” the sponsor may not begin a clinical trial until it submits an investigational device exemption (IDE) to the FDA and obtains approval to begin the trial.

After the PMA is submitted, the FDA has 45 days to make a threshold determination that the PMA is sufficiently complete to permit a substantive review. If the PMA is complete, the FDA will file the PMA. The FDA is subject to a performance goal review time for a PMA that is 180 days from the date of filing, although in practice this review time is longer. Questions from the FDA, requests for additional data and referrals to advisory committees may delay the process considerably. The total process may take several years and there is no guarantee that the PMA will ever be approved. Even if approved, the FDA may limit the indications for which the device may be marketed. The FDA may also request additional clinical data as a condition of approval or after the PMA is approved. Any changes to the medical device may require a supplemental PMA to be submitted and approved before changed medical device may be marketed.

Any products sold by us pursuant to FDA clearances or approvals will be subject to pervasive and continuing regulation by the FDA, including record keeping requirements, reporting of adverse experiences with the use of the device and restrictions on the advertising and promotion of our products. Device manufacturers are required to register their establishments and list their devices with the FDA and are subject to periodic inspections by the FDA and certain state agencies. Noncompliance with applicable FDA requirements can result in, among other things, warning letters, fines, injunctions, civil penalties, recalls or seizures of products, total or partial suspension of production, refusal of the FDA to grant 510(k) clearance or PMA approval for new devices, withdrawal of 510(k) clearances and/or PMA approvals and criminal prosecution.

Regulation of Companion Diagnostic Devices

If a sponsor or the FDA believes that a diagnostic test is essential for the safe and effective use of a corresponding therapeutic product, the sponsor of the therapeutic product will typically work with a collaborator to develop an in vitro companion diagnostic device, or IVD. IVDs are regulated by the FDA as medical devices. The FDA issued a final guidance document in 2014, entitled “In Vitro Companion Diagnostic Devices” that is intended to assist companies developing in vitro companion diagnostic devices and companies developing therapeutic products that depend on the use of a specific in vitro companion diagnostic for the safe and effective use of the product. The FDA defined an IVD companion diagnostic device as a device that provides information that is essential for the safe and effective use of a corresponding therapeutic product. The FDA expects that the therapeutic sponsor will address the need for an approved or cleared IVD companion diagnostic device in its therapeutic product development plan and that, in most cases, the therapeutic product and its corresponding IVD companion diagnostic will be developed contemporaneously.

It also issued a draft guidance on July 15, 2016, entitled, “Principles for Codevelopment of an In Vitro Companion Diagnostic Device with a Therapeutic Product” to serve as a practical guide to assist therapeutic product sponsors and IVD sponsors in developing a therapeutic product and an accompanying IVD companion diagnostic.

The FDA indicated that it will apply a risk-based approach to determine the regulatory pathway for IVD companion diagnostic devices, as it does with all medical devices. This means that the regulatory pathway will depend on the level of risk to patients, based on the intended use of the IVD companion diagnostic device and the controls necessary to provide a reasonable assurance of safety and effectiveness. The two primary types of marketing pathways for medical devices are clearance of a premarket notification under Section 510(k) of the Federal Food, Drug, and Cosmetic Act, or 510(k), and approval of a premarket approval application, or PMA. We expect that any

IVD companion diagnostic device developed for use with our drug candidates will utilize the PMA pathway and that a clinical trial performed under an investigational device exemption, or IDE, will have to be completed before the PMA may be submitted.

The FDA expects that the therapeutic sponsor will address the need for an IVD companion diagnostic device in its therapeutic product development plan and that, in most cases, the therapeutic product and its corresponding IVD companion diagnostic device will be developed contemporaneously. If the companion diagnostic test will be used to make critical treatment decisions such as patient selection, treatment assignment, or treatment arm, it will likely be considered a significant risk device for which a clinical trial will be required.

The sponsor of the IVD companion diagnostic device will be required to comply with the FDA's IDE requirements that apply to clinical trials of significant risk devices. If the diagnostic test and the therapeutic drug are studied together to support their respective approvals, the clinical trial must meet both the IDE and IND requirements.

PMA's must be supported by valid scientific evidence, which typically requires extensive data, including technical, preclinical, clinical and manufacturing data, to demonstrate to the FDA's satisfaction the safety and effectiveness of the device. For diagnostic tests, a PMA typically includes data regarding analytical and clinical validation studies. As part of its review of the PMA, the FDA will conduct a pre-approval inspection of the manufacturing facility or facilities to ensure compliance with the Quality System Regulation, or QSR, which requires manufacturers to follow design, testing, control, documentation and other quality assurance procedures. FDA review of an initial PMA may require several years to complete.

If the FDA evaluations of both the PMA and the manufacturing facilities are favorable, the FDA will either issue an approval order or an approvable letter, which usually contains a number of conditions that must be met in order to secure the final approval of the PMA. If the FDA's evaluation of the PMA or manufacturing facilities is not favorable, the FDA will send the applicant a not approvable letter or an order denying approval. A not approvable letter will outline the deficiencies in the application and, where practical, will identify what is necessary to make the PMA approvable. The FDA may also determine that additional clinical trials are necessary, in which case the PMA approval may be delayed for several months or years while the trials are conducted and then the data submitted in an amendment to the PMA. Once granted, PMA approval may be withdrawn by the FDA if compliance with post approval requirements, conditions of approval or other regulatory standards is not maintained or problems are identified following initial marketing.

After approval, the use of an IVD companion diagnostic device with a therapeutic product will be stipulated in the instructions for use in the labeling of both the diagnostic device and the corresponding therapeutic product. In addition, a diagnostic test that was approved through the PMA process or one that was cleared through the 510(k) process and placed on the market will be subject to many of the same regulatory requirements that apply to approved drugs. The FDA has approved a number of drug/diagnostic device companions in accordance with the Guidance.

Unique Device Identifier Requirements

In September 2013, the FDA issued its final rule on the Unique Device Identifier. This rule now requires an additional registered identifier, including a special barcode, on all FDA regulated medical devices. The rule is implemented in phases with the first deadline of September 24, 2014 being established for all Class III medical devices. For QIAGEN, this impacted the HC2, QuantiFERON, artus, and therascreen products. We established a task force to ensure that the deadline was met but there is additional administrative and regulatory burden on us related to the annual reporting of compliance of these products to the new regulation. Class II and Class I products were required

to have this same labeling as of September 24, 2016 and 2018, respectively. QIAGEN was fully compliant with the new rule by September 2018. The new rule will also require additional compliance oversight now that it has been implemented. The requirements are now confirmed as part of our annual reporting and PMA submissions. They are also assessed during site inspections by the U.S. FDA.

Regulation of Research Use Only Products

Some of our products are sold for research purposes in the U.S., and labeled “For Research Use Only” (RUO) or “for molecular biology applications.” In November 2013, the FDA issued a final Guidance for Industry and Food and Drug Administration Staff entitled, “Distribution of In Vitro Diagnostic Products Labeled for Research Use Only or Investigational Use Only.” In the Guidance, RUO refers to devices that are in the laboratory phase of development, and investigational use only, or IUO, refers to devices that are in the product testing phase of development. These types of devices are exempt from most regulatory controls. Because we do not promote our RUOs for clinical diagnostic use or provide technical assistance to clinical laboratories with respect to these tests, we believe that these tests are exempt from FDA’s premarket review and other requirements. If the FDA were to disagree with our designation of any of these products, we could be forced to stop selling the product until we obtain appropriate regulatory clearance or approval. Further, it is possible that some of our RUOs may be used by some customers without our knowledge in their LDTs, which they develop, validate and promote for clinical use. However, as previously noted, we do not promote these products for use in LDTs or assist in the development of the LDTs for clinical diagnostic use.

The 21st Century Cures Act (Cures Act) was enacted into law on December 13, 2016, after a bipartisan, multi-year effort. The Cures Act primarily affects activities of the Department of Health and Human Services (HHS) and its agencies, including the Food and Drug Administration (FDA or the Agency). On June 6, 2017, Scott Gottlieb, M.D., Commissioner of Food and Drugs, reported to Congress as required by the Cures Act. This report included the Food & Drug Administration Work Plan and Proposed Funding Allocations of FDA Innovation Account (Required by Section 1002 of the 21st Century Cures Act (Public Law 114-255)). This is now being implemented with a broad spectrum of initiatives within the FDA with the goal to support patients with improved and timely access to safe and efficacious medical products. For industry, it is anticipated that some processes will become less burdensome with more rapid approval/clearance cycles while others will continue to require significant investment.

HIPAA and Other Privacy and Security Laws

Numerous privacy and data security laws apply to personal information, including health information. These laws vary in their application. For example, the Health Insurance Portability and Accountability Act of 1996, as amended by the Health Information Technology for Economic and Clinical Health Act, and their implementing regulations (collectively, HIPAA), regulate the uses, disclosures and security of identifiable health information (protected health information or PHI) in the hands of certain health care providers, health plans or health care clearing houses (covered entities). HIPAA regulates and limits covered entities’ uses and disclosures of PHI and requires the implementation of administrative, physical and technical safeguards to keep PHI secure. HIPAA also applies to organizations that create, receive, maintain or transmit PHI to provide services to or for or on behalf of covered entities (business associates). Business associates and certain of their subcontractors are required to comply with certain privacy and all of the security standards of HIPAA. Business associates and covered entities must also comply with breach notification standards established by HIPAA. The HIPAA breach notification standards require covered entities to notify affected individuals, the government, and in some cases, local and national media in the event of a breach of PHI that has not been secured in accordance with HIPAA standards, such as by encryption. The breach notification standards require business associates to notify covered entity customers of their own breaches of unsecured PHI so that the relevant covered entity may make required notifications. In the ordinary course, HIPAA does not apply to us directly, but if we were to act as a HIPAA covered entity or business associate, we would be subject to these obligations. Most of our institutional and physician customers are covered entities under HIPAA and

must obtain proper authorization, de-identify information or take some other step so that we may provide services involving PHI. When PHI is de-identified in accordance with HIPAA or when the disclosure of PHI is authorized by a patient, HIPAA does not impose any compliance obligations on the recipient, but our use and disclosure of the information may be limited by contract or the terms of the authorization.

All 50 states have adopted data breach notification laws relating to the "personal information" of their residents. Personal information typically includes an individual's name or initials coupled with social security, financial account, debit, credit or state-issued identification number or other information that could lead to identity theft. An increasing number of states are broadly including "health information" as personal information protected under the law. There is significant variability under these laws, but most require notification to affected individuals and to the government in the event of breach. Other laws of some states require that that we comply with data security obligations. These laws may apply to us when we receive or maintain personal information regarding individuals, including our employees.

We are subject to enforcement by state attorneys general who have authority to enforce state data privacy or security laws. Accordingly, we maintain an active privacy and data security program designed to address applicable regulatory compliance requirements.

The Genetic Information Nondiscrimination Act of 2008, also referred to as GINA, is a federal law that protects individuals from discrimination in the health insurance and employment contexts because of DNA characteristics that may affect their health. GINA prohibits covered employers from requesting, obtaining, or using employees' genetic information (subject to limited exceptions), and prohibits covered health insurers from requesting genetic information or using any such information they may already have for purposes of making eligibility, premium, or coverage-related decisions.

Many states have also adopted genetic testing and privacy laws. These laws typically require a specific, written consent for genetic testing as well as consent for the disclosure of genetic test results and otherwise limit uses and disclosures of genetic testing results. A few states have adopted laws that give their residents property rights in their genetic information.

Privacy and data security laws, including those relating to health information, are complex, overlapping and rapidly evolving. As our activities evolve and expand, additional laws may be implicated. For example, the California Consumer Privacy Act of 2018, set to take effect on January 1, 2020, imposes expansive new requirements and protections upon the processing of personal data, aimed at giving California consumers more visibility and control over their personal information. There are also non-U.S. privacy laws, such as the General Data Protection Regulation (GDPR) of the European Union, that impose restrictions on the transfer, access, use, and disclosure of health and other personal information. We have implemented the requirements set forth by the GDPR, which took effect on May 25, 2018. All of these laws impact our business either directly or indirectly. Our failure to comply with applicable privacy or security laws or significant changes in these laws could significantly impact our business and future business plans. For example, we may be subject to regulatory action or lawsuits in the event we fail to comply with applicable privacy laws. We may face significant liability in the event any of the personal information we maintain is lost or otherwise subject to misuse or other wrongful use, access or disclosure.

Compliance with Fraud and Abuse Laws

We have to comply with various U.S. federal and state laws, rules and regulations pertaining to healthcare fraud and abuse, including anti-kickback laws and physician self-referral laws, rules and regulations. Violations of the fraud and abuse laws are punishable by criminal and civil sanctions, including, in some instances, exclusion from participation in federal and state healthcare programs, including Medicare and Medicaid.

Anti-Kickback Statute

The federal Anti-Kickback Statute prohibits persons from knowingly or willfully soliciting, receiving, offering or paying remuneration, directly or indirectly, in exchange for or to induce:

- › The referral of an individual for a service or product for which payment may be made by Medicare, Medicaid or other government-sponsored healthcare program; or
- › purchasing, ordering, arranging for, or recommending the ordering of, any service or product for which payment may be made by a government-sponsored healthcare program.

The definition of "remuneration" has been broadly interpreted to include anything of value, including such items as gifts, certain discounts, waiver of payments, and providing anything at less than its fair market value. In addition, several courts have interpreted the law to mean that if "one purpose" of an arrangement is intended to induce referrals, the statute is violated.

The Anti-Kickback Statute is broad and prohibits many arrangements and practices that are lawful in businesses outside of the healthcare industry. Recognizing that the Anti-Kickback Statute is broad and may technically prohibit many innocuous or beneficial arrangements, the Office of Inspector General of the Department of Health and Human Services (OIG) has issued regulations, commonly known as "safe harbors." These safe harbors set forth certain requirements that, if fully met, will insulate healthcare providers, medical device manufacturers, and others, from prosecution under the Anti-Kickback Statute. Although full compliance with these safe harbor provisions ensures against prosecution under the Anti-Kickback Statute, full compliance is often difficult and the failure of a transaction or arrangement to fit within a specific safe harbor does not necessarily mean that the transaction or arrangement is illegal or that prosecution under the Anti-Kickback Statute will be pursued. However, conduct and business arrangements that do not fully satisfy each applicable safe harbor may result in increased scrutiny by government enforcement authorities such as the OIG. The statutory penalties for violating the Anti-Kickback Statute include imprisonment for up to five years and criminal fines of up to \$25,000 per violation. In addition, through application of other laws, conduct that violates the Anti-Kickback Statute can also give rise to False Claims Act lawsuits, civil monetary penalties and possible exclusion from Medicare and Medicaid and other federal healthcare programs. In addition to the Federal Anti-Kickback Statute, many states have their own kickback laws. Often, these laws closely follow the language of the federal law, although they do not always have the same scope, exceptions, safe harbors or sanctions. In some states, these anti-kickback laws apply not only to payment made by a government health care program but also with respect to other payors, including commercial insurance companies.

We have and may in the future, enter into various agreements with health care providers who perform services for us, including some who make clinical decisions to use our products. All such arrangements have been structured with the intention of complying with all applicable fraud and abuse laws, including the Anti-Kickback Statute.

Other Fraud and Abuse Laws

The federal False Claims Act (FCA) prohibits any person from knowingly presenting, or causing to be presented, a false claim or knowingly making, or causing to be made, a false statement to obtain payment from the federal government. Those found in violation of the FCA can be subject to fines and penalties of three times the damages sustained by the government, plus mandatory civil penalties of between \$5,500 and \$11,000 for each separate false claim. Actions filed under the FCA can be brought by any individual on behalf of the government, a "qui tam" action, and such individual, known as a "relator" or, more commonly, as a "whistleblower," who may share in any amounts paid by the entity to the government in damages and penalties or by way of settlement. In addition, certain states have enacted laws modeled after the FCA, and this legislative activity is expected to increase. Qui tam actions have increased significantly in recent years, causing greater numbers of healthcare companies, including medical

device manufacturers, to defend false claim actions, pay damages and penalties or be excluded from Medicare, Medicaid or other federal or state healthcare programs as a result of investigations arising out of such actions.

The federal ban on physician self-referrals, commonly known as the Stark Law, prohibits, subject to certain exceptions, physician referrals of Medicare and Medicaid patients to an entity providing certain “designated health services” if the physician or an immediate family member of the physician has any financial relationship with the entity. Penalties for violating the Stark Law include fines, civil monetary penalties and possible exclusion from federal healthcare programs. In addition to the Stark Law, many states have their own self-referral laws. Often, these laws closely follow the language of the federal law, although they do not always have the same scope, exceptions or safe harbors.

The anti-inducement law (Section 1128A(a)(5) of the Social Security Act), prohibits providers from offering anything of value to a Medicare or Medicaid beneficiary to induce the beneficiary to use items or services covered by either program. Additionally, the Civil Monetary Penalties Law (Section 1128A of the Social Security Act), authorizes the United States Department of Health and Human Services to impose civil penalties administratively for various fraudulent or abusive acts.

The OIG also has authority to bring administrative actions against entities for alleged violations of a number of prohibitions, including the Anti-Kickback Statute and the Stark Law. The OIG may seek to impose civil monetary penalties or exclusion from the Medicare, Medicaid and other federal healthcare programs. Civil monetary penalties can range from \$2,000 to \$50,000 for each violation or failure plus, in certain circumstances, three times the amounts claimed in reimbursement or illegal remuneration. Typically, exclusions last for five years.

In addition, we must comply with a variety of other laws, such as laws prohibiting false claims for reimbursement under Medicare and Medicaid, all of which can also be triggered by violations of federal anti-kickback laws; the Health Insurance Portability and Accounting Act of 1996, which makes it a federal crime to commit healthcare fraud and make false statements; and the Federal Trade Commission Act and similar laws regulating advertisement and consumer protections.

There are also an increasing number of state “sunshine” laws that require manufacturers to provide reports to state governments on pricing and marketing information. Several states have enacted legislation requiring manufacturers, including medical device companies to, among other things, establish marketing compliance programs, file periodic reports with the state, make periodic public disclosures on sales and marketing activities, and to prohibit or limit certain other sales and marketing practices. In addition, a federal law known as the Physician Payments Sunshine Act, requires manufacturers, including medical device manufacturers, to track and report to the federal government certain payments and other transfers of value made to physicians and teaching hospitals and ownership or investment interests held by physicians and their immediate family members. The federal government discloses the reported information on a publicly available website. If we fail to track and report as required by these laws or to otherwise comply with these laws, we could be subject to the penalty provisions of the pertinent state and federal authorities.

Despite extensive procedures to ensure compliance, we may also be exposed to liabilities under the U.S. Foreign Corrupt Practices Act, or FCPA, which generally prohibits companies and their intermediaries from making corrupt payments to foreign officials for the purpose of obtaining or maintaining business or otherwise obtaining favorable treatment, and requires companies to maintain adequate record-keeping and internal accounting practices to accurately reflect the transactions of the company. We are also subject to a number of other laws and regulations relating to money laundering, international money transfers and electronic fund transfers. These laws apply to companies, individual directors, officers, employees and agents.

Environment, Health and Safety

We are subject to laws and regulations related to the protection of the environment, the health and safety of employees and the handling, transportation and disposal of medical specimens, infectious and hazardous waste and radioactive materials. For example, the U.S. Occupational Safety and Health Administration (OSHA) has established extensive requirements relating specifically to workplace safety for healthcare employers in the U.S. This includes requirements to develop and implement multi-faceted programs to protect workers from exposure to blood-borne pathogens, such as HIV and hepatitis B and C, including preventing or minimizing any exposure through needle stick injuries. For purposes of transportation, some biological materials and laboratory supplies are classified as hazardous materials and are subject to regulation by one or more of the following agencies: the U.S. Department of Transportation, the U.S. Public Health Service, the United States Postal Service and the International Air Transport Association.

Other Country Specific Requirements

In many countries outside of the United States and the EU, coverage, pricing and reimbursement approvals are also required. Additionally, many of the major markets are adopting regulations and requirements similar to U.S. Food and Drug Administration (FDA) which require additional submission activities and management of country specific regulatory requirements. This is being led by the International Medical Device Regulators Forum (IMDRF). This Forum consists of regulators from around the world that have signed governmental agreements to align global regulations, especially around submissions and approvals. In the long term this holds the promise of reducing volatility and complexity in the regulatory landscape.

Reimbursement

United States

In the United States, payments for diagnostic tests come from several sources, including third party payors such as health maintenance organizations and preferred provider organizations; government health programs such as Medicare and Medicaid; and, in certain circumstances, hospitals, referring laboratories or the patients themselves. For many years, federal and state governments in the United States have pursued methods to reduce the cost of these programs. For example, in 2010, the United States enacted major healthcare reform legislation known as the Patient Protection and Affordable Care Act (ACA). Such changes have had, and are expected to continue to have, an impact on our business. At present, Medicare payment rates are affected by across-the-board federal budget cuts commonly referred to as "sequestration." Under sequestration, the Centers for Medicare & Medicaid Services (CMS), the federal agency responsible for administering Medicare and Medicaid, reduced Medicare payments to providers by 2% annually beginning in 2013 and through 2023.

We frequently identify value propositions on our products and communicate them to payors, providers, and patient stakeholders and attempt to positively impact coverage, coding and payment pathways. However, we have no direct control over payor decisions with respect to coverage and payment levels for our products. The manner and level of reimbursement may depend on the site of care, the procedure(s) performed, the final patient diagnosis, the device(s) and/or drug(s) utilized, the available budget, or a combination of these factors, and coverage and payment levels are determined at each payor's discretion. Changes in reimbursement levels or methods may positively or negatively affect sales of our products in any given country for any given product. At QIAGEN, we work with several specialized reimbursement consulting companies and maintain regular contact with payers.

As government programs seek to expand healthcare coverage for their citizens, they have at the same time sought to control costs by limiting the amount of reimbursement they will pay for particular procedures, products or services. Many third-party payors have developed payment and delivery mechanisms to support cost control efforts and to focus on paying for quality. Such mechanisms include payment reductions, pay for performance metrics, quality-

based performance payments, restrictive coverage policies, studies to compare effectiveness and patient outcomes, and technology assessments. These changes have increased emphasis on the delivery of more cost-effective and quality-driven healthcare.

Code Assignment. In the United States, a third-party payor's decisions regarding coverage and payment are impacted, in large part, by the specific Current Procedural Terminology, or CPT, code used to identify a test. The American Medical Association, or AMA, publishes the CPT, which is a listing of descriptive terms and identifying codes for reporting medical services and procedures. The purpose of the CPT is to provide a uniform language that accurately describes medical, surgical, and diagnostic services and therefore to ensure reliable nationwide communication among healthcare providers, patients, and third-party payors. CMS uses its own HCPCS codes for medical billing and reimbursement purposes. Level I HCPCS codes reflect current CPT codes, while Level II codes primarily represent non-physician services and Level III codes are local codes developed by Medicaid agencies, Medicare contractors and private insurers.

A manufacturer of in vitro diagnostic kits or a provider of laboratory services may request establishment of a Category I CPT code for a new product. Assignment of a specific CPT code ensures routine processing and payment for a diagnostic test by both private and government third-party payors.

The AMA has specific procedures for establishing a new CPT code and, if appropriate, for modifying existing nomenclature to incorporate a new test into an existing code. If the AMA concludes that a new code or modification of nomenclature is unnecessary, the AMA will inform the requestor how to use one or more existing codes to report the test.

While the AMA's decision is pending, billing and collection may be sought under an existing, non-specific CPT code. A manufacturer or provider may decide not to request assignment of a CPT code and instead use an existing, non-specific code for reimbursement purposes. However, use of such codes may result in more frequent denials and/or requests for supporting clinical documentation from the third-party payor and in lower reimbursement rates, which may vary based on geographical location.

CMS reimbursement rates for clinical diagnostic tests are defined by HCPCS code in the Clinical Laboratory Fee Schedule (CLFS). In 2012, the AMA added 127 new CPT codes for molecular pathology services that became effective on January 1, 2013. These new CPT codes are biomarker specific and were designed to replace the previous methodology of billing for molecular pathology testing, which involved "stacking" a series of non-biomarker specific CPT codes together to describe the testing performed. CMS issued final national reimbursement prices for the new CPT codes in November 2013. These federal reimbursement amounts are widely acknowledged to be lower than the reimbursement obtained by the now outdated "stacking" method, but commercial payors and Medicare contractors are still in the process of solidifying their coverage and reimbursement policies for the testing described by these new CPT codes. As of January 1, 2018, in accordance with the Protecting Access to Medicare Act of 2014 (PAMA), CMS began calculating Medicare reimbursement rates for certain clinical diagnostic tests using weighted median private payor rates, which are based on rate information reported by applicable laboratories. This new rate methodology means the lower reimbursement rates previously experienced in the field of molecular pathology testing now extends to additional diagnostic testing codes on the CLFS.

Coverage Decisions. When deciding whether to cover a particular diagnostic test, private and government third-party payors generally consider whether the test is a contractual benefit and, if so, whether it is reasonable and necessary for the diagnosis or treatment of an illness or injury. However, most third-party payors do not cover experimental services. Coverage determinations are often influenced by current standards of practice and clinical data, particularly at the local level. CMS, the government agency responsible for overseeing the Medicare program,

has the authority to make coverage determinations on a national basis, but most Medicare coverage decisions are made at the local level by contractors that administer the Medicare program in specified geographic areas. Private and government third-party payors have separate processes for making coverage determinations, and private third-party payors may or may not follow Medicare's coverage decisions. If a third-party payor has a coverage determination in place for a particular diagnostic test, billing for that test must comply with the established policy. Otherwise, the third-party payor makes reimbursement decisions on a case-by-case basis.

Payment. Payment for covered diagnostic tests is determined based on various methodologies, including prospective payment systems and fee schedules. In addition, private third-party payors may negotiate contractual rates with participating providers or set rates as a percentage of the billed charge. Diagnostic tests furnished to Medicare inpatients generally are included in the bundled payment made to the hospital under Medicare's Inpatient Prospective Payment System, utilizing Diagnosis Related Groups (DRGs) depending on the patient's condition. Payment for diagnostic tests furnished to Medicare beneficiaries in outpatient settings is based on the CLF, under which a payment amount is assigned to each covered CPT code, or through the Outpatient Prospective Payment System (OPPS), which is the outpatient equivalent of the DRG model. The law technically requires fee schedule amounts to be adjusted annually by the percentage increase in the consumer price index (CPI) for the prior year, but Congress has frozen payment rates in certain years. Medicaid programs generally pay for diagnostic tests based on a fee schedule, but reimbursement varies by state.

European Union

In the European Union, the reimbursement mechanisms used by private and public health insurers vary by country. For the public systems, reimbursement is determined by guidelines established by the legislator or responsible national authority. As elsewhere, inclusion in reimbursement catalogues focuses on the medical usefulness, need, quality and economic benefits to patients and the healthcare system. Acceptance for reimbursement comes with cost, use, and often volume restrictions, which again can vary by country.

Organizational Structure

QIAGEN N.V. is the holding company for more than 50 consolidated subsidiaries, many of which have the primary function of distributing our products and services on a regional basis. Certain subsidiaries also have research and development or production activities. A listing of our significant subsidiaries and their jurisdictions of incorporation is included in Exhibit 8.1 to this Annual Report.

Description of Property

Our production and manufacturing facilities for consumable products are located in Germany, the United States and China. Our facilities for software development are located in the United States, Germany, Poland, Denmark and Romania. In recent years, we have made investments in automated and interchangeable production equipment to increase our production capacity and improve efficiency. Our production and manufacturing operations are highly integrated and benefit from sophisticated inventory control. Production management personnel are highly qualified, and many have advanced degrees in engineering, business and science. We also have installed and continue to expand production-planning systems that are included in our integrated information and control system based on the SAP R/3 business software package from SAP AG. Worldwide, we use SAP software to integrate most of our operating subsidiaries. Capital expenditures for property, plant and equipment totaled \$109.8 million, \$90.1 million and \$74.5 million for 2018, 2017 and 2016, respectively.

We have an established quality system, including standard manufacturing and documentation procedures, intended to ensure that products are produced and tested in accordance with the FDA's Quality System Regulations, which impose current Good Manufacturing Practice (cGMP) requirements. For cGMP production, special areas were built in our facilities in Hilden, Germany, Germantown, Maryland and Shenzhen, China. These facilities operate in accordance with cGMP requirements.

The consumable products manufactured at QIAGEN GmbH in Germany, and QIAGEN Sciences LLC in Maryland, are produced under ISO 9001: 2008, ISO 13485:2012, ISO 13485:2003 CMDCAS. Our certifications form part of our ongoing commitment to provide our customers with high-quality, state-of-the-art sample and assay technologies under our Total Quality Management system.

Our facilities in Hilden, Germany, currently occupy a total of approximately 786,000 square feet. Our most recent expansion to these facilities was in 2018 and included approximately 6,400 square feet of clean room space for Stat-DX integration. Our production capacity is increased through our manufacturing and research facilities in the United States. QIAGEN Sciences, LLC owns a 24-acre site in Germantown, Maryland. The 285,000 square foot Germantown facility consists of several buildings in a campus-like arrangement and can accommodate over 500 employees. There is room for future expansion of up to 300,000 square feet of facility space. In 2015, we completed expansion of our research and production facilities in Hilden, Germany and renovations of administrative facilities in Germantown, Maryland.

We lease a facility in Frederick, Maryland comprising 42,000 square feet for manufacturing, warehousing, distribution and research operations. We also lease facilities in Massachusetts with 24,860 square feet in Waltham for NGS system development and 44,000 square feet in Beverly for enzyme manufacturing. Additionally, we have leased facilities in Redwood City, California with 12,700 square feet and Cary, North Carolina with 10,900 square feet focused on bioinformatics and 19,000 square feet in Minden, Nevada for Service Solutions. We have shared service centers which lease facilities in Wroclaw, Poland (42,100 square feet) and Manila, Philippines (20,200 square feet). Additionally, we lease facilities in Shenzhen, China and Manchester, United Kingdom for research operations. Other subsidiaries throughout the world lease smaller amounts of space. Our corporate headquarters are located in leased office space in Venlo, The Netherlands.

We believe our existing production and distribution facilities can support anticipated production needs for the next 36 months. Our production and manufacturing operations are subject to various federal, state, and local laws and regulations including environmental regulations. We do not believe we have any material issues relating to these laws and regulations.

MANAGEMENT REPORT

Opportunities and Risks

QIAGEN's business, like that of any other company, involves significant opportunities and risks. Effective management is paramount in delivering sustainable value creation, and the central task of the leadership team. Execution in the development and commercialization of new products, as well as in acquisitions and strategic partnerships, is crucial to sustaining growth. As an international company, QIAGEN also is exposed to a wide variety of developments in markets where it operates. Managing opportunities and risks is an integral part of the corporate governance system in place throughout QIAGEN, not the task of one particular organizational unit. Management systems are in place to aggregate all risks and opportunities for review at the Managing Board and Supervisory Board levels of QIAGEN N.V., and these are reviewed on a routine basis. Based on our assessment at the end of 2018, we consider the opportunities and risks manageable and the survival of QIAGEN not in danger, the same position taken at year-end 2017. This assessment is supported by our strong balance sheet and the current business outlook, and further supported by the positive historical response to our external financing needs. As a result, QIAGEN has not sought an official rating by any of the leading rating agencies. We are confident in the future earnings strength of QIAGEN and have access to the resources to pursue value-creating business opportunities.

Opportunities

Our mission is to make improvements in life possible by capturing growth opportunities as genomic and molecular technologies disseminate across four customer classes: Molecular Diagnostics, Academia, Pharma and Applied Testing. Due to increased life expectancies worldwide and the dynamic growth of healthcare both in developed and emerging markets, the need for innovative diagnostics is increasing. Diagnostics offer proven benefits to improve healthcare outcomes, particularly the use of companion diagnostics in precision medicine, while still representing a small fraction of overall healthcare expenditures. Internal R&D activities of QIAGEN and partnerships with other companies present major opportunities to develop new products and improve existing ones across our portfolio of Sample to Insight solutions. We also continuously evaluate potential targeted acquisition opportunities to add new technologies or enter growing markets. All of these factors represent future growth opportunities for QIAGEN.

Senior management at QIAGEN focuses strategic attention on identifying and assessing opportunities as early as possible, taking actions to maximize the value of those opportunities and executing on initiatives to deliver business success. QIAGEN evaluates organic growth opportunities each year as part of its annual budget planning process, and during the year, especially in dynamically changing areas of the business portfolio. These evaluations are based on proposals for new products, services and technologies developed within QIAGEN. This cross-functional process involves a careful analysis of the market environment and competitive positioning, as well as factors such as expected development timelines, regulatory processes and reimbursement issues, when evaluating organic opportunities. Business plans include information about the product or service to be developed, along with profiles on target customers and competitors, market size and barriers to entry. It also outlines the resources required for implementation. As part of this process, these plans are subjected to a uniform profitability analysis to determine the net present value of an investment and the opportunities to create value (as measured with QIAGEN Value Added, or QVA) and generate returns that exceed the Group's cost of capital after a multi-year period. The monitoring of growth initiatives is accomplished through regular reporting to the Supervisory Board on the status and progress of key initiatives during the year. Project management and the supporting central functions report directly to Peer M. Schatz, the CEO of QIAGEN.

Risk Management

Our risk management approach embodies the key elements of a sound risk management system including (1) active Supervisory Board and senior management involvement; (2) adequate policies and procedures; (3) adequate risk management; monitoring and information systems; and (4) comprehensive internal controls.

QIAGEN is managed by a Managing Board and an independent Supervisory Board appointed by the General Meeting of Shareholders. One of the Managing Board's responsibilities is the oversight of the risk management system. The Managing Board has developed and implemented strategies, controls and mitigation measures to identify current and developing risks as part of the risk management system. Risk management policies and procedures are embodied in our corporate governance, code of ethics and financial reporting controls and procedures. A variety of functional experts evaluate these business risks, attempting to mitigate and manage these risks on an ongoing basis.

Identified risks are subdivided into three types:

- › A base business risk that is specific to us or our industry and threatens our existing business;
- › A business growth risk that is specific to us or our industry and threatens our future business growth; and
- › An underlying business risk that is not specific to us or our industry, but applies to a larger number of public companies.

All identified risks are evaluated based on their likelihood of occurring and their potential impact (estimated in monetary terms) in disrupting our progress in achieving our business objectives. The overall risk management goal is to identify risks that could significantly threaten our success and to allow management on a timely basis the opportunity to successfully implement mitigation actions. The results of the risk assessment, and any updates, are reported to the Audit Committee of the Supervisory Board on a regular basis. A detailed risk reporting update is provided each quarter to the Audit Committee for specific risks that have been newly identified or have changed since the previous assessment. At least once on an annual basis, the Supervisory Board discusses the corporate strategy and business risks as well as the results of an assessment by the Managing Board and the Audit Committee of the structure and operations of the internal risk management and control systems, including any significant changes.

Our corporate governance structure is based on a strong framework that outlines the responsibilities of our Managing and Supervisory Boards (discussed in more detail in Item 10 of this Annual Report) and the function of the Audit Committee of the Supervisory Board (discussed in more detail in Item 6 of this Annual Report). We maintain adequate internal controls over financial reporting to ensure the integrity of financial reporting, which is described further in Item 15 of this Annual Report. Additionally, we have a Compliance Committee that consists of senior executives from various functional areas who are responsible for ensuring compliance with legal and regulatory requirements, as well as overseeing the communication of corporate policies, including our Code of Ethics as described further in Item 16B of the 2018 Annual Report on Form 20-F.

| Risk Types | |
|--------------------------|---|
| Base Business Risk | <ul style="list-style-type: none"> · Identification and monitoring of competitive business threats · Monitoring complexity of product portfolio · Monitoring dependence on key customers for single product groups · Reviewing dependence on individual production sites or suppliers · Evaluating purchasing initiatives, price controls and changes to reimbursements · Monitoring production risks, including contamination prevention, high-quality product assurance · Ensuring ability to defend against intellectual property infringements and maintain competitive advantage after expiration |
| Business Growth Risk | <ul style="list-style-type: none"> · Managing development and success of key R&D projects · Managing successful integration of acquisitions to achieve anticipated benefits |
| Underlying Business Risk | <ul style="list-style-type: none"> · Evaluating financial risks, including economic risks and currency rate fluctuations · Monitoring financial reporting risks, including multi-jurisdiction tax compliance · Reviewing possible asset impairment events · Assessing compliance and legal risks, including safety in operations and environmental hazard risks, compliance with various regulatory bodies and pending product approvals · Monitoring risks of FCPA (Foreign Corrupt Practices Act) or antitrust concerns arising from a network of subsidiaries and distributors in foreign countries |

The risks described below are listed in the order of our current view of their expected significance. Describing the risk factors in order of significance does not imply that a lower listed risk factor may not have a material adverse impact on our results of operations, liquidity or capital resources.

Risks

Our continued growth is dependent on the development and success of new products.

Rapid technological change and frequent new product introductions are typical in the markets we serve. Our success will depend in part on continuous, timely development and introduction of new products that address evolving market requirements. We believe successful new product introductions provide a significant competitive advantage because customers make an investment of time in selecting and learning to use a new product and are reluctant to switch thereafter. To the extent that we fail to introduce new and innovative products, or such products suffer significant delays in development or are not accepted in the market, we may lose market share to our competitors, which will be difficult or impossible to regain. An inability to successfully develop and introduce new products, for technological or other reasons, could reduce our growth rate or otherwise have an adverse effect on our business. In the past, we have experienced delays in the development and introduction of products, including regulatory approvals, and we may experience delays in the future.

As a result, we cannot assure you that we will keep pace with the rapid rate of change in our markets or that our new products will adequately meet the requirements of the marketplace, achieve market acceptance or regulatory approval, or compete successfully with competitive technologies. Some of the factors affecting market acceptance of new products include:

- › availability, quality and price relative to competitive products;
- › the timing of introduction of the new product relative to competitive products;
- › opinions of the new product's utility;
- › citation of the new product in published research;
- › regulatory trends and approvals; and
- › general trends in life sciences research, applied markets and molecular diagnostics.

In the development of new products we may make significant investments in intellectual property and software. These investments increase our fixed costs, resulting in higher operational costs in the short term that will negatively impact our gross profit and operating income until products reach a minimum level of market acceptance. The expenses or losses associated with unsuccessful product development activities or lack of market acceptance of our new products could materially adversely affect our business, financial condition and results of operations.

Our continued growth depends significantly on the success of new products in the molecular testing markets we serve. Important new product programs underway include our modular medium-throughput QIASymphony automation platform, GeneReader NGS System for next-generation sequencing (NGS), QIAstat-Dx system for one-step, fully integrated molecular analysis of hard-to-diagnose syndromes, the high-throughput NeuMoDx 288 and mid-throughput NeuMoDx 96 fully integrated automation systems for higher-throughput PCR testing, sample and assay technologies designed either for QIAGEN instruments or for "universal" use on other platforms, and bioinformatics solutions to analyze and interpret genomic data. In addition, we are now developing next-generation systems for digital PCR, an emerging analytical technique in the life sciences, targeting a 2020 launch with fully-integrated solutions that simplify workflows and offer other advantages.

The speed and level of adoption of our new automation platforms will affect sales not only of instrumentation but also of consumables, sample and assay kits, designed to run on the systems. The rollouts of new automation platforms are intended to drive the dissemination and increasing sales of consumables for these systems. We are developing or co-developing new kits for each of these platforms and seeking regulatory approvals for a number of these new products. In turn, the availability and regulatory approval of more tests to run on QIASymphony, GeneReader NGS System, QIAstat-Dx and NeuMoDx systems, as well as the planned digital PCR systems, especially molecular assays for specific diseases or companion diagnostics paired with new drugs, will influence the value of the instruments to prospective buyers. Slower adoption of QIASymphony, including the complete QIASymphony RGQ system, the GeneReader NGS System, the QIAstat-Dx and NeuMoDx systems, and the planned digital PCR workflows, could significantly affect sales of products designed to run on these platforms.

Our strategic initiative in NGS, including rollout of the GeneReader NGS System and related consumables, aims to drive the adoption of this technology in clinical research and diagnostics. This involves development and commercialization of universal pre-analytic and bioinformatics products for NGS, as well as commercialization of our proprietary GeneReader NGS workflow and related consumables. The market for next-generation sequencing instruments is very competitive, and the speed and level of adoption of our universal solutions and the GeneReader workflow will affect sales of our Sample to Insight solutions.

An inability to manage our growth, manage the expansion of our operations, or successfully integrate acquired businesses could adversely affect our business.

Our business has grown, with total net sales increasing to \$1.50 billion in 2018 from \$1.34 billion in 2014. We have made a series of acquisitions in recent years, including the acquisitions of STAT-Dx Life, S.L. in 2018, OmicSoft Corporation in 2017, Exiqon A/S in 2016, MO BIO Laboratories in 2015, and Enzymatics and BIOBASE in 2014. We intend to identify and acquire other businesses in the future, including the acquisition of N-of-One announced in January 2019, that support our strategy to build on our global leadership position in Sample to Insight solutions. The successful integration of acquired businesses requires a significant effort and expense across all operational areas.

We continue to make investments to expand our business operations. These projects increase our fixed costs, resulting in higher operational costs in the short term that will negatively impact our gross profit and operating income until we more fully utilize the additional capacity of these facilities. In addition, we have invested in establishing and expanding shared service centers in Poland and the Philippines, opening new commercial operations in emerging markets to expand our geographic footprint, and implementing digitization of business processes to increase efficiency and improve customer experiences. The expansion of our business and the addition of new personnel may place a strain on our management and operational systems. As we continue to upgrade our operating and financial systems and expand the geographic presence of our operations, we intend to continue to assess the need for reallocation of existing resources or the hiring of new employees as well as increased responsibilities for both existing and new management personnel.

Our future operating results will depend on our ability to continue to implement and improve our research, product development, manufacturing, sales and marketing and customer support programs, enhance our operational and financial control systems, expand, train and manage our employee base, integrate acquired businesses, and effectively address new issues related to our growth as they arise. There can be no assurance that we will be able to manage our recent or any future expansion or acquisitions successfully, and any inability to do so could have a material adverse effect on our results of operations.

Our acquisitions expose us to new risks, and we may not achieve the anticipated benefits of acquisitions of technologies and businesses.

During the past several years, we have acquired and integrated a number of companies through which we have gained access to new technologies, products and businesses that complement our internally developed product lines. In the future, we expect to acquire additional technologies, products or businesses to expand our operations. Acquisitions expose us to new operating and other risks, including risks associated with the:

- › assimilation of new products, technologies, operations, sites and personnel;
- › integration and retention of fundamental personnel and technical expertise;
- › application for and achievement of regulatory approvals or other clearances;
- › diversion of resources from our existing products, business and technologies;
- › generation of sales;
- › implementation and maintenance of uniform standards and effective controls and procedures;
- › maintenance of relationships with employees, customers and suppliers, and integration of new management personnel;
- › issuance of dilutive equity securities;

- › incurrence or assumption of debt and contingent liabilities;
- › amortization or impairment of acquired intangible assets or potential businesses; and
- › exposure to liabilities of and claims against acquired entities or personnel.

Our failure to address the above risks successfully in the future may prevent us from achieving the anticipated benefits from any acquisition in a reasonable time frame, or at all.

Global economic conditions could adversely affect our business, results of operations and financial condition.

Our results of operations could be materially affected by adverse general conditions in the global economy and financial markets. Potentially adverse changes that may come from the United Kingdom's exit from the European Union ("Brexit") are not well understood as the actual impact from Brexit will depend on many factors including the ability of both the United Kingdom and European Union authorities to provide a path forward with minimal disruption. In the near term we anticipate the largest potential exposures to be on supply chain with our United Kingdom based suppliers and the local operations for our domestic United Kingdom business and pharma development activities. There also is risk of loss of revenue, penalties due to delayed deliveries and currency losses, or other unforeseen costs which would negatively impact margins.

During challenging economic times, access to financing in the global financial markets has also been adversely affected for many businesses. The uncertainty surrounding the resolution of the economic and sovereign debt crisis in Europe continues to have a negative impact on financial markets and economic conditions more generally. Our customers may face internal financing pressures that adversely impact spending decisions or the ability to purchase our products, or that lead to a delay in collection of receivables and thus negatively impact our cash flow. A severe or prolonged economic downturn could result in a variety of risks to our business that would adversely impact our results of operations, including the reduction or delay in planned improvements to healthcare systems in various countries, the reduction of funding for life sciences research, and intensified efforts by governments and healthcare payors regarding cost-containment efforts.

Our results of operations could also be negatively impacted by any governmental actions or inaction resulting in automatic government spending cuts (sequestration) that may take effect. These conditions may add uncertainty to the timing and budget for investment decisions by our customers, particularly researchers, universities, government laboratories and private foundations whose funding is dependent upon grants from government agencies, such as the U.S. National Institutes of Health (NIH) and similar bodies.

As is the case for many businesses, we face the following risks in regard to financial markets:

- › severely limited access to financing over an extended period of time, which may affect our ability to fund our growth strategy and could result in delays to capital expenditures, acquisitions or research and development projects;
- › failures of currently solvent financial institutions, which may cause losses from our short-term cash investments or our hedging transactions due to a counterparty's inability to fulfill its payment obligations;
- › inability to refinance existing debt at competitive rates, reasonable terms or sufficient amounts; and
- › increased volatility or adverse movements in foreign currency exchange rates.

We may encounter delays in receipt, or limits in the amount, of reimbursement approvals and public health funding, which will impact our ability to grow revenues in the healthcare market or may negatively impact our profitability.

Changes in the availability or reimbursement of our diagnostic testing products by insurance providers and health maintenance organizations could also have a significant adverse impact on our results of operations. Third-party payors are often reluctant to reimburse healthcare providers for the use of medical tests that involve new technologies or provide novel diagnostic information. In addition, third-party payors are increasingly limiting reimbursement coverage for medical diagnostic products and, in many instances, are exerting pressure on suppliers to reduce their prices. Since each third-party payor often makes reimbursement decisions on an individual patient basis, obtaining such approvals is a time-consuming and costly process that requires us to provide scientific and clinical data supporting the clinical benefits of each of our products. As a result, there can be no assurance that reimbursement approvals will be obtained, and the process can delay the broad market introduction of new products. If third-party reimbursement is not consistent or financially adequate to cover the cost of our products, this could limit our ability to sell our products or cause us to reduce prices, which would adversely affect our results of operations.

Further, the ability of many of our customers to successfully market their products depends in part on the extent to which reimbursement for the costs of these products is available from governmental health administrations, private health insurers and other organizations. Governmental and other third-party payors are increasingly seeking to contain healthcare costs and to reduce the price of medical products and services. For example, in 2010, the Patient Protection and Affordable Care Act, or ACA, was enacted with the goal of expanding coverage, increasing quality of care and reducing costs through payment innovation, among other things. With evolving political realities in the United States, including divergent efforts by the Trump Administration and members of Congress, certain sections of the ACA have not been fully implemented and the direction of healthcare policy is unpredictable. Uncertainty around the future of the ACA, and in particular the impact to reimbursement levels, may lead to uncertainty or delay in the purchasing decisions of our customers, which may in turn negatively impact our product sales. As of January 1, 2018, in accordance with the Protecting Access to Medicare Act of 2014 (PAMA), the Centers for Medicare & Medicaid Services began calculating Medicare reimbursement rates for certain clinical diagnostic tests using weighted median private payor rates, which are based on rate information reported by applicable laboratories. This new rate methodology means the lower reimbursement rates previously experienced in the field of molecular pathology testing now extends to additional diagnostic testing codes on the Clinical Laboratory Fee Schedule. If there are not adequate reimbursement levels, our business and results of operations could be adversely affected.

Reduction in research and development budgets and government funding may result in reduced sales.

Our customers include researchers at pharmaceutical and biotechnology companies, academic institutions, and government and private laboratories. Fluctuations in the research and development budgets of these organizations could have a significant adverse effect on demand for our products. Research and development budgets are affected by changes in available resources, the mergers of pharmaceutical and biotechnology companies, changes in spending priorities and institutional budgetary policies. Our results of operations could be adversely affected by any significant decrease in expenditures for life sciences research and development by pharmaceutical and biotechnology companies, academic institutions, and government and private laboratories. In addition, short-term changes in administrative, regulatory or purchasing-related procedures can create uncertainties or other impediments that can have an adverse impact on our results of operations.

In recent years, the pharmaceutical and biotechnology industries have undergone substantial restructuring and consolidation. Additional mergers or consolidation within the pharmaceutical and biotechnology industries could cause us to lose existing customers and potential future customers, which could have a material adverse impact on our results of operations.

Approximately 23% of our sales are generated from demand for our products used in the Academia customer class by researchers at universities, government laboratories and private foundations, and whose funding is dependent upon grants from government agencies, such as the NIH. Although the level of research funding has been increasing in recent years, we cannot assure you that this trend will continue given federal and state budget constraints. Government funding of research and development is subject to the political process, which is inherently unpredictable. Future sales may be adversely affected if our customers delay purchases as a result of uncertainties regarding the approval of government or industrial budget proposals. Also, government proposals to reduce or eliminate budgetary deficits have sometimes included reduced allocations to the NIH and government agencies in other countries that fund life sciences research and development activities. A reduction in government funding for the NIH or government research agencies in other countries could have a serious adverse impact on our results of operations.

Competition could reduce our sales.

The markets for most of our pre-analytical solutions and other products are very competitive. Competitors may have significant advantages in financial, operational, sales and marketing resources as well as experience in research and development. These competitors may have developed, or could develop in the future, new technologies that compete with our products or even render our products obsolete. Some competitors may obtain regulatory approval from the FDA or similar non-U.S. authorities and market approved products. Our competitors' development of alternative products offering superior technology, greater cost-effectiveness or regulatory approval could have a material adverse effect on our sales and results of operations.

The growth of our business depends in part on the continued conversion of users from competitive products to our sample and assay technologies and other solutions. Lack of conversion could have a material adverse effect on our sales and results of operations.

It can be difficult for users of sample and assay technologies to switch from their current supplier of a particular product, primarily due to the time and expense required to properly integrate new products into their operations. As a result, if we are unable to be the first to develop and supply new products, our competitive position may suffer, resulting in a material adverse effect on our sales and results of operations.

For our commercial clinical assays, we often compete with solutions developed by our laboratory customers, and driving conversion from such laboratory-developed tests to commercial diagnostics assays can be challenging.

The time and expense needed to obtain regulatory approval and respond to changes in regulatory requirements could adversely affect our ability to commercially distribute our products and generate sales.

We and our customers operate in a highly regulated environment characterized by frequent changes in the governing regulatory framework. Genetic research activities and products commonly referred to as "genetically engineered" (such as certain food and therapeutic products) are subject to extensive governmental regulation in most developed countries, especially in the major markets for pharmaceutical and diagnostic products such as the European Union, the U.S., China and Japan. In recent years, several highly publicized scientific events (notably in genomic research, gene editing and cloning) have prompted intense public debates on the ethical, philosophical and religious implications of an unlimited expansion in genetic research and the use of products emerging from this research. As a result of this debate, some key countries may increase or establish regulatory barriers, which could adversely affect demand for our products and prevent us from fulfilling our growth expectations. Furthermore, there can be no assurance that any future changes in applicable regulations will not require further expenditures or an alteration, suspension or liquidation of our operations in certain areas, or even in their entirety.

Changes in the existing regulations or adoption of new requirements or policies could adversely affect our ability to sell our approved or cleared products or to seek approvals for new products in other countries around the world. Sales of certain products now in development may be dependent upon us successfully conducting pre-clinical studies, clinical trials and other tasks required to gain regulatory approvals and meet other requirements from the FDA in the U.S., and regulatory agencies in other countries. If we are not able to meet the applicable requirements, we will not be able to commercialize our products and tests, which will have a material adverse effect on our business.

Several of our key products and programs are medical devices that are subject to extensive regulation by the FDA under the U.S. Food, Drug and Cosmetic Act. We plan to apply for FDA clearance or approval of additional products in the future. Regulatory agencies in other countries also have medical device and IVD approval requirements that are becoming more extensive. These regulations govern most commercial activities associated with medical devices, including indications for the use of these products as well as other aspects that include product development, testing, manufacturing, labeling, storage, record-keeping, advertising and promotion. Compliance with these regulations is expensive and time-consuming.

Our cleared or approved devices, including diagnostic tests and related equipment, are subject to numerous post-approval requirements. We are subject to inspection and marketing surveillance by the FDA to determine our compliance with regulatory requirements. If the FDA determines that we have failed to comply, it can institute a wide variety of enforcement actions, ranging from warning letters to more severe sanctions such as fines, injunctions and civil penalties, recalls or seizures of our products, operating restrictions, partial suspension or total shutdown of production, denial of our requests for 510(k) clearance or pre-market approval of product candidates, withdrawal of 510(k) clearance or pre-market approval already granted and civil or criminal prosecution. Any enforcement action by the FDA may affect our ability to commercially distribute these products in the U.S.

Some of our products are sold for research purposes in the U.S. We do not promote these products for clinical diagnostic use, and they are labeled "For Research Use Only" (RUO) or "for molecular biology applications." If the FDA were to disagree with our designation of a product as an RUO product, we could be forced to stop selling it until appropriate regulatory clearance or approval has been obtained.

Changes in tax laws or their application or the termination or reduction of certain government tax incentives, could adversely impact our overall effective tax rate, results of operations or financial flexibility.

Our effective tax rate reflects the benefit of some income being partially exempt from income taxes due to various intercompany operating and financing activities. The benefit also derives from our global operations, where certain income or loss is taxed at rates higher or lower than The Netherlands' statutory rate of 25%. Changes in tax laws or their application with respect to matters such as changes in tax rates, transfer pricing and income allocation, utilization of tax loss carryforwards, intercompany dividends, controlled corporations, and limitations on the deductibility of interest and foreign related-party expenses, and changes to tax credit mechanisms, could increase our effective tax rate and adversely affect our results of operations and limit our ability to repurchase our Common Shares without experiencing adverse tax consequences. The increased tax burden as a result of changes in law may adversely affect our results of operations. Additionally, if our tax positions are challenged by tax authorities or other governmental bodies, such as the European Commission, we could incur additional tax liabilities, which could have an adverse effect on our results of operations or financial flexibility.

We are subject to risks associated with patent litigation.

The biotechnology industry has been characterized by extensive litigation regarding patents and other intellectual property rights, particularly since industry competitors gravitate around common technology platforms. We are aware that patents have been applied for and/or issued to third parties claiming technologies for sample and assay technologies that are closely related to those we use. From time to time, we receive inquiries requesting confirmation that we do not infringe patents of third parties. We endeavor to follow developments in this field, and we do not believe that our technologies or products infringe any proprietary rights of third parties. However, there can be no assurance that third parties will not challenge our activities or, if so challenged, that we will prevail. In addition, the patent and proprietary rights of others could require that we alter our products or processes, pay licensing fees or cease certain activities, and there can be no assurance that we will be able to license any technologies that we may require on acceptable terms. In addition, litigation, including proceedings that may be declared by the U.S. Patent and Trademark Office or the International Trade Commission, may be necessary to respond to any assertions of infringement, enforce our patent rights and/or determine the scope and validity of our proprietary rights or those of third parties. Litigation, or threatened litigation, could involve substantial cost, and there can be no assurance that we would prevail in any proceedings.

We rely on collaborative commercial relationships to develop and/or market some of our products.

Our long-term business strategy involves entering into strategic alliances as well as marketing and distribution arrangements with academic, corporate and other partners relating to the development, commercialization, marketing and distribution of certain of our existing and potential products. In 2017, we entered a new joint venture with Sichuan Maccura Biotechnology Co., Ltd. (Maccura) for the distribution of our GeneReader NGS System in China and entered a new partnership with a Chinese company in 2018 that took over the commercial distribution and infrastructure of the HPV test franchise in China. We may be unable to continue to negotiate these collaborative arrangements on acceptable terms, and these relationships also may not be scientifically or commercially successful. In addition, we may be unable to maintain these relationships, and our collaborative partners may pursue or develop competing products or technologies, either on their own or in collaboration with others.

Our Precision Medicine business includes projects with pharmaceutical and biotechnology companies to co-develop companion diagnostics paired with drugs that those companies either market currently or are developing for future use. The success of these co-development programs, including regulatory approvals for the companion diagnostics, depends upon the continued commitment of our partners to development of their drugs, the outcome of clinical trials for the drugs and diagnostics, and regulatory approvals of the tests and drugs. In addition, the future level of sales for companion diagnostics depends to a high degree on the commercial success of the related medicines for which the tests have been designed. More companion diagnostics would be sold in combination with a widely prescribed drug than one with limited use.

The successful marketing of QIAGEN products, in some cases, depends on commercial relationships such as joint ventures or distributorships, particularly in emerging markets where we partner with local companies to augment our less-established commercial relationships and infrastructure. The continued commitment of our partners to these ventures, as well as the management of the commercial efforts, will influence QIAGEN's sales and profitability in these markets.

We have made investments in and are expanding our business into emerging markets, which exposes us to risks.

Our top seven emerging markets are Brazil, Russia, India, China, South Korea, Mexico and Turkey, which together accounted for approximately 16% of total sales in 2018, and we expect to continue to focus on expanding our business in these or other fast-growing markets, including those in the Middle East and Asia. In addition to the currency and operating risks described above, our international operations are subject to a variety of risks that

include those arising out of the economy, political outlook, language and cultural barriers in countries where we have operations or do business. In many of these emerging markets, we may be faced with several risks that are more significant than in other countries in which we have a history of doing business. These risks include economies that may be dependent on only a few products and are therefore subject to significant fluctuations, weak legal systems which may affect our ability to enforce contractual rights, exchange controls, unstable governments, and privatization or other government actions affecting the flow of goods and currency. In conducting our business, we move products from one country to another and may provide services in one country from a subsidiary located in another country. Accordingly, we are vulnerable to abrupt changes in customs and tax regimes that could have significant negative impacts on our results of operations.

Some of our customers are requiring us to change our sales arrangements to lower their costs, and this may limit our pricing flexibility and harm our business.

Some of our customers have developed purchasing initiatives to reduce the number of vendors from which they purchase products to lower their supply costs. In some cases, these customers have established agreements with large distributors, which include discounts and direct involvement in the distributor's purchasing process. These activities may force us to supply large distributors with our products at discounts in order to continue providing products to some customers. For similar reasons, many larger customers, including the U.S. government, have requested, and may request in the future, special pricing arrangements, which can include blanket purchase agreements. These agreements may limit our pricing flexibility, which could harm our business and affect our results of operations. For a limited number of customers, and at the customers' request, we have conducted sales transactions through distribution and other value-added partners. If sales grow through these intermediaries, it could have an adverse impact on our results of operations, particularly a negative impact on our gross profit.

We are subject to privacy and data security laws and rely on secure communication and information systems which, in the event of a breach or failure, expose us to risks.

We rely heavily on communications and information systems to conduct our business. In the ordinary course of business, we collect and store sensitive data, including our intellectual property and other proprietary business information and that of our customers, suppliers and business partners, and personally identifiable information of our customers and employees, in our data centers and on our networks. Our operations rely on the secure processing, storage and transmission of confidential and other information on our computer systems and networks. We are transforming to a digital, cloud-leveraging organization, which places our assets, customer data, and personally identifiable data at a higher risk than in previous years. We have made significant investments to ensure our employees are aware of cybersecurity risks facing our company and how to prevent data breaches, including but not limited to, mandatory yearly trainings that are continually updated. We have modernized our cyber security tools, and are continually modernizing our cybersecurity processes, in an attempt to keep pace with evolving cybersecurity risks. In spite of our efforts, we are unable to completely eliminate these risks and occasionally experience minor cybersecurity incidents. External phishing emails (occurring outside of our computer services) are a growing threat that our customers are facing. These emails could lead to the disclosing of intellectual property or personally identifiable information, which could lead to financial harm or reputational damage. While our cybersecurity team works diligently with our customers to mitigate these threats by helping to identify and analyze phishing emails, we cannot guarantee that sensitive data will not be lost or stolen.

A breach in cybersecurity due to unauthorized access to our computer systems or misuse could include the misappropriation of assets or sensitive information, the corruption data or other operational disruption. Failures to our computer systems and networks could be caused by internal or external events, such as incursions by intruders or hackers, computer viruses, failures in hardware or software, or cyberterrorists. If we do experience a breach or failure of our systems, we could experience operational delays resulting from the disruption of systems, loss due to

theft or misappropriation of assets or data, or negative impacts from the loss of confidential data or intellectual property. We may face significant liability in the event any of the personal information we maintain is lost or otherwise subject to misuse or other wrongful use, access or disclosure. Further, we could experience negative publicity resulting in reputation or brand damage with customers or partners.

Additionally, we are subject to privacy and data security laws across multiple jurisdictions, including those relating to the storage of health information, which are complex, overlapping and rapidly evolving. For example, the California Consumer Privacy Act of 2018, set to take effect on January 1, 2020, imposes expansive new requirements and protections upon the processing of personal data, aimed at giving California consumers more visibility and control over their personal information. There are also non-U.S. privacy laws, such as the General Data Protection Regulation (GDPR) of the European Union, that impose restrictions on the transfer, access, use, and disclosure of health and other personal information. We implemented the requirements set forth by the European Union General Data Protection Regulation (GDPR), which took effect on May 25, 2018. As our activities continue to evolve and expand, we may be subject to additional laws which impose further restrictions on the transfer, access, use, and disclosure of health and other personal information which may impact our business either directly or indirectly. A failure to comply with applicable privacy or security laws or significant changes in these laws could significantly impact our business and future business plans. For example, we may be subject to regulatory action or lawsuits in the event we fail to comply with applicable privacy laws.

Exchange rate fluctuations may adversely affect our business and operating results.

Because we currently market our products throughout the world, a significant portion of our business is conducted in currencies other than the U.S. dollar, our reporting currency. As a result, fluctuations in value relative to the U.S. dollar of the currencies in which we conduct our business have caused and will continue to cause foreign currency transaction gains and losses. Foreign currency transaction gains and losses arising from normal business operations are charged against earnings in the period when incurred. Due to the number of currencies involved, the variability of currency exposures and the potential volatility of currency exchange rates, we cannot predict the effects of future exchange rate fluctuations. While we may engage in foreign exchange hedging transactions to manage our foreign currency exposure, there can be no assurance that our hedging strategy will adequately protect our operating results from the effects of future exchange rate fluctuations.

Our global operations may be affected by actions of governments, global or regional economic developments, weather or transportation delays, natural disasters or other force majeure events (collectively, unforeseen events) which may negatively impact our suppliers, our customers or us.

Our business involves operations around the world. Our consumable manufacturing facilities are located in Germany, the U.S. and China. We have established sales subsidiaries in numerous countries and our products are sold through independent distributors serving more than 40 additional countries. Our facilities may be harmed by unforeseen events, and in the event that we or our customers are affected by a disaster, we may experience delays or reductions in sales or production, increased costs, or may be required to identify alternate suppliers and/or rely on third-party manufacturers.

To the extent that our suppliers are impacted by a natural disaster or other disruption, we may experience periods of reduced production. Any unexpected interruptions in our production capabilities may lead to delayed or lost sales and may adversely affect our results of operations for the affected period.

In addition, to the extent we temporarily shut down any facility following such an unforeseen event, we may experience disruptions in our ability to manufacture or ship products to customers or otherwise operate our business. Many of our products are manufactured in a single location and we may experience adverse effects to the extent

these manufacturing operations are disrupted. While our global operations give us the ability to ship product from alternative sites, we may not be able to do so because our customers' facilities are shut down or the local logistics infrastructure is not functioning, and our sales will suffer.

Damage to our property due to unforeseen events and the disruption of our business from casualties may be covered by insurance, but this insurance may not be sufficient to cover all of our potential losses, and such insurance may not continue to be available to us on acceptable terms, or at all. In addition, we may incur incremental costs following an unforeseen event, which will reduce profits and adversely affect our results of operations.

We depend on suppliers for materials used to manufacture our products, and if shipments from these suppliers are delayed or interrupted, we may be unable to manufacture our products.

We buy materials to create our products from a number of suppliers and are not dependent on any one supplier or group of suppliers for our business as a whole. However, key components of certain products, including certain instrumentation and chemicals, are available only from a single source. If supplies from these vendors are delayed or interrupted for any reason, we may not be able to obtain these materials timely or in sufficient quantities or qualities to produce certain products, and this could have an adverse impact on our results of operations.

We heavily rely on air cargo carriers and other overnight logistics services, and shipping delays or interruptions could harm our business.

Our customers in the scientific research markets typically keep only a modest inventory of our products on hand, and consequently require overnight delivery of purchases. As a result, we heavily rely on air cargo carriers and logistic suppliers. If overnight services are suspended or delayed, and other delivery carriers and logistic suppliers cannot provide satisfactory services, customers may suspend a significant amount of their work. The lack of adequate delivery alternatives would have a serious adverse impact on our results of operations.

Our success depends on the continued employment of qualified personnel, any of whom we may lose at any time.

Although we have not experienced any difficulties attracting or retaining management and scientific staff, our ability to recruit and retain qualified, skilled employees will continue to be critical to our success. Given the intense competition for experienced scientists and managers among pharmaceutical and biotechnology companies, as well as academic and other research institutions, there can be no assurance that we will be able to attract and retain employees critical to our success on acceptable terms. Initiatives to expand QIAGEN will also require additional employees, including management with expertise in areas such as research and development, manufacturing, digitization, sales and marketing, and the development of existing managers to lead a growing organization. The failure to recruit and retain qualified employees, or develop existing employees, could have a material adverse impact on our results of operations.

Our ability to accurately forecast our results during each quarter may be negatively impacted by the fact that a substantial percentage of our sales may be recorded in the final weeks or days of the quarter.

The markets we serve are typically characterized by a high percentage of purchase orders being received in the final few weeks or days of each quarter. Although this varies from quarter to quarter, many customers make a large portion of their purchase decisions late in each quarter, in particular because they receive new information during this period on their budgets and requirements. Additionally, volatility in the timing of milestones from companion diagnostic partnerships can be difficult to predict. As a result, even late in each quarter, we cannot predict with certainty whether our sales forecasts for the quarter will be achieved.

Historically, we have been able to rely on the overall pattern of customer purchase orders during prior periods to project with reasonable accuracy our anticipated sales for the current or coming quarters. However, if customer purchasing trends during a quarter vary from historical patterns as may occur with changes in market conditions, our quarterly financial results could deviate significantly from our projections. As a result, our sales forecasts for any given quarter may prove not to have been accurate. We also may not have sufficient, timely information to confirm or revise our sales projections for a specific quarter. If we fail to achieve our forecasted sales for a particular quarter, the value of our Common Shares could be adversely affected.

We have a significant amount of debt that may adversely affect our financial condition and flexibility.

We have a significant amount of debt and debt service obligations as well as restrictive covenants imposed by our lenders. A high level of indebtedness increases the risk that we may default on our debt obligations and restrictive covenants may prevent us from borrowing additional funds. There is no assurance that we will be able to generate sufficient cash flow to pay the interest on our debt and comply with our debt covenants or that future working capital, borrowings or equity financing will be available to repay or refinance our debt. If we are unable to generate sufficient cash flow to pay the interest on our debt and comply with our debt covenants, we may have to delay or curtail our research and development programs. The level of our indebtedness could, among other things:

- › make it difficult for us to make required payments on our debt;
- › make it difficult for us to obtain financing in the future necessary for working capital, capital expenditures, debt service requirements or other purposes;
- › limit our flexibility in planning for, or reacting to, changes in our business and the industry in which we compete; and
- › make us more vulnerable in the event of a downturn in our business.

The Financial Conduct Authority of the United Kingdom plans to phase out the London Interbank Offered Rate (LIBOR) by the end of 2021. Presently, we do hold debt and derivative instruments which use LIBOR. While certain of these agreements do contain language for the determination of interest rates in the event the LIBOR rate is not available, changes to these agreements may be required and we could be negatively impacted by any newly determined alternative benchmark.

Our business may require substantial additional capital, which we may not be able to obtain on terms acceptable to us, if at all.

Our future capital requirements and level of expenses will depend upon numerous factors, including the costs associated with:

- › marketing, sales and customer support efforts;
- › research and development activities;
- › expansion of our facilities;
- › consummation of possible future acquisitions of technologies, products or businesses;
- › demand for our products and services;

- › repayment or refinancing of debt; and
- › payments in connection with our hedging activities and/or taxes.

We currently anticipate that our short-term capital requirements will be satisfied by cash flow from our operations and/or cash on hand. As of December 31, 2018, we had outstanding long-term debt of approximately \$2.2 billion, of which \$503.1 million was current. Furthermore, as of December 31, 2018, we had capital lease obligations, including the current portion, of \$0.1 million, that expire in various years through 2020. We may need to refinance all or part of these liabilities before or at their contractual maturities.

If at some point in time our existing resources should be insufficient to fund our activities, we may need to raise funds through public or private debt or equity financings. The funds for the refinancing of existing liabilities or for the ongoing funding of our business may not be available or, if available, not on terms acceptable to us. If adequate funds are not available, we may be required to reduce or delay expenditures for research and development, production, marketing, capital expenditures and/or acquisitions, which could have a material adverse effect on our business and results of operations. To the extent that additional capital is raised through the sale of equity or convertible securities, the issuance of any securities could result in dilution to our shareholders.

The accounting for the cash convertible notes we have issued will result in recognition of interest expense significantly greater than the stated interest rate of the notes and may result in volatility to our Consolidated Statements of Income.

We will settle any conversions of the Cash Convertible Notes described under the heading "Other Factors Affecting Liquidity and Capital Resources" elsewhere in this report, entirely in cash. Accordingly, the conversion option that is part of the Cash Convertible Notes will be accounted for as a derivative pursuant to accounting standards relating to derivative instruments and hedging activities. Refer to Note 13 "Derivatives and Hedging" and Note 15 "Lines of Credit and Debt" , of the Notes to Consolidated Financial Statements. In general, this resulted in an initial valuation of the conversion option separate from the debt component of the Cash Convertible Notes, resulting in an original issue discount. The original issue discount will be accreted to interest expense over the term of the Cash Convertible Notes, which will result in an effective interest rate reported in our financial statements significantly in excess of the stated coupon rates of the Cash Convertible Notes. This accounting treatment will reduce our earnings. For each financial statement period after the issuance of the Cash Convertible Notes, a gain (or loss) will be reported in our financial statements to the extent the valuation of the conversion option changes from the previous period. The Call Options issued in connection with the Cash Convertible Notes will also be accounted for as derivative instruments, substantially offsetting the gain (or loss) associated with changes to the valuation of the conversion option. This may result in increased volatility to our results of operations.

The cash convertible note hedge and warrant transactions we entered into in connection with the issuance of our Cash Convertible Notes may not provide the benefits we anticipate, and may have a dilutive effect on our common stock.

Concurrently with the issuance of the Cash Convertible Notes, we entered into Call Options and issued Warrants. We entered into the Call Options with the expectation that they would offset potential cash payments by us in excess of the principal amount of the Cash Convertible Notes upon conversion of the Cash Convertible Notes. In the event that the hedge counterparties fail to deliver potential cash payments to us, as required under the Call Options, we would not receive the benefit of such transaction. Separately, we also issued Warrants. The Warrants could separately have a dilutive effect to the extent that the market price per share of our common stock, as measured under the terms of the Warrants, exceeds the strike price of the Warrants.

An impairment of goodwill and intangible assets could reduce our earnings.

At December 31, 2018, our consolidated balance sheet reflected approximately \$2.1 billion of goodwill and approximately \$475.0 million of intangible assets. Goodwill is recorded when the purchase price of a business exceeds the fair value of the tangible and separately measurable intangible net assets. U.S. generally accepted accounting principles (U.S. GAAP) require us to test goodwill for impairment on an annual basis or when events or circumstances occur indicating that goodwill might be impaired. Long-lived assets, such as intangible assets with finite useful lives, are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. The impairment review often cannot be done at the level of the individual asset and it must instead be applied to a group of assets. For the purpose of our annual goodwill impairment testing based on the current circumstances of how we manage our business, this group of assets is the Company as a whole. If we determine that any of our goodwill or intangible assets were impaired, we will be required to take an immediate charge to earnings and our results of operations could be adversely affected.

Our strategic equity investments may result in losses.

We have made, and may continue to make, strategic investments in businesses as opportunities arise. We periodically review the carrying value of these investments for impairment, considering factors that include the most recent stock transactions, book values from the most recent financial statements, and forecasts and expectations of the investee. The results of these valuations may fluctuate due to market conditions and other conditions over which we have no control.

Estimating the fair value of non-marketable equity investments in life science companies is inherently subjective. If actual events differ from our assumptions and unfavorable fluctuations in the valuations of the investments are indicated, we could be required to write down the investment. This could result in future charges on our earnings that could materially adversely affect our results of operations. It is uncertain whether or not we will realize any long-term benefits from these strategic investments.

Doing business internationally creates certain risks.

Our business involves operations in several countries outside of the U.S. Our consumable manufacturing facilities are located in Germany, China and the U.S. We source raw materials and subcomponents to manufacture our products from different countries. We have established sales subsidiaries in many countries. In addition, our products are sold through independent distributors serving more than 40 other countries. Conducting and launching operations on an international scale requires close coordination of activities across multiple jurisdictions and time zones and consumes significant management resources. We have invested heavily in computerized information systems in order to manage more efficiently the widely dispersed components of our operations. If we fail to coordinate and manage these activities effectively, our business and results of operations will be adversely affected.

Our operations are subject to other risks inherent in international business activities, such as general economic conditions in the countries in which we operate, trade restrictions and changes in tariffs, longer accounts receivable payment cycles in certain countries, overlap of different tax structures, unexpected changes in regulatory requirements, and compliance with a variety of foreign laws and regulations. Other risks associated with international operations include import and export licensing requirements, exchange controls and changes in freight rates, as may occur as a result of rising energy costs. As a result of these conditions, an inability to successfully manage our international operations could have a material adverse impact on our business and results of operations.

Unethical behavior and non-compliance with laws by our sales agents, consultants, distributors or employees could seriously harm our business.

Our business in countries with a history of corruption and transactions with foreign governments increases the risks associated with our international activities. Based on our international operations, we are subject to the U.S. Foreign Corrupt Practices Act (FCPA), the U.K. Bribery Act and other laws that prohibit improper payments or offers of payments to foreign governments and their officials and political parties by business entities for the purpose of obtaining or retaining business. We have operations, agreements with third parties and sales in countries known to experience corruption. Further international expansion may involve increased exposure to such practices. Our activities in these countries and others create risks of unauthorized payments or offers of payments, non-compliance with laws, or other unethical behavior by any of our employees, consultants, sales agents or distributors, that could be in violation of various laws, including the FCPA, even though these parties are not always subject to our control. Our policy is to implement safeguards to discourage these or other unethical practices by our employees and distributors including online and in-person employee trainings, periodic internal audits and standard reviews of our distributors. However, our existing safeguards and any future improvements may not prove to be effective, and our employees, consultants, sales agents or distributors may engage in conduct for which we might be held responsible. Violations of the FCPA and other laws may result in criminal or civil sanctions, which could be severe, and we may be subject to other liabilities, which could negatively affect our business, results of operations and financial condition.

We depend on patents and proprietary rights that may fail to protect our business.

Our success depends to a large extent on our ability to develop proprietary products and technologies and to establish and protect our patent and trademark rights in these products and technologies. As of December 31, 2018, we owned 340 issued patents in the United States, 277 issued patents in Germany and 1,786 issued patents in other major industrialized countries. In addition, at December 31, 2018, we had 576 pending patent applications, and we intend to file applications for additional patents as our products and technologies are developed. The patent positions of technology-based companies involve complex legal and factual questions and may be uncertain, and the laws governing the scope of patent coverage and the periods of enforceability of patent protection are subject to change. In addition, patent applications in the United States are maintained in secrecy until patents issue, and publication of discoveries in the scientific or patent literature tends to lag behind actual discoveries by several months. Therefore, no assurance can be given that patents will issue from any patent applications that we own or license, or if patents do issue, that the claims allowed will be sufficiently broad to protect our technology. In addition, no assurance can be given that any issued patents that we own or license will not be challenged, invalidated or circumvented, or that the rights granted thereunder will provide us competitive advantages. Further, as issued patents expire, we may lose some competitive advantage as others develop competing products and as a result, we may lose revenue.

Certain of our products incorporate patents and technologies that are licensed from third parties and for certain products, these in-licensed patents together with other patents provide us with a competitive advantage. These licenses impose various commercialization, sublicensing and other obligations on us. Our failure to comply with these requirements could result in the conversion of the applicable license from being exclusive to non-exclusive or, in some cases, termination of the license, and as a result, we may lose some competitive advantage and experience a loss of revenue.

We also rely on trade secrets and proprietary know-how, which we seek to protect through confidentiality agreements with our employees and consultants. There can be no assurance that any confidentiality agreements that we have with our employees, consultants, outside scientific collaborators and sponsored researchers and other advisors will provide meaningful protection for our trade secrets or adequate remedies in the event of unauthorized use or disclosure of such information. There also can be no assurance that our trade secrets will not otherwise become known or be independently developed by competitors.

We currently engage in, and may continue to engage in, collaborations with academic researchers and institutions. There can be no assurance that under the terms of such collaborations, third parties will not acquire rights in certain inventions developed during the course of these collaborations.

Our business exposes us to potential product liability.

The marketing and sale of our products and services for certain applications entail a potential risk of product liability. Although we are not currently subject to any material product liability claims, product liability claims may be brought against us in the future. Further, there can be no assurance that our products will not be included in unethical, illegal or inappropriate research or applications, which may in turn put us at risk of litigation. We carry product liability insurance coverage, which is limited in scope and amount. There can be no assurance that we will be able to maintain this insurance at a reasonable cost and on reasonable terms, or that this insurance will be adequate to protect us against any or all potential claims or losses.

We are subject to various laws and regulations generally applicable to businesses in the different jurisdictions in which we operate, including laws and regulations applicable to the handling and disposal of hazardous substances. The risk of accidental contamination or injury from these materials cannot be completely eliminated. In the event of such an accident, we could be held liable for any damages that result, and any such liability could have a material adverse impact on us.

Our operating results may vary significantly from period to period and this may affect the market price of our Common Shares.

Our operating results may vary significantly from quarter to quarter, and also year to year, since they are dependent upon a broad range of factors that include demand for our products, the level and timing of customer research budgets and commercialization efforts, the timing of government funding budgets of our customers, the timing of our research and development activities and related regulatory approvals, the impact of sales and marketing expenses, restructuring activities, introduction of new products by us or our competitors, competitive market conditions, exchange rate fluctuations and general economic conditions. Our expense levels are based in part on our expectations as to future sales trends. As a result, sales and earnings may vary significantly from quarter to quarter or from year to year, and actual sales and earnings results in any one period will not necessarily be indicative of results to be anticipated in subsequent periods. Our results may also fail to meet or exceed the expectations of securities analysts or investors, which could cause a decline in the market price of our Common Shares.

Our holding company structure makes us dependent on the operations of our subsidiaries.

QIAGEN N.V. is incorporated under Dutch law as a public limited liability company (naamloze vennootschap), and is organized as a holding company. Currently, the material assets are the outstanding shares of the QIAGEN subsidiaries, intercompany receivables and other financial assets such as cash, short-term investments and derivative instruments. As a result, QIAGEN N.V. is dependent upon payments, dividends and distributions from the subsidiaries for funds to pay operating and other expenses as well as to pay future cash dividends or distributions, if any, to holders of our Common Shares. Dividends or distributions by subsidiaries in a currency other than the U.S. dollar may result in a loss upon a subsequent conversion into U.S. dollars.

Our Common Shares may have a volatile public trading price.

The market price of our Common Shares since our initial public offering in September 1996 has increased significantly and been highly volatile. In the last two years, the price of our Common Shares has ranged from a high of \$39.45 to a low of \$27.40 on NASDAQ to January 9, 2018 and the New York Stock Exchange (NYSE) from January 10, 2018, and a high of €34.05 to a low of €25.22 on the Frankfurt Stock Exchange. In addition to overall stock market fluctuations, factors that may have a significant impact on the price of our Common Shares include:

- › announcements of technological innovations or the introduction of new products by us or our competitors;
- › developments in our relationships with collaborative partners;
- › quarterly variations in our operating results or those of our peer companies;
- › changes in government regulations, tax laws or patent laws;
- › developments in patent or other intellectual property rights;
- › developments in government spending budgets for life sciences-related research;
- › general market conditions relating to the diagnostics, applied testing, pharmaceutical and biotechnology industries; and
- › impact from foreign exchange rates.

The stock market has from time to time experienced extreme price and trading volume fluctuations that have particularly affected the market for technology-based companies. These fluctuations have not necessarily been related to the operating performance of these companies. These broad market fluctuations may adversely affect the market price of our Common Shares.

Holders of our Common Shares should not expect to receive dividend income.

In January 2017 we completed a synthetic share repurchase that combined a direct capital repayment with a reverse stock split, and in early 2018 we announced plans to return up to an additional \$200.0 million through open-market purchases. We do not anticipate paying any cash dividends on our Common Shares for the foreseeable future, and until the January 2017 distribution in connection with a synthetic share repurchase, we have not paid cash dividends since our inception. Although we do not anticipate paying any cash dividends on a regular basis, the distribution of any cash dividends in a currency other than the U.S. dollar will be subject to the risk of foreign currency transaction losses. Investors should not invest in our Common Shares if they are seeking dividend income; the only return that may be realized through investing in our Common Shares would be through an appreciation in the share price.

Holders of our Common Shares may not benefit from continued stock repurchase programs.

In January 2017, we completed a synthetic share repurchase that combined a direct capital repayment with a reverse stock split. The transaction was announced in August 2016 and involved an approach used by various large, multinational Dutch companies to provide returns to all shareholders in a faster and more efficient manner than traditional open-market purchases. \$243.9 million was returned to shareholders through the transaction, which reduced the total number of issued common shares by approximately 3.7% or 8.9 million shares as of January 31, 2017.

The purpose of our share repurchases has been to hold the shares in treasury in order to satisfy obligations from exchangeable debt instruments, warrants and/or employee share-based remuneration plans and thus to reduce dilution to existing holders of our Common Shares. We may decide not to continue such programs in the future, our covenants with lenders may limit our ability to use available cash to do so, or the market price of our Common Shares may make such repurchases less desirable. In any of these cases, holders of our Common Shares may suffer dilution from conversion of our indebtedness or issuance of shares pursuant to employee remuneration plans that would otherwise be at least partially offset by repurchased shares.

 Future sales and issuances of our Common Shares could adversely affect our stock price.

Any future sale or issuance of a substantial number of our Common Shares in the public market, or any perception that a sale may occur, could adversely affect the market price of our Common Shares. Under Dutch law, a company can issue shares up to its authorized share capital provided for in its Articles of Association. Pursuant to our Articles of Association, our authorized share capital amounts to EUR 9.0 million, which is divided into 410.0 million common shares, 40.0 million financing preference shares and 450.0 million preference shares, with all shares having a EUR 0.01 par value. As of December 31, 2018, a total of approximately 225.5 million Common Shares were outstanding along with approximately 9.2 million additional shares reserved for issuance upon exercise or release of outstanding stock options and awards, of which 0.9 million were vested. A total of approximately 19.9 million Common Shares are reserved and available for issuances under our stock plans as of December 31, 2018, including the shares subject to outstanding stock options and awards. The majority of our outstanding Common Shares may be sold without restriction, except shares held by our affiliates, which are subject to certain limitations on resale. Additionally, the Warrants issued in connection with the Cash Convertible Notes Call Spread Overlays cover an aggregate of 46.3 million shares of our common stock (subject to customary adjustments under certain circumstances).

 Shareholders who are United States residents could be subject to unfavorable tax treatment.

We may be classified as a "passive foreign investment company," or a PFIC, for U.S. federal income tax purposes if certain tests are met. Our treatment as a PFIC could result in a reduction in the after-tax return to holders of Common Shares and would likely cause a reduction in the value of these shares. If we were determined to be a PFIC for U.S. federal income tax purposes, highly complex rules would apply to our U.S. shareholders. We would be considered a PFIC with respect to a U.S. shareholder if for any taxable year in which the U.S. shareholder held the Common Shares, either (i) 75% or more of our gross income for the taxable year is passive income; or (ii) the average value of our assets (during the taxable year) which produce or are held for the production of passive income is at least 50% of the average value of all assets for such year. Based on our income, assets and activities, we do not believe that we were a PFIC for U.S. federal income tax purposes for our taxable year ended December 31, 2018, and do not expect to be a PFIC for the current taxable year or any future taxable year. No assurances can be made, however, that the Internal Revenue Service will not challenge this position or that we will not subsequently become a PFIC.

Provisions of our Articles of Association and Dutch law and an option we have granted may make it difficult to replace or remove management and may inhibit or delay a takeover.

Our Articles of Association (Articles) provide that our shareholders may only suspend or dismiss our Managing Directors and Supervisory Directors against their wishes with a vote of two-thirds of the votes cast if such votes represent more than 50% of our issued share capital. If the proposal was made by the joint meeting of the Supervisory Board and the Managing Board, a simple majority is sufficient. The Articles also provide that if the members of our Supervisory Board and our Managing Board have been nominated by the joint meeting of the Supervisory Board and Managing Board, shareholders may only overrule this nomination with a vote of two-thirds of the votes cast if such votes represent more than 50% of our issued share capital.

Certain other provisions of our Articles allow us, under certain circumstances, to prevent a third party from obtaining a majority of the voting control of our Common Shares through the issuance of Preference Shares. Pursuant to our Articles and the resolution adopted by our General Meeting of Shareholders, our Supervisory Board is entitled to issue Preference Shares in case of an intended takeover of our company by (i) any person who alone or with one or more other persons, directly or indirectly, have acquired or given notice of an intent to acquire (beneficial) ownership of an equity stake which in aggregate equals 20% or more of our share capital then outstanding or (ii) an “adverse person” as determined by the Supervisory Board. If the Supervisory Board opposes an intended takeover and authorizes the issuance of Preference Shares, the bidder may withdraw its bid or enter into negotiations with the Managing Board and/or Supervisory Board and agree on a higher bid price for our Shares.

In 2004, we granted an option to the Stichting Preferente Aandelen QIAGEN, or the Foundation (Stichting), subject to the conditions described in the paragraph above, which allows the Foundation to acquire Preference Shares from us. The option enables the Foundation to acquire such number of Preference Shares as equals the number of our outstanding Common Shares at the time of the relevant exercise of the option, less one Preference Share. When exercising the option and exercising its voting rights on these Preference Shares, the Foundation must act in our interest and the interests of our stakeholders. The purpose of the Foundation option is to prevent or delay a change of control that would not be in the best interests of our stakeholders. An important restriction on the Foundation’s ability to prevent or delay a change of control is that a public offer must be announced by a third party before it can issue (preference or other) protective shares that would enable the Foundation to exercise rights to 30% or more of the voting rights without an obligation to make a mandatory offer for all shares held by the remaining shareholders. In addition, the holding period for these shares by the Foundation is restricted to two years, and this protective stake must fall below the 30% voting rights threshold before the two-year period ends.

MANAGEMENT REPORT

Performance Review

Our future operating results may be affected by various risk factors, many of which are beyond our control. Certain statements included in this Annual Report and the documents incorporated herein by reference may be forward-looking statements within the meaning of Section 27A of the U.S. Securities Act of 1933, as amended, and Section 21E of the U.S. Securities Exchange Act of 1934, as amended, including statements regarding potential future net sales, gross profit, net income and liquidity. 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. Reference is made in particular to the description of our plans and objectives for future operations, assumptions underlying such plans and objectives, and other forward-looking statements. 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. Factors which could cause such results to differ materially from those described in the forward-looking statements include those set forth in the risk factors below. As a result, our future success involves a high degree of risk. When considering forward-looking statements, you should keep in mind that the risk factors could cause our actual results to differ significantly from those contained in any forward-looking statement.

Results of Operations

Overview

We are a leading global provider of Sample to Insight solutions to transform biological materials into valuable molecular insights. QIAGEN sample technologies isolate and process DNA, RNA and proteins from any biological sample, such as blood or tissue. Assay technologies make these biomolecules visible and ready for analysis, such as identifying the DNA of a virus or a mutation of a gene. Bioinformatics solutions integrate software and cloud-based resources to interpret increasing volumes of biological data and report relevant, actionable insights. Our automation solutions tie these together in seamless and cost-effective molecular testing workflows.

We sell our products - consumables, automated instrumentation systems using those technologies, and bioinformatics to analyze and interpret the data - to four major customer classes:

- › **Molecular Diagnostics** - healthcare providers engaged in many aspects of patient care requiring accurate diagnosis and insights to guide treatment decisions in oncology, infectious diseases and immune monitoring
- › **Applied Testing** - government or industry customers using molecular technologies in non-healthcare fields, such as forensics and human identification
- › **Pharma** - pharmaceutical and biotechnology companies using molecular testing to support drug discovery, translational medicine and clinical development efforts
- › **Academia** - researchers exploring the secrets of life such as the mechanisms and pathways of diseases, and in some cases translating that research into drug targets or commercial applications

We market products in more than 130 countries, mainly through subsidiaries in markets we believe have the greatest sales potential in Europe, Asia, the Americas and Australia. We also work with specialized independent distributors and importers. As of December 31, 2018, we employed approximately 5,000 people in more than 35 locations worldwide.

Recent Acquisitions

We have made a number of strategic acquisitions and implemented other strategic transactions since 2016, aiming to achieve market-leading positions with innovative technologies in high-growth areas of molecular diagnostics and research. These transactions have enhanced our product offerings and technology platforms, as well as our geographic footprint. They include:

- › In April 2018, QIAGEN acquired STAT-Dx, a privately held company with a next-generation multiplex PCR system that enables fast, cost-effective and flexible syndromic testing. Following the acquisition, we launched the novel Sample to Insight system, known as QIAstat-Dx, in Europe, delivering one-step, fully integrated molecular analysis of widespread syndromes based on QIAGEN chemistries. The first two CE-IVD marked assays provide differential diagnosis of serious respiratory and gastrointestinal infections. FDA submission was completed in late 2018, and U.S. launch is expected in 2019. A broad menu of tests is under development for syndromes in infectious disease, oncology and other areas. QIAGEN acquired STAT-Dx for approximately \$149 million in cash and additional future payments of up to about \$44 million based on the achievement of regulatory and commercial milestones.
- › In September 2018, QIAGEN announced a strategic partnership with NeuMoDx Molecular, Inc. to commercialize two next-generation, fully integrated automation systems for PCR testing. The NeuMoDx 288 (high-throughput version) and NeuMoDx 96 (mid-throughput version) systems help clinical laboratories process increasing molecular test volumes and deliver more rapid diagnostic insights. QIAGEN is initially distributing the systems and related consumables in Europe and other major markets outside the United States, while NeuMoDx is currently distributing these instruments within the United States. The two companies entered into a merger agreement under which QIAGEN can acquire all NeuMoDx shares that it does not currently own at a price of approximately \$234 million (QIAGEN currently owns 19.9% of NeuMoDx), subject to regulatory and operational milestones. The systems offer a growing menu of in vitro diagnostic tests and the ability to flexibly and efficiently process both commercial and laboratory-developed tests.
- › In January 2019, QIAGEN announced plans to develop next-generation systems for digital PCR, one of the fastest-growing molecular testing applications in the life sciences industry, and acquired the digital PCR assets of Formulatrix, Inc., a developer of laboratory automation solutions. Combining the Formulatrix assets with QIAGEN technologies and automation, we expect to bring to market a fully integrated digital PCR solution with a targeted launch in 2020. The system will offer highly automated workflows, quicker time-to-result, and higher multiplexing and throughput flexibility than current digital PCR platforms. QIAGEN paid Formulatrix \$125 million in cash upon closing and agreed to future milestone payments of approximately \$136 million in 2020.
- › Also in January 2019, QIAGEN acquired N-of-One, Inc., a pioneer in molecular oncology decision support services, to strengthen our bioinformatics leadership in clinical NGS interpretation. The acquisition enables us to offer a broader range of software, content and service-based solutions. N-of-One's services and proprietary database will be integrated into QIAGEN Clinical Insight (QCI), adding medical interpretation and real-world evidence insights and offering robust decision support in oncology. N-of-One's somatic cancer database with more than 125,000 anonymized patient samples will further increase QIAGEN's lead as provider of the industry's largest genomics knowledge base.
- › In April 2018, QIAGEN took steps to streamline our presence in veterinary testing through a strategic partnership with Fidelio Capital, a Swedish firm with significant investments in animal health. QIAGEN transferred our portfolio of veterinary assays and the Leipzig site to INDICAL BIOSCIENCE GmbH, a new company created by Fidelio. Under the agreement, QIAGEN manufactures and supplies sample processing solutions for INDICAL.

- › QIAGEN entered into a joint venture in May 2017 with Sichuan Maccura Biotechnology Co., Ltd., a leading in vitro diagnostics company in China, to accelerate the growth of QIAGEN's GeneReader NGS System. Known as MAQGEN China and based in Chengdu, Sichuan Province, the venture will develop local adaptations, pursue regulatory paths for the GeneReader and leverage Maccura's broad customer network to expand the system's adoption in laboratories across China. Maccura owns 60% of the joint venture and QIAGEN owns 40%. QIAGEN's own operations in China continue as a stand-alone company, focusing on our other products and services for customers such as QuantiFERON-TB and the Life Sciences portfolio.
- › QIAGEN took steps in late 2017 to streamline its product portfolio in China and focus on growth areas by discontinuing commercialization of some non-core PCR tests and externalizing the HPV test franchise for cervical cancer screening in China to a third-party company. In January 2018, a partnership became effective with a Chinese company that has taken over R&D, commercial distribution, and the related QIAGEN employees and infrastructure of the HPV test franchise in China. QIAGEN is a minority shareholder of this company.
- › In January 2017, QIAGEN acquired OmicSoft Corporation, a privately held company based in the Research Triangle area of North Carolina, to expand our industry-leading bioinformatics offering with complementary solutions enabling scientists to visualize and mine large institutional and publicly available "omics" datasets. The OmicSoft software solutions meet a growing need in discovery and translational research to access and manage huge amounts of data on DNA, RNA and other biological variables generated by next-generation sequencing studies.
- › In 2016, QIAGEN acquired Exiqon A/S, a publicly traded company based in Vedbaek, Denmark, expanding our leadership position in Sample to Insight solutions for RNA analysis. Exiqon's RNA analysis solutions, with proprietary Locked Nucleic Acid (LNA) technology, are used by academic, biotech and pharmaceutical researchers worldwide to explore correlations between gene activity and the development of cancer and other diseases. In two steps during 2016, we paid a total of \$100.7 million for 100% of the shares of Exiqon. In 2017, Exiqon's product offering was fully integrated into QIAGEN, providing customers of both companies ready access to the combined portfolio of solutions.

Our financial results include the contributions of recent acquisitions and divestitures from their effective dates, as well as costs related to the transactions and integration of the acquired companies, such as the relocation and closure of certain facilities.

We determined that we operate as one business segment in accordance with ASC Topic 280, Segment Reporting. Our chief operating decision maker (CODM) makes decisions on business operations and resource allocation based on evaluations of the QIAGEN Group as a whole. Considering the acquisitions made during 2018, we determined that we still operate as one business segment. We provide certain revenue information by customer class to allow better insight into our operations. This information is estimated using certain assumptions to allocate revenue among the customer classes.

Year Ended December 31, 2018, Compared to 2017

Net Sales

In 2018, net sales grew 6% to \$1.50 billion compared to \$1.42 billion in 2017 reflecting our organic business expansion in both consumables and related revenues and instruments as well as growth due to the April 2018 acquisition of STAT-Dx Life, S.L. (STAT-Dx), a privately-held company developing the next generation of multiplex diagnostics for one-step, fully integrated molecular analysis of common syndromes using a novel system based on real-time PCR technology and proven QIAGEN chemistries. We experienced good volume gains across the consumables and related revenues portfolio (+6% / 88% of sales), while instrument sales (+7% / 12% of sales) were supported by solid placements of the QIASymphony automation system.

Customer classes: An overview of performance in QIAGEN's four customer classes:

Net sales by product category and customer class

| | Full-year 2018 | | |
|--------------------------------------|-----------------|----------|------------|
| | Sales (In \$ m) | % change | % of sales |
| Consumables and related revenues | \$ 1,315 | +6% | 88% |
| Instruments | \$ 186 | +7% | 12% |
| Molecular Diagnostics ⁽¹⁾ | \$ 732 | +7% | 49% |
| Applied Testing | \$ 137 | —% | 9% |
| Pharma | \$ 291 | +6% | 19% |
| Academia | \$ 342 | +6% | 23% |

(1) Includes companion diagnostic co-development revenues (\$58 million, +36%) and U.S. HPV sales (\$19 million, -33%, 1% of sales).

Molecular Diagnostics grew at a 7% rate due, in part, to the QuantiFERON-TB test delivering 21% growth and a record year in Precision Medicine supported by the expansion in revenues from companion diagnostic co-development projects. This more than offset the decline in U.S. HPV sales (\$19 million in 2018 as compared to \$28 million in 2017), the divestment of the HPV test franchise in China to a third party in January 2018, and the accelerated reduction of low-margin, third-party instrument service contracts during the final months of 2018 to ensure service capacity for several new instrument launches.

Applied Testing was impacted by the April 2018 divestment of the veterinary assays portfolio in addition to changes made during the later portion of 2018 to a third-party research and development project linked to this divestment. Excluding the impact of this divestment, Applied Testing grew due to expansion of the forensics portfolio in the Americas.

Pharma experienced 6% sales growth 2018 as a result of solid gains in both instruments and consumables during the course of the year with gains in the Americas and Europe, Middle East and Africa regions.

Academia was led by a strong performance in the Asia Pacific / Japan region during 2018 with overall robust growth in instrument revenues along with more modest growth for consumables.

Net sales by geographic region

| | Full-year 2018 | | |
|-------------------------------|-----------------|----------|------------|
| | Sales (In \$ m) | % change | % of sales |
| Americas | \$693 | +6% | 46% |
| Europe / Middle East / Africa | \$490 | +6% | 33% |
| Asia-Pacific / Japan | \$315 | +6% | 21% |

Top 7 emerging markets: Brazil, Russia, India, China, South Korea, Mexico and Turkey (\$246 million, +5%, 16% of sales)

Rest of world represented less than 1% of net sales.

Geographic regions: All geographic regions grew at solid single-digit rates in 2018. The Europe / Middle East / Africa region experienced improving trends in Italy, Switzerland and Turkey during the year in addition to benefits from the geographic expansion in the Middle East. The Asia-Pacific / Japan advanced due partially to improving

performance in Japan and China during the second half of 2018 despite a weaker performance in South Korea in part due to a 2017 QuantiFERON-TB tender in the country. The Americas advanced at a 6% rate due to gains in Latin America and Canada and the strong underlying U.S. performance after considering the decline in instrument service revenues in the Molecular Diagnostics customer class.

Gross Profit

Gross profit was \$1.0 billion, or 67% of net sales, in 2018, compared with \$922.6 million, or 65% of net sales, in 2017. Generally, our consumables and related products have a higher gross margin than our instrumentation products and service arrangements. Fluctuations in the sales levels of these products and services can result in changes in gross margin between periods. The 2018 growth in consumables contributed to the higher margin in 2018. Further, gross profit in 2018 was impacted by \$1.6 million in restructuring charges while 2017 was impacted by restructuring charges of \$4.4 million.

Amortization expense related to developed technology and patent and license rights, which have been acquired in business combinations, is included in cost of sales. The amortization expense on acquisition-related intangibles within cost of sales decreased to \$56.7 million in 2018 from \$72.7 million in 2017 reflecting the end of the amortization period of intangibles acquired in 2007. Acquisition-related intangible amortization may increase in the future should we make further acquisitions.

Research and Development

Research and development expenses increased by 5% to \$161.9 million (11% of net sales) in 2018, compared to \$154.1 million (11% of net sales) in 2017. The increase in research and development costs in 2018 reflects our ongoing investments in NGS and our life sciences portfolio, together with regulatory activity in support of new products. Research and development costs during 2018 also reflect incremental costs due to the acquisition of STAT-Dx in January 2018. Lower expense in 2017 includes a \$0.7 million reduction in costs as a result of forfeitures of share-based compensation. 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.

Sales and Marketing

Sales and marketing expenses increased by 4% to \$392.3 million (26% of net sales) in 2018 compared to \$375.6 million (26% of net sales) in 2017. Sales and marketing expenses were primarily associated with personnel, commissions, advertising, trade shows, publications, freight and logistics expenses, and other promotional expense. We experienced efficiencies due to a lower cost base following the realignment of marketing activities as part of restructuring projects which were offset by higher personnel costs, including the expansion into China and external services, as well as initiatives for new product launches. Sales and marketing expenses are primarily associated with personnel, commissions, advertising, trade shows, publications, freight and logistics expenses, and other promotional expenses. We anticipate that absolute sales and marketing costs will increase along with new product introductions and growth in sales of our products, but decrease as a percentage of sales.

General and Administrative, Restructuring, Integration and Other

General and administrative, restructuring, integration and other costs decreased by 29% to \$141.2 million (9% of net sales) in 2018 from \$200.1 million (14% of net sales) in 2017. The decrease in 2018 reflects lower litigation related charges which totaled \$10.5 million in 2018 as compared to \$45.3 million in 2017. Additionally, 2018 includes a \$4.8 million revaluation gain of a minority interest investment in connection with the acquisition as

discussed in Note 5 "Acquisitions and Divestitures" , and overall lower acquisition and integration costs which were partially offset higher compensation costs. As we further integrate the acquired companies and pursue other opportunities to gain efficiencies, we expect to continue to incur additional restructuring and business integration costs in 2019. Over time, we believe the restructuring and integration activities will reduce expenses as we improve efficiency in operations.

Acquisition-Related Intangible Amortization

Amortization expense related to developed technology and patent and license rights acquired in a business combination is included in cost of sales. Amortization of trademarks and customer base acquired in a business combination is recorded in operating expense under the caption "acquisition-related intangible amortization." Amortization expenses of intangible assets not acquired in a business combination are recorded within cost of sales, research and development, or sales and marketing line items based on the use of the asset.

During 2018, amortization expense on acquisition-related intangibles within operating expense decreased to \$39.0 million, compared to \$39.4 million in 2017. We expect acquisition-related intangible amortization will increase as a result of our future acquisitions.

Other Income (Expense)

Total other expense, net was \$40.8 million in 2018, compared to \$39.0 million in 2017. Total other expense, net is primarily the result of interest expense and other expense, partially offset by interest income.

For the year ended December 31, 2018, interest income increased to \$20.9 million from \$10.6 million in 2017. Interest income includes interest earned on cash, cash equivalents and short-term investments, income related to certain interest rate derivatives as discussed in Note 13 "Derivatives and Hedging" in the accompanying consolidated financial statements and other components including the interest portion of operating lease transactions.

Interest expense increased to \$67.3 million in 2018, compared to \$49.7 million in 2017. Interest costs primarily relate to debt, discussed in Note 15 "Lines of Credit and Debt" in the accompanying consolidated financial statements.

Other income, net was \$5.6 million for the year ended December 31, 2018. Other income includes \$13.1 million of upward adjustments resulting from observable price changes for non-marketable investments not accounted for under the equity method, a \$5.1 million gain from the sale of our interest in a non-publicly traded company and \$2.6 million in income from equity-method investments, all as discussed further in Note 10 "Investments" . Additionally in 2018, we recorded a divestiture gain of \$8.0 million as discussed in Note 5 "Acquisitions and Divestitures" . This income was partially offset by impairments, including \$6.1 million of impairments in non-marketable investments accounted for under the equity method as discussed further in Note 10 , and net losses on foreign currency of \$12.3 million for the year ended December 31, 2018.

Other expense, net for the year ended December 31, 2017 includes a \$3.5 million gain in connection with the sale of our interest in a non-marketable investment accounted for under the equity method as well as \$3.2 million in income from equity-method investments offset by a \$5.1 million loss recognized in connection with the impairments of non-marketable investments not accounted for under the equity method and net losses on foreign currency in 2017 of \$3.3 million.

Provision for Income Taxes

Our effective tax rates differ from The Netherlands statutory tax rate of 25% due in part to our operating subsidiaries being exposed to effective tax rates ranging from zero to more than 40%. In 2018 and 2017, our effective tax rates were 15.7% and 64.7%, respectively. The comparison is impacted by pre-tax book income which was higher in

2018 at \$225.7 million compared to \$114.4 million in 2017. 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. In 2018 and 2017, tax expense on foreign operations was favorably impacted by lower income tax rates and partial tax exemptions on foreign income primarily derived from operations in Germany, Singapore, Luxembourg, Ireland and Switzerland. These foreign tax benefits are due to a combination of favorable tax laws, rules, rulings, and exemptions in these jurisdictions. In particular, we have pre-tax income in Germany which is statutorily exempt from trade tax on intercompany foreign royalty income. Further, we have intercompany financing arrangements through Luxembourg and Ireland in which the intercompany income is partially exempt.

During 2017, the 64.7% reflects the impacts of the U.S. tax reform. Because of the tax reform, we revalued our U.S. deferred tax assets and liabilities to reflect the corporate income tax rate change from 35% to 21% and provided for a valuation allowance of \$60.8 million which was recorded against deferred tax assets related to U.S. interest carry forwards. We also recorded full valuation allowances against other deferred tax assets on tax losses due to unlikely future profits in other jurisdictions. During 2017, we increased accruals for tax contingencies by \$22.1 million, primarily related to ongoing income tax audits.

See Note 16 "Income Taxes" to the consolidated financial statements for a full reconciliation of the effective tax rate to The Netherlands statutory rate.

In future periods, our effective tax rate may fluctuate from similar or other factors as discussed in "Changes in tax laws or their application could adversely affect our results of operations or financial flexibility" in Item 3 Risk Factors of the 2018 Annual Report on Form 20-F files with the U.S. Securities and Exchange Commission.

Foreign Currencies

QIAGEN N.V.'s reporting 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. The net loss on foreign currency transactions is included in other expense, net, and in 2018 and 2017 was \$12.3 million and \$3.3 million, respectively, and in 2016 was less than \$0.1 million.

Derivatives and Hedging. 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 variable rate debt. The principal objective of such derivative instruments is to minimize the risks and/or costs associated with global financial and operating activities. We do not utilize derivative or other financial instruments for trading or speculative purposes. We recognize all derivatives as either assets or liabilities on the balance sheet, 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. In determining fair value, we consider both the counterparty credit risk and our own creditworthiness, to the extent that the derivatives are not covered by collateral agreements with the respective counterparties. To determine our own credit risk, we estimated our own credit rating by benchmarking the price of our outstanding debt to publicly-available comparable data from rated companies. Using the estimated rating, we quantify our credit risk by reference to publicly-traded debt with a corresponding rating.

Foreign Currency Derivatives. 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 our balance sheet exposure on a group-wide basis using foreign exchange forwards, options and cross-currency swaps.

Interest Rate Derivatives. We use interest rate derivative contracts on certain borrowing transactions to hedge interest rate exposures. We have entered into interest rate swaps in which we agree to exchange, at specified intervals, the difference between fixed and floating interest amounts calculated by reference to an agreed-upon notional principal amount.

We also make use of economic hedges. Further details of our derivative and hedging activities can be found in Note 13 "Derivatives and Hedging" to the accompanying consolidated financial statements.

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. As of December 31, 2018 and 2017, we had cash and cash equivalents of \$1.16 billion and \$657.7 million, respectively. We also had short-term investments of \$234.6 million at December 31, 2018. 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 local working capital needs. At December 31, 2018, cash and cash equivalents had increased by \$501.4 million from December 31, 2017, primarily as a result of cash provided by operating activities of \$359.5 million and cash provided by financing activities of \$360.4 million, partially offset by cash used in investing activities of \$211.4 million. Working capital as of December 31, 2018 decreased to \$1.18 billion as compared to \$1.32 billion as of December 31, 2017, reflecting current portion of long-term debt as of December 31, 2018 of \$503.1 million in addition to the cash provided by the operating and financing activities in 2018 as described below.

Operating Activities. For the years ended December 31, 2018 and 2017, we generated net cash from operating activities of \$359.5 million and \$286.8 million, respectively. While net income was \$190.4 million in 2018, non-cash components in income included \$206.4 million of depreciation and amortization and \$17.0 million of non-cash impairments due to the impairment of cost-method investments as further discussed in Note 10 "Investments" and impairments of internal-use software as discussed in Note 9 "Property, Plant and Equipment" .

Operating cash flows include a net decrease in working capital of \$80.8 million excluding changes in fair value of derivative instruments. The current period change in working capital is primarily due to increased inventories and accounts receivable and decreased accrued and other current liabilities and taxes 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. Approximately \$211.4 million of cash was used in investing activities during 2018, compared to \$464.3 million during 2017. Investing activities during 2018 consisted principally of \$568.0 million for purchases of short-term investments, \$172.8 million in cash paid for acquisitions, net of cash acquired as discussed in Note 5 "Acquisitions and Divestitures" , \$109.8 million in cash paid for purchases of property and equipment, as well as \$41.0 million paid for intangible assets and \$9.4 million paid for strategic investments in privately and publicly held companies as discussed in Note 10 "Investments" , partially offset by \$691.8 million from the sale of short-term investments. Investing activities during 2017 consisted principally of \$450.6 million for purchases of short-term investments, partially offset by \$189.0 million from the sale of short-term investments. Additionally, during 2017 cash paid for acquisitions, net of cash acquired, totaled \$50.5 million.

Financing Activities. For the year ended December 31, 2018, cash provided by financing activities was \$360.4 million compared to cash provided by financing activities of \$387.2 million in 2017. Financing activities during

2018 consisted primarily of \$494.9 million net cash proceeds from the 2018 cash convertible offering. We used \$97.3 million of the proceeds from the from the cash convertible offering to pay the premium for a call option related to the cash convertible notes, and simultaneously received \$72.4 million from the sale of Warrants, for a net cash outlay of \$24.9 million for the call spread overlay. Cash provided in 2018 was further offset by the repurchase of QIAGEN shares totaling \$104.7 million.

In 2017, cash provided from financing activities included \$329.9 million net cash proceeds from the German private placement and \$394.4 million net cash proceeds from the 2017 cash convertible offering. We used \$73.7 million of the proceeds from the from the cash convertible offering to pay the premium for a call option related to the cash convertible notes, and simultaneously received \$45.3 million from the sale of Warrants, for a net cash outlay of \$28.3 million for the call spread overlay. Cash provided in 2017 was further offset by the capital repayment of \$243.9 million made to shareholders in connection with the January 2017 synthetic share buyback discussed in Note 17 "Equity" and repurchased QIAGEN shares of \$61.0 million.

Cash used in other financing activities during the year ended December 31, 2018 and 2017 consisted primarily of \$5.5 million and \$4.4 million paid for contingent consideration, respectively, together with \$2.0 million and \$4.1 million paid in connection with derivative collateral arrangements, respectively.

Other Factors Affecting Liquidity and Capital Resources

In November 2018, we issued \$500.0 million aggregate principal amount of Cash Convertible Senior Notes which is due in 2024 (2024 Notes). The net proceeds of the 2024 Notes were \$470.0 million, after payment of the net cost of the Call Spread Overlay and transaction costs paid through December 31, 2018 as described more fully in Note 15 "Lines of Credit and Debt" . 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 which are due in 2023 (2023 Notes), which are discussed fully in Note 15 "Lines of Credit and Debt" . 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.

Additionally in 2017, we completed a German private placement of \$329.9 million, net of issuance costs, 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 described in Note 15 "Lines of Credit and Debt" .

In October 2016, we extended the maturity of our €400 million syndicated revolving credit facility, which now has a contractual lifetime until December 2021 of which no amounts were utilized at December 31, 2018. The facility can be utilized in Euro, British pounds sterling, Swiss franc or U.S. dollar and bears interest of 0.40% to 1.20% above three months EURIBOR, or LIBOR in relation to any loan not in euro, and is offered with interest periods of one, two, three or six months. We have additional credit lines totaling €26.6 million with no expiration date, none of which were utilized as of December 31, 2018. We also have capital lease obligations, including interest, in the aggregate amount of \$0.1 million, and carry \$2.2 billion of long-term debt, of which no amounts are current as of December 31, 2018.

In March 2014, we issued \$730.0 million aggregate principal amount of Cash Convertible Senior Notes of which \$430.0 million is due in 2019 (2019 Notes) and \$300.0 million is due in 2021 (2021 Notes). Interest on the 2019 and 2021 Notes is payable semiannually in arrears on March 19 and September 19 of each year, at rates of 0.375% and 0.875% per annum for the 2019 Notes and 2021 Notes, respectively, commencing on September 19,

2014. The 2019 Notes will mature on March 19, 2019 and the 2021 Notes will mature on March 19, 2021, unless repurchased or converted in accordance with their terms prior to such date.

In October 2012, we completed a U.S. private placement through the issuance of new senior unsecured notes at a total amount of \$400 million with a weighted average interest rate of 3.66% (settled on October 16, 2012). The notes were issued in three series: (1) \$73 million 7-year term due in 2019 (3.19%); (2) \$300 million 10-year term due in 2022 (3.75%); and (3) \$27 million 12-year term due in 2024 (3.90%).

We also have capital lease obligations, including interest, in the aggregate amount of \$0.1 million, and carry \$2.2 billion of long-term debt, of which no amounts are current as of December 31, 2018.

In connection with certain acquisitions, we could be required to make additional contingent cash payments totaling up to \$57.3 million based on the achievement of certain revenue and operating results milestones as further discussed in Note 19 "Commitments and Contingencies" .

In January 2018, we announced our fifth share repurchase program of up to \$200 million of our common shares. During 2018, we repurchased 2.9 million QIAGEN shares for \$104.7 million (including transaction costs). In April 2016, we announced the launch of our fourth \$100 million share repurchase program. During 2017, 1.9 million QIAGEN shares were repurchased for \$61.0 million (including transaction costs). Repurchased shares will be held in treasury in order to satisfy various obligations, which include employee share-based remuneration plans.

In January 2017, we completed a synthetic share repurchase that combined a direct capital repayment with a consolidation of shares. The transaction was announced in August 2016 and involved an approach used by various large, multinational Dutch companies to provide returns to shareholders in a faster and more efficient manner than traditional open-market purchases. \$243.9 million was repaid to shareholders through the transaction and the outstanding number of common shares was reduced by 8.9 million, or 3.7%. As discussed further in Note 17 "Equity" , the capital repayment program was completed in January 2017.

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 our 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.

Off-Balance Sheet Arrangements

Other than our former arrangements with QIAGEN Finance as discussed in Note 15 "Lines of Credit and Debt" to the consolidated financial statements, we did not use special purpose entities and do not have off-balance sheet financing arrangements as of and during the years ended December 31, 2018, 2017 and 2016.

Contractual Obligations

As of December 31, 2018, our future contractual cash obligations are as follows:

| Contractual Obligations (in thousands) | Payments Due by Period | | | | | | |
|---|------------------------|-------------------|------------------|-------------------|-------------------|-------------------|-------------------|
| | Total | 2019 | 2020 | 2021 | 2022 | 2023 | Thereafter |
| Long-term debt ⁽¹⁾ | \$ 2,288,726 | \$ 531,197 | \$ 25,884 | \$ 339,446 | \$ 490,402 | \$ 344,550 | \$ 557,247 |
| Purchase obligations | 128,281 | 93,214 | 20,804 | 8,883 | 2,690 | 2,690 | — |
| Operating leases | 60,666 | 20,235 | 14,845 | 10,745 | 6,839 | 3,854 | 4,148 |
| License and royalty payments ⁽²⁾ | 48,631 | 11,973 | 11,613 | 9,167 | 6,731 | 4,704 | 4,443 |
| Capital lease obligations ⁽³⁾ | 86 | 63 | 23 | — | — | — | — |
| Total contractual cash obligations | \$ 2,526,390 | \$ 656,682 | \$ 73,169 | \$ 368,241 | \$ 506,662 | \$ 355,798 | \$ 565,838 |

⁽¹⁾ Amounts include required principal, stated at the current carrying values, and interest payments.

⁽²⁾ As of December 31, 2018, \$10.5 million and \$24.3 million are included in accrued and other current liabilities and other long-term liabilities, respectively.

⁽³⁾ Includes future cash payments, including interest, due under capital lease arrangements.

On January 31, 2019, QIAGEN acquired all assets related to the digital PCR program of Formulatrix, Inc., for \$125 million in cash with future milestone payments of approximately \$136 million due in 2020.

In addition to the above and pursuant to purchase agreements for several of our recent acquisitions, we could be required to make additional contingent cash payments totaling up to \$57.3 million based on the achievement of certain revenue and operating results milestones as follows: \$23.7 million in 2019, \$22.7 million in 2020, \$5.9 million in 2022 and \$5.0 million, payable in any 12-month period from now until 2028 based on the accomplishment of certain revenue or other milestones, regulatory approvals or clearances. Of the \$57.3 million total contingent obligation, we have assessed the fair value at December 31, 2018 to be \$49.0 million of which \$27.5 million is included in accrued and other current liabilities and \$21.5 million is included in other long-term liabilities in the accompanying consolidated balance sheet.

Liabilities associated with uncertain tax positions, including interest and penalties, are currently estimated at \$59.9 million as of December 31, 2018 and are not included in the table above, as we cannot reasonably estimate when, if ever, an amount would be paid to a government agency. Ultimate settlement of these liabilities is dependent on factors outside of our control, such as examinations by each agency and expiration of statutes of limitation for assessment of additional taxes.

Dividend

QIAGEN has not paid a cash dividend since its inception and does not intend to pay any dividends in the foreseeable future. We intend to retain any earnings for the development of our business.

Credit Rating

QIAGEN is currently not rated by any credit rating agency.

MANAGEMENT REPORT

Human Resources

Overview

The skills, knowledge, dedication and passion of our employees are critical for the success of QIAGEN. We want to recruit, support and retain the best employees, offering performance-based remuneration, development opportunities and measures to balance work and family life. We are committed to diversity in our teams, fueling innovation and engagement with our customers and business partners. In a fast-changing, competitive business environment, QIAGEN has a significant commitment to being an employer of choice and further enhancing our position as a great place to work. At the end of 2018, QIAGEN had 4,952 full-time equivalent employees, a small increase from 4,688 at the end of 2017. Total personnel expenses including share-based compensation in 2018 were \$483.6 million compared to \$453.6 million in 2017.

Code of Ethics

QIAGEN has in place a Code of Conduct which qualifies as a code of ethics, as required by SEC and the New York Stock Exchange (NYSE) Listed Company Manual. The Code of Conduct applies to all of QIAGEN's employees, including our principal executive officer, principal financial officer, principal accounting officer or controller and other persons performing similar functions. The full text of the Code of Conduct is available on our website at www.QIAGEN.com.

Training and Retention

At QIAGEN, we recognize that employees are our most important resource. Their exceptional talent, skill, and passion are key to our long-term success and corporate value. Employee development is therefore viewed as an integral success factor in creating lasting value for our customers, patients, colleagues, partners, and shareholders.

QIAGEN maintains a transparent framework, the QIAGEN Profile Navigator (QPN), to make career paths, job requirements and performance expectations clear based on objective criteria for all positions across our growing global organization. Our global Performance Enhancement System (PES) provides all employees and their managers with regular, one-on-one review sessions to discuss career development topics. PES sessions include discussion of an employee's goals and achievements, training needs and interests, career planning drawing upon the QPN role profile system, organizational development, and results of regular "180° surveys." Professional training and development are an ongoing process for all employees, tailored to different career paths. An employee's pursuit of training cycles from PES session to training participation, review, follow-up, and back to PES review. QIAGEN's compensation structure (see below) ties in with the QPN role profiles and PES performance evaluations.

Leadership Campus (LC)

This program, composed of three components, is designed to ensure the ongoing development of QIAGEN's future management generations. LC for Starters prepares high-performing employees to take an initial leadership position. The program provides leadership basics and an overview of relevant business management topics. LC I accelerates

the careers of our professionals by providing further insights into advanced leadership and management topics while focusing on individual development and business-related innovative actions. LC II is a senior executive program that is designed to increase the leadership skills and management knowledge of outstanding QIAGEN senior managers by a more individual development approach. The program mainly focuses on leadership coaching sessions, as well as on business-related innovative actions.

QIAGEN Executive MBA Program

To support our future growth, QIAGEN offers employees the opportunity to participate in the QIAGEN Executive MBA Business Integration Program in cooperation with the University of Würzburg, Germany. The program provides professionals with a wide range of management skills and knowledge, which are key to an executive career in the industry and at QIAGEN in particular. Participants study in an international environment with colleagues from around the world. Two modules are conducted with partner universities in the U.S.: at Boston University in Boston, Massachusetts, and at Florida Gulf Coast University in Fort Myers, Florida.

QIAGEN Academy

To support all QIAGEN employees in individual development, QIAGEN has implemented an online learning management system (LMS), the QIAGEN Academy. It manages the entire training process from enrollment to certificate conveniently in one platform. The QIAGEN Academy is available to every employee 24/7 via the internet. Continual access to all training materials at any time allows employees to blend different learning methods such as virtual classrooms, web-based training, videos or classroom training into holistic and sustainable learning concepts. We offer a huge training catalog with a wide range of development options aligned to our competency model. This includes courses in soft skills, product training and training in QIAGEN-specific processes.

For more information about our training system, please also refer to the section “Employee matters” in our non-financial statement included in this report.

Compensation System

Since the creation of QIAGEN, management has formed a culture that seeks to attract and retain the best talent worldwide and reward associates for performance. This compensation system fosters a focus on achieving corporate strategic initiatives as well as personal accountability.

It is critical for QIAGEN to offer attractive compensation packages on a global basis. According to the QIAGEN philosophy, an employee who achieves his or her performance objectives should generally be awarded compensation comparable to the median levels of compensation provided by relevant benchmark companies. QIAGEN participates in various compensation benchmarking surveys that provide information on the level and mix of compensation awarded by various companies and industries for a broad range of positions around the world. In the case of QIAGEN, these include many peer life science and diagnostics companies based in the U.S.

QIAGEN has a “pay for performance” culture, with the compensation of employees linked to the achievement of corporate financial and individual performance goals. Business goals are established by senior management. These goals are set at ambitious levels each year to motivate and drive performance, with a focus on both short-term and long-term quantifiable objectives. Performance metrics used for these goals include the achievement of targets for net sales, adjusted operating income and free cash flow. In 2017, the payments for short-term variable compensation were based on 105% achievement of the business goals. Compensation for a significant majority of employees worldwide includes fixed base compensation and benefits, which vary according to local market customs, as well as a short-term variable cash bonus. The level of fixed compensation is paid in cash, usually on a monthly basis, and is designed to provide the employee with a reasonable standard of living relative to the compensation offered by peer

companies. The amount of short-term variable cash bonus is designed to reward performance, with the payout amount based on the achievement of overall corporate financial results as well as individual performance against a written set of objectives.

For the Chief Executive Officer the target annual short-term variable cash bonus is set at 58% of the annual base salary and the maximum is equivalent to 89% of the annual base salary. The Chief Financial Officer has a target annual short-term variable cash bonus set at 45% with the maximum being equivalent to 69% of the annual fixed salary. Furthermore, to align our compensation programs with the interests of shareholders, senior executives receive a portion of their total compensation in the form of long-term compensation, which is granted as equity as a reward for performance. These grants are determined on an individual basis and approved by the Compensation Committee. These equity grants are made in the form of Performance Stock Units (PSUs) with a staggered vesting period typically over three (40%), five (50%) and 10 years (10%).

For enhanced Work-Life Balance, QIAGEN offers services to help employees balance their personal life with our dynamic and driven work environment, including in-house corporate childcare and sabbatical programs, as well as company-sponsored fitness and health facilities, and programs. Flexible working hours apply to all employees except for functions that require critical on-time presence.

Workplace Health

In today's business climate, the health of employees is often directly related to the health of the company. Increased job satisfaction, improved morale, reduced injuries, and increased productivity are just some of the benefits which a healthy work environment can have. At its headquarters, QIAGEN regularly offers "health days" where all employees are invited to receive free counsel and to participate in screening and nutrition programs, medical check-ups, etc. QIAGEN provides in-house gyms open to all employees, sports courses coached by professional trainers, and on-site soccer fields and beach volleyball courts, all free of charge. All female employees have free access to screening for HPV, the primary cause of cervical cancer.

Employees worldwide

| | 2016 | 2017 | 2018 |
|------------|------|------|------|
| Americas | 1260 | 1245 | 1230 |
| EMEA | 2543 | 2567 | 2670 |
| APAC & RoW | 881 | 876 | 1052 |
| Total | 4684 | 4688 | 4952 |

2016

| | |
|------------|-----|
| Production | 21% |
| R&D | 21% |
| Sales | 41% |
| Marketing | 7% |
| Admin | 10% |

2017

| | |
|------------|-----|
| Production | 23% |
| R&D | 20% |
| Sales | 40% |
| Marketing | 6% |
| Admin | 11% |

2018

| | |
|------------|-----|
| Production | 22% |
| R&D | 21% |
| Sales | 40% |
| Marketing | 6% |
| Admin | 11% |

MANAGEMENT REPORT

Non-Financial Statement

Our approach to sustainability

For QIAGEN, sustainability means long-term economic success combined with respect for the natural environment and healthy, high-performance workplaces, with the aim to make improvements in life possible as a good corporate citizen.

Our commitment to sustainability goes beyond formal regulations. As a market and innovation leader in life sciences and molecular diagnostics, we believe there is room for innovation in driving sustainable development in our industry, and we are resolved to continue moving forward.

To achieve this, QIAGEN has integrated sustainability throughout its value chain. We pledge to continually evaluate the potential environmental impact of our business, saving energy and reducing negative environmental impacts of our operations. We look after the welfare of our employees, taking care of their developmental needs and supporting them in every way to become and remain committed and responsible. We extend our commitment to sustainability into the supply chain, committing our business partners to sign up to our environmental, social and human-rights related standards.

We recognize that ongoing success for QIAGEN also depends on the sustainability of society's resources. This is why we engage in dialogue with our various stakeholders - employees, customers, patients, suppliers, shareholders, non-governmental organizations (NGOs) and communities - in order to gain a better understanding of our operating environment, including market developments and cultural dynamics. Depending on the subject matter, we use different approaches ranging from standardized questionnaires to one-to-one conversations.

Please find information about our business model, organizational structure, products, customers, business strategy, as well as main trends and issues pertaining to the reporting year, in our Management Report.

Material non-financial information

For guidance on materiality and non-financial disclosure, we base our non-financial reporting on the Sustainability Reporting Standards (SRS) of the Global Reporting Initiative (GRI Standards 2016) as well as on the sustainability accounting standards for Medical Equipment and Supplies and Biotechnology of the Sustainability Accounting Standards Board (SASB).

To identify the relevant information, we have conducted a systematic materiality analysis. For each thematic aspect prescribed in the European Commission's CSR Directive 2014/95/EU (environmental, social and employee matters, respect for human rights, anti-corruption and bribery) we identified a series of topics, which possess high business relevance, strongly influence the decisions of our stakeholders, and where QIAGEN's activities have significant impact on the thematic aspects. In a joint workshop with representatives from our different departments, the various perspectives had been assessed and discussed. The final list had been validated by our senior management and resulted in the following material topics:

- › **Environmental matters:** energy consumption, emissions
- › **Employee matters:** training, diversity, employee satisfaction, employee retention
- › **Social matters:** quality and product safety, customer satisfaction, access to healthcare
- › **Respect for human rights:** conflict minerals
- › **Anti-corruption and bribery matters:** antitrust, anti-corruption

Business ethics

For QIAGEN, conducting business in a responsible way includes looking beyond our day-to-day business operations into the ethical foundations of our company. This means, in particular, the respect for human rights and legally compliant business behavior.

Human rights

QIAGEN believes that the respect for human rights is an essential component of promoting sustainability in our global business. As a publicly listed company with international operations, we regard ourselves as a responsible corporate citizen in all the countries and regions where we do business. This role includes rights and obligations governed by international and national law, with human rights as one of the foundations of international law.

In this sense, we acknowledge and endorse the UN Universal Declaration of Human Rights, the European Convention on Human Rights, and the business-related OECD Guidelines for Multinational Enterprises, the ILO Declaration on Fundamental Principles and Rights at Work, and the UN Guiding Principles on Business and Human Rights and its application in National Actions Plans of our relevant jurisdictions.

In 2018, QIAGEN began developing a Human Rights Policy, which is expected to be adopted during 2019 and become part of our Global Policy Manual. It is designed to provide guidance to all human rights issues in our sphere of influence, such as in our relationship with customers, on the employee level, and in our supply chain. The policy is available in the sustainability section of our corporate website.

Compliance

As a publicly listed company with international operations, QIAGEN is subject to regulation in various jurisdictions. Unethical behavior and non-compliance with laws and regulations have the potential to seriously harm our business, our reputation and our shareholders and to expose our employees to personal liability. QIAGEN has established a comprehensive Compliance Program which translates legal and regulatory requirements as well as our fundamental values into clear, precise and understandable guidelines as our Corporate Code of Conduct and Ethics and supplementing specific policies for our employees. The policies include, but are not limited to aspects as conflicts of interest, insider trading, revenue recognition, interactions with healthcare professionals, confidentiality and social media.

Special attention is paid to antitrust and anti-corruption laws (see section “Opportunities and Risks” in the Management Report). Our specific antitrust and anti-corruption policies set forth our commitment to ensure that QIAGEN and its subsidiaries abide by the antitrust and anti-corruption laws of the countries in which we operate.

We extend our Compliance Program not only to our management and employees, but also to third-party intermediaries as distributors or agents. Third-party due diligence lies in the remit of the Sales Compliance Manager. This contains the following five elements:

1. Anti-corruption questionnaire and certification for new distributors, resellers and agents;
2. Risk assessment based on a calculated risk score, which factors location of business (Transparency International Index Score, TIIS) and annual sales revenue for distributing QIAGEN products by multiplying total revenues of the prior calendar year with the inverse of the TIIS;
3. Training;
4. Contractual obligations;
5. Due diligence;
also including payment monitoring.

All our policies are provided to all employees worldwide. Online training reaches all employees in local language, supported by multiple communication resources. All new employees are required to take online training on our Corporate Code of Conduct and Ethics at a minimum. Additional trainings which are customized to the specific area of responsibility are mandatory. All employees in Sales and Marketing as well as Upper Management are required to take training on anti-corruption and antitrust laws. Such basic trainings are followed by refresher courses on a regular basis. In addition, employees are informed through the company's Compliance@QIAGEN intranet page and regular updates on compliance topics via the company's internal communication platform Yammer.

We have established a hotline for reporting accounting-related concerns on an anonymous basis in good faith. We also offer a direct email and telephone hotline for employees to address questions or make suggestions for our Compliance Program.

Our Compliance Program is overseen by the Compliance Committee under the leadership of the Head of Global Legal Affairs and Compliance, who reports in this function directly to the Audit Committee of the Supervisory Board. The Compliance Committee consists of managers from Legal, Internal Audit, Human Resources, Commercial Operations, Trade Compliance and Regulatory functions.

In the reporting period QIAGEN had no legal actions pending or completed with regard to antitrust or corruption.

Environment

Environmental protection is an issue of continued and committed concern for QIAGEN. As an international pioneer in our industry when it comes to eliminating harmful substances and waste products in laboratories, we have seen the value of environmentally responsible solutions as a source of competitive advantage, as well as an act of corporate citizenship.

We strive to reduce the consumption of energy and water and to impose limits on packaging, waste, and transportation. With these efforts, we aim to operate in the most cost-efficient and environmentally friendly way possible. To support these aims, our key production facility in Hilden, Germany, is currently being recertified according to the international energy management norm ISO 50001. To best cater to the specific nature of our industry, at other sites we work according to our own environmental guidelines.

As concerns about climate change and effects of dwindling natural resources continue to impact pricing, we will be exposed to fluctuations in costs of these key inputs. By being able to improve our manufacturing efficiencies and limit our dependence on finite resources, we are engaging in active risk management, serving our customers and enhancing the value of our company.

For QIAGEN, the commitment to safe and environmentally sound practices comes with a culture of operational excellence - reinforced by training, decision-making and standard procedures. Operations employ a concept we called QIAzen, derived from the Japanese word "kaizen" (continuous improvement). Key employees in Operations have received QIAzen training to identify and prioritize avenues to improve our manufacturing organization, initiate projects, and monitor implementation with cross-functional teams. This includes issues of environmental concern such

as transportation and the consumption of energy and natural resources. This applies, in particular, to our sites in Hilden (Germany), Köping (Sweden), Germantown (USA), as well as Shenzhen and Beijing (China).

QIAGEN is acting proactively to minimize its contribution to climate change. We recognize consumer and customer awareness of our corporate environmental stewardship as an opportunity and a way to differentiate from our competitors. Investments in renewable energies serve to maintain our competitive advantage by protecting against the rising costs of conventional energy.

QIAGEN recognizes material climate change risks such as intensified weather events, e.g. severe rainstorms or power outages that might impact our manufacturing operations. Operations also could be negatively impacted by volatility in the cost of raw materials, components, freight and energy. New laws or regulations adopted in response to climate change could increase energy costs, the costs of certain raw materials, components, packaging and transportation. In line with the development of a 2°C climate target (limiting global warming to less than 2 degrees Celsius), QIAGEN will develop a company strategy for the reduction of climate risks, covering both physical and transitional risks.

Environmental performance

To increase transparency regarding our own global energy consumption and greenhouse gas emissions, QIAGEN has extended the coverage of the energy consumption data in 2018 by the integration of a centralized data collection process management for all production sites, research centers and major offices. As a result, our global data collection coverage was increased from 30% in 2017 to more than 95% in 2018. The consideration of additional sites led to an increase in our total energy consumption of 91.3 GWh in 2018 compared to an energy consumption in the reporting year 2017 of 35.3 GWh as shown in the table below.

In addition to our energy and climate management activities, we have started to collect data regarding fresh water consumption and waste for the two largest production sites in the USA and Germany. The table below lists figures for the 2017 and 2018 reporting years and puts our consolidated environmental data in relation to our production volume sold to establish a basis for a long-term monitoring system. With the help of these key performance indicators (KPIs), we will be able to target reduction potential for energy, climate emissions, fresh water as well as waste. We are in the process of implementing additional procedures, including dashboards and other tools, to enable improvements in measurement and monitoring of these metrics during 2019.

| | 2018 | KPI 2018 | 2017 | KPI 2017 |
|-------------------------------|---------|------------------------------------|---------|------------------------------------|
| Energy (in MWh) | 91,300 | 0.02622 MWh/ Unit | 35,300 | 0.01198 MWh/ Unit |
| GHG (in tCO ₂) | 30,587 | 0.00878 tCO ₂ / Unit | 12,512 | 0.00425 tCO ₂ / Unit |
| Fresh Water | 119,621 | 0.03435 m ³ / Unit | n/a | n/a m ³ / Unit |
| Waste (in kg) | 632,530 | 0.18162 kg/ Unit | 569,720 | 0.19341 kg/ Unit |
| Haz. Waste | 249,990 | 0.07178 kg/ Unit | 183,170 | 0.06218 kg/ Unit |

The expansion in the collection of our energy data enabled us to calculate our corporate carbon footprint (CCF) more accurately in the reporting year according to ISO 14064. As of 2018, all relevant scope 1+2 emissions are included in the CCF. Scope 1 covers direct greenhouse gas emissions (GHG emissions) from combustion of fossil fuels on our own premises; scope 2 are indirect emissions originating from external generation of electricity for our operations. In 2018, QIAGEN emitted 13,150 tCO₂ in scope 1, corresponding to 43% of the total GHG emissions (2017: 3,661 tCO₂). For the scope 2 emissions, 17,430 tCO₂ occurred, representing 57% of the total GHG

emissions (2017: 8,851 tCO₂). Our total carbon footprint amounted to 30,587 in 2018 (2017: 12,512 tCO₂). This increase is again attributable to the expansion of our data scope.

The now almost complete coverage of our scope 1 and 2 emissions offers a good starting point for the development of a <2°C compatible climate target in 2019 together with the identification of climate-related risks and opportunities. In addition, we have started to collect data for calculating GHG emissions in scope 3. These emissions occur along our value chain, for example through transport services, suppliers or the use of our products. We are currently collecting the relevant data and will integrate the first scope 3 categories into our CCF in 2019.

At our Hilden site, action plans have already been drawn up to achieve reduction targets. On the basis of this experience, we can now develop concrete action plans for other sites, research centers and offices. They will be developed simultaneously with the establishment of the <2°C climate target, since we will be investigating long-term mitigation reduction potential as well as interim solutions, e.g. purchase of green electricity.

To limit the footprint of our business on the environment, we have already introduced a broad panel of activities and programs. We run simulations to reduce energy consumption and have installed energy recovery and control systems to provide only the minimum power required for operations. Improvements encompass energy extraction from co-generators, better insulation, heat recovery and installation of intelligent building systems.

As a significant part of the energy consumption associated with our business occurs beyond our own premises, transportation of people and cargo is an additional focus. In 2018, we have started to change our transports from air to sea freight wherever it is reasonable and possible. We have currently been able to convert around 150 tonnes per year to sea freight. In the next phase, which we will start in 2019, we expect to convert 100 additional tonnes per year.

At QIAGEN's headquarters, discounted train and bus tickets encourage employees to use public transportation, and we have installed charging stations for electric cars and bikes. The pool of company cars has been changed to ecological and CO₂-efficient models in a continuous adjustment process. Low emissions play a critical role in the decision process for new company cars. At most sites, video conferencing systems have been installed to encourage virtual team meetings and reduce travel between sites.

Plastic Footprint Reduction

The use of plastic materials is increasingly being questioned in public debates. QIAGEN currently uses plastics in many of our products and production support materials, as well as for transport and packaging purposes. We are aware of our responsibility in this respect and are working intensively with a special internal team focusing on solutions to avoid and reduce the usage of plastic, or at least improve the recyclability of the plastic used.

The reduction of plastic materials presents us and our industry with a number of challenges: Due to the use of our products in laboratory or medical applications, these products are subject to strict functional and legal requirements so in many cases other materials cannot simply be substituted for plastics. In the case of packaging materials, we must ensure that appropriate safety and hygiene standards are met.

In 2018 we set up a global, cross-departmental "Plastic Footprint Reduction" focus team to analyze the use of plastics and specifically identify reduction potential for QIAGEN. Our approach is to completely avoid unnecessary materials, develop more environmentally friendly alternatives or, where possible, optimize recyclability. As a first step, we have targeted polystyrene foam boxes that are used within the cold chain packaging of our products and are currently working on reducing the size of the boxes while optimizing the way the contents are structured. Our ultimate goal is to replace polystyrene foam boxes to a more environmentally friendly alternatives wherever possible.

In order to also identify starting points within our supply chain, we have initiated a query with suppliers about the use of plastic materials. We are currently exploring ways to establish a “box cycle” where supplies are packaged directly by our suppliers and the packaging material is returned to them. In addition, we are in discussions with suppliers in order to achieve a better recyclability of their products.

As a medium-term objective we will investigate our product kits with regards to the plastic materials used and evaluate potential alternatives for material components, e.g. bioplastics or biodegradable plastics, that are not in direct contact with the product. At the same time, we are working on establishing a material identification system that will make recycling of unavoidable plastics easier worldwide.

Employees

QIAGEN’s long-term success and growth are shaped decisively by the knowledge, skill and passion of our employees. Focusing on human capital therefore drives our economic performance and considerably influences the sustainability of our operations. We are convinced that the professional and personal development of our employees is an integral factor in creating value for our customers, patients, colleagues, partners and shareholders. Being the industry’s employer of choice by attracting and developing top talent is one of our global goals. To achieve that, QIAGEN creates a work environment that empowers and involves employees at all levels.

As a company headquartered in the European Union, freedom of association and collective bargaining are cornerstones of the good relationship between management and representatives of employees. We don’t have significant operations in countries with severe legal limitations to freedom of association and collective bargaining. In all regions where we operate we respect local laws and regulations concerning labor relations.

Among all QIAGEN guidelines, the following policies aim to incorporate QIAGEN’s culture and values into all of our internal and external relationships. These are available internally for all employees.

Our Ethical Standards Policy: QIAGEN’s cultural norms and values are defined in the “3I’s: Identity, Inspire, Impact.” Our values form the basis of our business success and every employee is expected to treat everyone in an open, honest, and respectful manner.

Our Diversity & Inclusion Philosophy: At QIAGEN, we are committed to the richness of diversity. Diverse teams strengthen our organization through the variety of ideas of opinions. In addition, teams outperform and succeed when they are composed of individuals with the widest possible range of personalities, backgrounds and traits. Therefore, we are committed to maintaining an environment where all individuals have the opportunity to grow and contribute to our progress.

All our employees in the various regions of the world are covered by the relevant local laws or by our voluntary corporate guidelines to the greatest possible extent, which guarantee freedom of association and/or collective bargaining mechanisms.

Depending on local law and custom, there are different types of employment ranging from long-term fixed contracts to temporary positions, also including flexible time and programs for parents returning from childcare. In 2018, we employed 5.57% part-time employees and 1.26% temporary employees (with QIAGEN contract / fixed-term work contract).

Employee training

As a fast-growing technology and knowledge-based company, we consider high-quality training and career development to be an integral part of our success. The QIAGEN Academy provides the possibility to either take part

in e-learning sessions globally or to participate in personal trainings. The focus is on job-specific skills, competencies and leadership development.

In 2018, 87% of all QIAGEN employees completed internal training. In addition 87 employees participated in our advanced leadership development programs.

In 2018, we ran a mix of instructor-led, virtual instructor-led and e-learning courses attended by 4,892 employees. The company also organized 20 development centers with almost 150 participants designed to assess leaders and future leaders' competencies and identify development opportunities.

As part of our talent and succession management, we have established transparent career paths with the QIAGEN Profile Navigator (QPN). It defines jobs, core competencies and approaches to advancement across the global organization.

In addition, QIAGEN's global Performance Enhancement System (PES) creates a clear framework of regular, one-on-one review sessions for each employee and their manager to discuss career development. These include discussions of goals and achievement levels, assessment of relevant competencies, as well as training needs and career planning steps.

The supervisor feedback process provides the opportunity for employees to provide anonymized feedback to their supervisors. For 2018 as in previous years employees provided overall very positive feedback.

QIAGEN has implemented a program to develop promising specialists and managers to prepare for senior positions in cooperation with the University of Würzburg, Germany (QIAGEN Executive MBA Business Integration Program). Participants not only benefit from a curriculum providing a wide range of management skills and knowledge, but they also experience an international environment, learning with colleagues from around the world. In 2018 another class of 16 participants graduated.

Diversity

We are committed to create a working environment where all individuals have the opportunity to grow and contribute to our progress, regardless of age, educational background, gender, nationality, physical abilities, racial and ethnic background, religion, or sexual orientation. Strategic consideration of diversity not only makes QIAGEN a better place to work. We also consider it to be a key success factor on the path to achieving our mission and goals.

In 2018, the gender split across the whole company was at 51% men and 49% women. The participation of women in leadership roles was at 28%. Specific information about the diversity policy for the composition of the Managing Board and the Supervisory Board can be found in the Corporate Governance Report.

In 2018, QIAGEN introduced the Diversity Ambassador program, selecting more than 20 QIAGEN employees from across the world to champion diversity in the sites and countries they are based in. Training has been developed to help address unconscious bias, including an online assessment, and is aimed at all managers of people, including all individuals involved in Recruiting & Hiring. Our recruitment team members have all undertaken training aimed at helping to identify unconscious bias and eliminate it from the hiring process. QIAGEN remains committed to diversity, and we continue to develop and implement additional programs to promote awareness and are working to implement additional procedures to enable improvements in measurement and monitoring of diversity in future periods.

Employee satisfaction and retention

Recognizing that QIAGEN's employees are the key to our success, we seek to be a great place to work. QIAGEN offers opportunities to work on exciting tasks and projects in an engaging work environment. Employees join QIAGEN and stay with QIAGEN because they can see how their work makes a difference to people's life everywhere in the world. Internal and external ratings have improved significantly and show QIAGEN's reputation and preferred position in the global working environment.

A prudent work-life balance is an important measure to create and maintain employee satisfaction. We provide services to help employees balance their personal lives with the company's dynamic work environment, including in-house childcare, sabbatical programs, and flexible working hours.

QIAGEN has implemented frameworks for performance-based compensation, equity-based compensation, and incentive programs for new ideas and innovation. These programs aim to ensure fair and attractive compensation and to encourage each employee to work for the company's long-term benefit.

An essential component of QIAGEN's efforts to maintain a high level of satisfaction at work is our corporate health and safety management. We offer a wide range of measures and tools, from annual "health days" with free counseling, screening and medical check-ups to sports opportunities in the form of in-house gyms, on-site soccer fields and beach volleyball courts.

QIAGEN's commitment to being an employer of choice is also reflected in the high number of applications for open positions, which exceeded 40,000 applications in 2018. At the same time, the average voluntary annual turnover rate remained largely unchanged.

Occupational safety and health protection

QIAGEN recognizes its responsibilities with respect to health and occupational safety in all our operations and meets all applicable governmental requirements. We prepare hazard analyses and risk assessments, carry out occupational safety and health audits and implement improvement measures in which all our divisions are involved. All employees of the company are obliged to actively work for occupational safety and to follow relevant instructions and regulations. Safety, orderliness and cleanliness are demanded by management as a key success factor.

The figures in the below table are based on our production sites and major non-production sites in the regions and countries indicated for the year ended December 31, 2018. Recordable accidents includes the following incidents: lost workdays; restricted work; and medical treatment beyond first aid.

| Recordable Accidents | 2018 |
|--------------------------|-------------|
| Germany | 29.0 |
| United States of America | 10.0 |
| Japan | 4.0 |
| China | — |
| Sweden | — |
| United Kingdom | — |
| Total | 43.0 |

Information from the comparable year is not included as our process for implementing additional procedures to enable improvements in measurement and monitoring is currently underway. We expect to provide recordable accidents and additional metrics for current and future periods.

Customers and products

QIAGEN's mission is to make improvements in life possible by enabling our customers to achieve outstanding success and breakthroughs in life sciences, applied testing, pharma and molecular diagnostics. We are committed to customers and their patients to deliver innovative solutions that unlock new insights for scientific research, forensics, food safety or better treatment decisions. We understand and live up to our responsibility to customers and patients who depend on us for reliable, efficient and safe workflows.

Customer satisfaction

Customer satisfaction is an integral part of the QIAGEN mission of making improvements in life possible which is therefore the direct responsibility of the Chief Executive Officer. Our customers have high expectations on reliability, safety and the environment-friendly manufacturing of our products. We develop our products and services in close contact with our customers and incorporate their feedback into our processes.

Our commitment is to continually improve the customer experience, taking into account their evolving needs and expectations. QIAGEN has established a global systematic approach to measure customer experience in the form of an aggregated Customer Experience Indicator (CEI). The CEI is measured on a monthly basis through a set of internal KPIs (product and delivery performance, phone support, etc.) that are directly linked to customer experience in our transactions. Thus, we are able to identify quickly and systematically areas for improvement while staying closely connected with our customers. Employee performance in relation to the CEI is embedded into our annual goal setting process. With an average CEI of 1,515 of possible 2,000 points in 2018, we have managed to further increase our strong performance compared to the previous year.

Quality and product safety

QIAGEN stands for quality. Since QIAGEN's founding 30 years ago, we have always been committed to the highest quality, and we always strive to exceed our customers' expectations. QIAGEN's reputation as a quality supplier is best-in-class in our industry and the foundation of our loyal global customer base.

To achieve and maintain our quality standards, we established Total Quality Management (TQM) systems in all of our manufacturing facilities around the globe. These assure constant high quality as well as safe and effective medical devices. QIAGEN's TQM systems are certified according ISO 9001, ISO 13485, ISO 18385, as well as 21 CFR 820 and all other applicable medical device standards around the globe (see section "Government Regulations" in the Management Report).

QIAGEN products and their components are safe to use by customers, as well by our employees in Research and Development (R&D). We use a list of qualified substances (the "MDx Toolbox"), specifically excluding any substances of concern. Our transparent and responsible product and development policy also includes the communication and marketing of products. As with all companies in the medical device/in vitro diagnostics industry, product claims and product properties are verified and validated during development and approved by regulatory bodies around the world as part of the product submission process.

QIAGEN, like other companies, is exposed to the financial implications of potential recalls and other adverse events due to equipment failures, manufacturing defects, design flaws, or inadequate disclosure of product-related risks. In the event of a recall, QIAGEN has established global procedures applicable to all QIAGEN sites. Processes, responsibilities and improvements programs are defined as required by regulating authorities to avoid the reoccurrence of recalls. There is full traceability of each product to the final customer; therefore, any recalls are executed by direct customer notifications. Due to QIAGEN's stringent quality management, recalls rarely occur: 2018 (4), 2017 (0), 2016 (3), 2015 (1). The percentage of affected product is low as well: 2018 (0.09%), 2017

(0%), 2016 (0.21%), 2015 (0.022%). In past recalls, 90% to 100% of customers have been reached and confirmed recall notification.

The safe use of our electronic devices in terms of cybersecurity is another high-priority area at QIAGEN. All relevant employees are regularly trained in the latest technology and applications to ensure that our customers do not face any risks related to cybercrimes.

Access to healthcare

QIAGEN is aware of the importance of providing access to healthcare and research products around the world. In developing countries with scarce resources, new ways are needed to ensure access to affordable diagnostics that play a critical role in helping to prevent and treat diseases. In particular, infectious diseases and various malignancies can be treated much more cost-effectively through early and precise detection - and with improved patient outcomes. However, many emerging countries lack properly trained lab personnel and technical infrastructure to utilize the latest molecular testing technologies.

For QIAGEN, a strategic approach to providing access to diagnostic technologies can yield opportunities for growth, innovation and unique public-private partnerships. To support our growth strategy in emerging markets, we are expanding our presence in these markets and adapting our products to local needs, where necessary. An example is the development of careHPV as an adaptation of our gold standard digene HC2 test for detection of high-risk human papillomavirus (HPV), which has been shown to be the primary cause of cervical cancer. In cooperation with PATH, an NGO, and support from the Bill & Melinda Gates Foundation, QIAGEN developed this dedicated testing system for use in regions with limited healthcare resources. The main advantages of decentralized HPV testing are:

- › immediate analysis at the point of care
- › instant treatment decisions
- › higher compliance of patients

Our *careHPV* Test is currently available in more than 25 countries worldwide. Since its launch through the end of 2018, more than 3 million tests have been distributed.

Another example is our effort to advance diagnostics for tuberculosis (TB) in low-resource, high disease burden countries. Based on a five-year memorandum of understanding signed in 2015, QIAGEN is cooperating with FIND, an NGO, to develop innovative and affordable tests to detect people with latent TB infections who are at risk of developing active TB.

Furthermore, we are providing financial support to several organizations and initiatives focused on global health projects. In 2018, among the projects that we continued to support were the International Agency for Research on Cancer in Tanzania, Basic Health International in El Salvador, and the Pink Ribbon Red Ribbon initiative in different countries.

Sustainable supply chain management

QIAGEN strives to ensure that its quality standards, compliance with laws and regulations, as well as ecological and social standards, are maintained along the entire value chain of suppliers and partners. For us, organic growth is the goal, not maximum profit. We demand the same from our business partners. In 2018, we revised our procurement policy to include specific requirements for corporate governance, environmental and social standards, which we expect from our suppliers as minimum standards. The policy is publicly available on the QIAGEN Website.

In alignment with QIAGEN's Compliance Program (especially QIAGEN's Corporate Code of Conduct and Ethics), every QIAGEN employee must conduct themselves honestly, fairly, and objectively in all business relationships with suppliers and all others with whom QIAGEN maintains business relationships. Employees in the Procurement organization, especially, must understand our revised procurement guidelines and comply with them.

Structure of our supply chain

QIAGEN operates in over 35 locations worldwide. Our sites are supported by a global supplier network that includes approximately 9,000 suppliers in over 60 countries, supplying resources such as chemicals and bioreagents, plastics, packaging materials, as well as other materials and services essential to our business. In 2018, 89.7% of our overall purchasing volume came from OECD countries.

Region of origin of suppliers

| Region of origin | % |
|------------------|------|
| Europe | 47% |
| North America | 24% |
| Asia | 23% |
| South America | 3% |
| Australia | 2% |
| Africa | 0.4% |

Due diligence process

In order to minimize compliance, environmental and social risks in our supply chain, we introduced a multi-stage vendor selection process in 2018. As a first step, existing suppliers were subjected to a risk analysis with regard to ecological and social criteria based on their geographic location. These criteria were supported by information from the MVO Nederlands platform financed by the Dutch Foreign Ministry, as well as the Bertelsmann Stiftung foundation's Sustainable Development Goals Index. As a result, 70 suppliers were identified for whom potential risks exist due to geographic location and sales to QIAGEN.

The revised procurement policy was then sent to these suppliers with the request to sign. All new suppliers must also sign this policy in order to be approved as QIAGEN suppliers. In detail, the policy contains requirements with regard to legal compliance, bribery and corruption, labor rights, non-discrimination and fair treatment, health and safety as well as environmental protection and conservation. In addition, first-tier suppliers must confirm REACH, RoHS and SEC compliance as appropriate.

As part of our supplier selection process, we additionally assess the suppliers' policy with a perspective on QIAGEN's requirements. Supplier audits are conducted if non-compliance is suspected. To our knowledge, there were no violations regarding corporate governance, environmental and social standards in the reporting period.

Conflict minerals

The sourcing of certain minerals (known as "conflict minerals") has been linked with human rights abuses in the Democratic Republic of Congo ("DRC") and other conflict zones. QIAGEN has performed an extensive inquiry into the company's supply chain to confirm that the products supplied to us are either DRC conflict-free or that the suppliers are not aware of any non-compliance in their supply base. QIAGEN has no indication that any conflict minerals from the Democratic Republic of Congo or adjoining countries are used in the company's laboratory instruments.

Our products consist of sample and assay kits, known as consumables, and automated instrumentation systems. We do not believe that any Conflict Minerals are necessary to the production or functionality of any of our consumable products. We conduct due diligence measures annually to determine the presence of Conflict Minerals in our instrumentation products and the source of any such Conflict Minerals. Because we do not purchase Conflict Minerals directly from smelters or refineries, we rely on our suppliers to specify to us their Conflict Minerals sources and declare their Conflict Minerals status. We disclosed our Conflict Minerals findings to the U.S. Securities and Exchange Commission ("SEC") for the calendar year ending December 31, 2017, on Form SD on May 17, 2018, and will provide updated disclosure to the SEC annually.

MANAGEMENT REPORT

Future Perspectives

QIAGEN Perspectives for 2019

With a dynamic and disruptive portfolio of Sample to Insight solutions for molecular testing, QIAGEN expects to sustain its growth in sales and earnings in 2019 and beyond. QIAGEN serves more than 500,000 customers across the value chain, from researchers in Academia and the pharmaceutical industry to healthcare providers using molecular diagnostics to bring state-of-the-art care to patients. QIAGEN is executing on mid-term strategic plans to enhance financial performance and returns to shareholders from 2016 through 2020. Investments in innovation and commercial support are paying off in a faster sales trajectory for growth drivers, while efficiency and capital allocation initiatives enhance operating leverage and profitability.

QIAGEN continues its focus on differentiated solutions in fast-growing markets and made significant progress in enlarging and transforming its portfolio in 2018. Growth engines in 2019 include expanding the market for QuantiFERON-TB technology; driving the adoption of novel solutions in next-generation sequencing (NGS); enabling precision medicine with insights to guide treatment decisions; delivering valuable insights through automation systems; integrating bioinformatics to analyze and interpret genomic data; and deepening QIAGEN's leadership in core technologies for sample processing. QIAGEN continues to build its innovative portfolio through research and development, external partnerships and targeted acquisitions.

Sales of QuantiFERON-TB, the gold-standard blood test for latent tuberculosis (TB) infection, grew 21% in 2018 – tracking toward a target of \$300 million by 2020. As global efforts to control tuberculosis continue to intensify, QuantiFERON-TB Gold Plus (QFT-Plus) is gaining adoption worldwide to replace the time-consuming, unreliable 120-year-old tuberculin skin test. QIAGEN is adding automation options for QFT-Plus through partnerships with DiaSorin, Hamilton and Tecan to enhance the efficiency of screening, particularly for large TB programs. The company also is developing QuantiFERON-TB Access to make blood-based latent TB detection accessible to low-resource regions with a high disease burden (launch expected in 2020).

With next-generation sequencing emerging from elite research labs into clinical research and diagnostics, QIAGEN's portfolio of NGS solutions grew rapidly to over \$140 million in 2018 sales, about 10% of total revenues. A new target of \$190 million was set for 2019. QIAGEN continues to add to its "universal solutions," industry-leading sample technologies, "Digital NGS" assays and bioinformatics, reaching into nearly every NGS lab around the world. The GeneReader NGS System, a complete Sample to Insight solution for benchtop sequencing, is benefiting from new placements and growing consumable sales. After adding new GeneRead QIAact gene panels in 2018, QIAGEN continues to develop innovative content for the platform.

QIAGEN's Precision Medicine franchise, marshaling genomic insights to enable personalized treatment decisions for patients with cancer and other diseases, exceeded \$100 million in sales in 2018 and offers dynamic growth potential. More than 25 partnerships with Pharma and biotech companies make QIAGEN the global leader in creating companion diagnostics for selection of the most appropriate therapies based on genetic variations. In 2019, QIAGEN expects a stream of companion diagnostic launches in oncology and hematology.

QIAGEN is commercializing disruptive new automation systems to expand its reach in large, growing markets – and is leveraging a rich pipeline of molecular content through assay development efforts. The focus in 2019 is on execution across these platforms:

- › QIASymphony, the flagship modular system for Sample to Insight analysis with polymerase chain reaction (PCR), surpassed its target of 2,300 cumulative placements around the world in 2018, and a new target of over 2,500 was set for 2019. The QIASymphony SP module is the market-leading “front end” solution for automated processing of samples – a critical need as laboratories handle growing volumes for NGS and PCR testing.
- › The GeneReader NGS System continues to gain share in the benchtop NGS market with a full menu of cancer gene panels for clinical research, plus selected forensics applications. New panels for immuno-oncology and liquid biopsy monitoring of lung cancer are expected to launch in 2019, as well as custom panels and improvements in automation.
- › QIAstat-Dx, a one-step, fully integrated system for syndromic testing, is gaining momentum after its April 2018 launch in Europe. A U.S. launch and additional diagnostic panels are expected in 2019. QIAstat-Dx delivers cost-efficient diagnosis in about an hour, with less than one minute of hands-on time. The addressable market is estimated at \$800 million.
- › The NeuMoDx 288 and 96 systems, launched in Europe in late 2018, offer a disruptive new platform in the fully integrated PCR market for higher-throughput diagnostics, estimated at \$2.7 billion. The Sample to Insight NeuMoDx systems automate the otherwise expensive, time-consuming liquid handling process and speed up analysis for labs. QIAGEN plans to expand the assay menu in 2019 and begin to drive NeuMoDx adoption globally.
- › In 2019, QIAGEN is investing to develop disruptive new solutions for digital PCR, a fast-growing molecular technology among Life Sciences customers. QIAGEN is targeting a 2020 launch with fully integrated systems that simplify digital PCR workflows, offer higher throughput and multiplexing, and provide favorable economics for customers.

Bioinformatics solutions are growing rapidly as QIAGEN software and knowledge bases deliver the real value of molecular testing: actionable insights. In 2018, launches included major enhancements to QIAGEN Clinical Insight (QCI); easy-to-use new CLC Genomics Workbench software; and other solutions. So far in 2019, QIAGEN has acquired N-of-One, adding powerful real-world evidence in oncology to QCI, and partnered with Ares Genetics to advance the fight against antibiotic-resistant infections. Bioinformatics is a key strategic advantage for QIAGEN.

QIAGEN’s differentiated core technologies for sample processing continue to drive growth, with a focus on emerging applications such as liquid biopsies and microbiome research. In 2019, QIAGEN is launching QIACube Connect, a next-generation solution for automated sample processing that delivers digitization and ease of use to help labs process increasing volumes.

Ongoing actions to improve efficiency are expected to continue to benefit results in 2019. Key actions include consolidating activities into shared service centers and global centers of excellence, and embracing digital tools across the business. Digital channels account for a growing portion of sales, exceeding 40% in 2018 and moving toward a goal of 50% in 2020.

Global Economic Perspectives for 2019

Global economic growth slowed in 2018 and is expected to decelerate further in 2019, as well as facing downside risks from geopolitical and financial uncertainties. The World Bank forecasts global GDP growth of 2.9% in 2019, down from 3.0% in 2018, easing further to 2.8% in 2020 and 2021. Although no recession is predicted near-term, risks include increasing tariffs and other trade barriers, a chill in emerging-market economies, the United Kingdom’s

move to leave the European Union, shifts toward normalizing monetary policy and the chance of a financial market disruption. U.S. growth remains solid but slower in 2019, after the 2018 surge triggered by tax reform. Growth in Europe has slowed as exports soften in an uncertain trade climate. China's rapid growth is expected to continue to moderate amid weaker exports, though supported by domestic consumption. Japan remains in a slow-growth mode. Economic momentum tends to benefit the business environment for QIAGEN, while a downturn could hurt customer funding budgets. Currency exchange rates also affect results reported in U.S. dollars.

Industry Perspectives for 2019

Genomic insights today are moving rapidly from basic research laboratories into applications in medicine and other fields, delivering ever-greater value for patients and other users. Multiple segments of molecular testing are growing at double-digit rates. As innovation drives market expansion, QIAGEN has a fertile environment to sustain its growth in 2019 and beyond.

Molecular diagnostics, in particular, is growing briskly as healthcare providers adopt genomic testing to evaluate and monitor patients for cancer, infectious diseases and other conditions. Molecular medicine is migrating from research-based institutions into hospitals and reference laboratories in need of quick, accurate results, increasing the demand for standardized tests and automated workflows. Customers, meanwhile, embrace diverse technologies based on different needs – from low-throughput to high-throughput, and from single-target or multiplex PCR analysis to in-depth next-generation sequencing. Common themes across different customer types are need for easy-to-use technologies and decision-support software.

Life science researchers in Academia and the Pharma industry rely on novel sample and sequencing technologies to explore disease pathways and biomarkers, and increasingly to guide drug development and clinical trials as well. Developments in the science presage a wave of new therapies based on genomic insights. Applications of molecular testing also are expanding for public safety needs such as forensics and environmental monitoring.

QIAGEN is executing on a strategy to engage customers across the continuum, from discovery to routine molecular testing, and to create value with differentiated solutions and automation systems that make improvements in life possible.

Subsequent Events

On January 7, 2019, we announced the acquisition of N-of-One, Inc, a privately-held U.S. molecular decision support company and pioneer in clinical interpretation services for complex genomic data. The cash consideration totaled approximately \$26.0 million. The acquisition included contingent consideration which is recorded as part of the purchase price based on the acquisition date fair value. The addition of N-of-One will enable QIAGEN to significantly expand its decision-support solutions while offering a broader range of software, content and service-based solutions. It will also enable QIAGEN to provide customers with greater access to valuable genomic data assets and service offerings. N-of-One is not expected to provide a significant contribution to our results in 2019.

On January 31, 2019, we acquired the digital PCR assets of Formulatrix, Inc., a developer of laboratory automation solutions. Combining the Formulatrix assets with QIAGEN technologies and automation, we expect to bring to market a fully integrated digital PCR solution with a targeted launch in 2020. We agreed to pay Formulatrix \$125.0 million in cash upon closing and future milestone payments of \$135.9 million in 2020.

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GOVERNANCE

Corporate Governance and Compensation

We recognize the importance of clear and straightforward rules on corporate governance and, where appropriate, have adapted our internal organization and processes to these rules. This section provides an overview of QIAGEN's corporate governance structure and includes details of the information required under the Dutch Corporate Governance Code (the Dutch Code). The Dutch Code is applicable to QIAGEN N.V. (in the following also referred to as the "Company"), as it is a publicly listed company incorporated under the laws of The Netherlands with a registered seat in Venlo, The Netherlands. The Dutch Code contains the principles and concrete provisions which the persons involved in a listed company (including Managing Board members and Supervisory Board members) and stakeholders should observe in relation to one another.

Our corporate governance practices generally derive from the provisions of the Dutch Civil Code and the Dutch Corporate Governance Code. Further, due to our listing on the New York Stock Exchange in the U.S., the Managing Board and the Supervisory Board of QIAGEN N.V. declared their intention to disclose in QIAGEN's Annual Reports the Company's compliance with the corporate governance practices followed by U.S. companies under the New York Stock Exchange listing standards or state the deviations recorded in the period.

A brief summary of the principal differences follows.

Corporate Structure

QIAGEN is a 'Naamloze Vennootschap,' or N.V., a Dutch public limited liability company similar to a corporation in the United States. QIAGEN has a two-tier board structure. QIAGEN is managed by a Managing Board consisting of executive management acting under the supervision of a Supervisory Board (non-executives), similar to a Board of Directors in a U.S. corporation. It is in the interest of QIAGEN and all its stakeholders that each Board performs its functions appropriately and that there is a clear division of responsibilities between the Managing Board, the Supervisory Board, the general meeting of shareholders (General Meeting) and the external auditor in a well-functioning system of checks and balances.

Managing Board

General

The Managing Board manages QIAGEN and is responsible for defining and achieving QIAGEN's aims, strategy, policies and results and is expected to act in a sustainable manner by focusing on long-term value creation in the performance of their work. The Managing Board is also responsible for complying with all relevant legislation and regulations as well as for managing the risks associated with the business activities and the financing of QIAGEN. It reports related developments to and discusses the internal risk management and control systems with the Supervisory Board and the Audit Committee. Under Dutch Law, QIAGEN's Managing Board, which has two members, has chosen to work with an Executive Committee and is accountable for the actions and decisions of the Executive Committee, which is comprised of the CEO, the CFO and certain experienced leaders who have responsibilities for the operational management of the Company and the achievement of its objectives and results. The Managing Board has ultimate responsibility for the Company's external reporting and is answerable to shareholders of the Company at the Annual General Meeting of Shareholders. Pursuant to the two-tier corporate structure, the Managing Board is required to render account for the performance of its duties to the Supervisory Board and the General Meeting of Shareholders (General Meeting). The Managing Board provides the Supervisory Board with timely information necessary for the exercise of the duties of the Supervisory Board. In discharging its duties, the Managing Board takes into account the interests of QIAGEN, its enterprises and all parties involved in QIAGEN, including shareholders and other stakeholders.

Composition and Appointment

The Managing Board consists of one or more members as determined by the Supervisory Board. The members of the Managing Board are appointed by the General Meeting upon the joint meeting of the Supervisory Board and the Managing Board (the Joint Meeting) having made a binding nomination for each vacancy. However, the General Meeting may at all times overrule the binding nature of such a nomination by a resolution adopted by at least a two-thirds majority of the votes cast, if such majority represents more than half the issued share capital. Managing Directors are appointed annually for the period beginning on the date following the Annual General Meeting up to and including the date of the Annual General Meeting held in the following year.

Members of the Managing Board may be suspended and dismissed by the General Meeting by a resolution adopted by a two-thirds majority of the votes cast, if such majority represents more than half of the issued share capital, unless the proposal was made by the Joint Meeting, in which case a simple majority of votes cast is sufficient. Furthermore, the Supervisory Board may at any time suspend (but not dismiss) a member of the Managing Board.

Our Managing Directors for the year ended December 31, 2018 and their ages as of January 31, 2019, are as follows:

Managing Directors

| Name | Age | Position |
|----------------|-----|--|
| Peer M. Schatz | 53 | Managing Director, Chief Executive Officer |
| Roland Sackers | 50 | Managing Director, Chief Financial Officer |

The following is a brief summary of the background of each of the Managing Directors. References to "QIAGEN" and the "Company" in relation to periods prior to April 29, 1996 mean QIAGEN GmbH and its consolidated subsidiaries:

Peer M. Schatz, 53, joined QIAGEN in 1993, when the Company had just 30 employees and revenues of approximately \$2 million, and has been Chief Executive Officer since January 1, 2004. He was Chief Financial

Officer between 1993 and 2003 and became a member of the Managing Board in 1998. Mr. Schatz was previously a partner in a private management buyout group in Switzerland, worked in finance and systems positions in Sandoz, Ltd. and Computerland AG, and participated in the founding of start-up companies in the computer and software trading industry in Europe and the United States. Mr. Schatz graduated from the University of St. Gallen, Switzerland, with a Master's degree in Finance in 1989 and obtained an M.B.A. in Finance from the University of Chicago Graduate School of Business in 1991. Mr. Schatz served as a member of the German Corporate Governance Commission from 2002 to 2012. He is Managing Director of PS Capital Management GmbH. He is a board member of AdvaMedDx, an advocacy dedicated to issues facing the in vitro diagnostics industry in the United States and Europe, and ALDA (the Analytical, Life Science and Diagnostics Association), a trade association of developers and suppliers in these fields.

Roland Sackers, 50, joined the Company in 1999 as Vice President Finance and has been Chief Financial Officer since 2004. In 2006, Mr. Sackers became a member of the Managing Board. Between 1995 and 1999, he served as an auditor with Arthur Andersen Wirtschaftsprüfungsgesellschaft Steuerberatungsgesellschaft. Mr. Sackers earned his Diplom-Kaufmann from University of Münster, Germany. He is a former member of the Supervisory Board and Audit Committee of IBS AG and a former member of the board of directors of Operon Biotechnologies, Inc. Mr. Sackers is a board member of the industry association BIO Deutschland. He was previously a non-executive director and chair of the audit committee from 2011 to 2018 of Immunodiagnostic Systems Holding PLC (IDS), a leading producer of immunological tests for research and diagnostic applications publicly listed in the United Kingdom.

Conflicts of Interest, Loans or Similar Benefits

Resolutions to enter into transactions under which members of the Managing Board could have a conflict of interest with QIAGEN, and which are of material significance to QIAGEN and/or the relevant member of the Managing Board, require the approval of the Supervisory Board. A Managing Director that has a personal conflict of interest will not participate in the decision making process regarding such item. QIAGEN has not entered into any such transactions in 2018. No credit, loans or similar benefits were granted to members of the Managing Board. Additionally, the Managing Board Members did not receive any benefits from third parties that were either promised or granted in view of their position as members of the Managing Board.

Supervisory Board

General

The Supervisory Board supervises the policies of the Managing Board, the general course of QIAGEN's affairs and the manner in which the Management Board implements the long-term value creation strategy and the business enterprises which we operate. The Supervisory Board assists the Managing Board by providing advice relating to the business activities of QIAGEN. In 2018, the Supervisory Board had five regular meetings that were held with the attendance of the Managing Board, while certain agenda items were discussed exclusively between the Supervisory Board members. In discharging its duties, the Supervisory Board takes into account the interests of QIAGEN, its enterprise and all parties involved in QIAGEN, including shareholders and other stakeholders. The Supervisory Board is responsible for the quality of its own performance. In this respect, the Supervisory Board conducts a self-evaluation on an annual basis. Our Supervisory Board has specified matters requiring its approval, including decisions and actions which would fundamentally change the company's assets, financial position or results of operations. The Supervisory Board has appointed an Audit Committee, a Compensation Committee, a Selection and Appointment (Nomination) Committee and a Science and Technology Committee from among its members and can appoint other committees as deemed beneficial. The Supervisory Board has approved charters pursuant to which each of the committees operates.

Composition and Appointment

The Supervisory Board consists of at least three members, or a larger number as determined by the Joint Meeting. Members of the Supervisory Board are appointed by the General Meeting upon the Joint Meeting having made a

binding nomination for each vacancy. However, the General Meeting may at all times overrule the binding nature of such a nomination by a resolution adopted by at least a two-thirds majority of the votes cast, if such majority represents more than half the issued share capital.

The Supervisory Board shall be composed in a way that enables it to carry out its duties properly and enables its members to act critically and independently of one another and of the Managing Board and any particular interests. To that effect, the Supervisory Board has adopted a profile of its size and composition that takes into account the nature of our business, our activities and the desired diversity, expertise and background of the members of the Supervisory Board. The current profile of the Supervisory Board can be found on our website. The Supervisory Board has appointed a chairman from its members who has the duties assigned to him by the Articles of Association and the Dutch Code.

Members of the Supervisory Board are appointed annually for the period beginning on the date following the General Meeting up to and including the date of the General Meeting held in the following year. Members of the Supervisory Board may be suspended and dismissed by the General Meeting by a resolution adopted by a two-thirds majority of the votes cast, if such majority represents more than half of the issued share capital, unless the proposal was made by the Managing Board and the Supervisory Board in which case a simple majority of votes cast is sufficient.

Our Supervisory Directors for the year ended December 31, 2018 and their ages as of January 31, 2019, are as follows:

Supervisory Directors

| Name | Age | Nationality | Gender | Position |
|----------------------|-----|-------------|--------|---|
| Stéphane Bancel | 46 | French | Male | Supervisory Director, Member of the Compensation Committee, Audit Committee and Science and Technology Committee |
| Dr. Håkan Björklund | 62 | Swedish | Male | Chairman of the Supervisory Board, Member of the Compensation Committee and Selection and Appointment Committee |
| Dr. Metin Colpan | 64 | German | Male | Supervisory Director, Chairman of the Science and Technology Committee and Member of the Selection and Appointment Committee |
| Dr. Ross L. Levine | 47 | U.S. | Male | Supervisory Director and Member of the Science and Technology Committee |
| Dr. Elaine Mardis | 56 | U.S. | Female | Supervisory Director and Member of the Science and Technology Committee |
| Lawrence A. Rosen | 61 | U.S. | Male | Supervisory Director and Chairman of the Audit Committee |
| Elizabeth E. Tallett | 69 | U.S. | Female | Supervisory Director, Chairwoman of the Compensation Committee, Member of the Audit Committee and Member of the Selection and Appointment Committee |

The following is a brief summary of the background of each of the Supervisory Directors and Managing Directors. References to "QIAGEN" and the "Company" in relation to periods prior to April 29, 1996 mean QIAGEN GmbH and its consolidated subsidiaries:

Stéphane Bancel, 46, joined the Company's Supervisory Board as well as the Compensation Committee in 2013 and joined the Audit Committee and Science and Technology Committee in 2014. He is Chief Executive Officer of Moderna Therapeutics, Inc., a clinical-stage biotechnology company based in Cambridge, Massachusetts, which is advancing multiple drug development programs involving messenger RNA therapeutics. Before joining Moderna, Mr. Bancel served for five years as Chief Executive Officer of the French diagnostics company bioMérieux SA. Prior to bioMérieux, he was Managing Director of Eli Lilly in Belgium and Executive Director of Global Manufacturing Strategy and Supply Chain at Eli Lilly in Indianapolis, Indiana, after having started at Lilly in Great Britain. Before joining Eli Lilly, Mr. Bancel served as Asia-Pacific Sales and Marketing Director for bioMérieux while based in Tokyo,

Japan. He holds a Master of Engineering degree from École Centrale Paris (ECP), a Master of Science in Chemical Engineering from the University of Minnesota and an M.B.A. from Harvard Business School.

Dr. Håkan Björklund, 62, was appointed as a new Supervisory Board Member in March 2017 and as Chairman of the Supervisory Board in June 2018. He is a member of the Compensation Committee and the Selection and Appointment Committee. Dr. Björklund brings an extensive international background in the life science industry to QIAGEN, in particular through his current role as Operating Executive at Avista Capital Partners, as well as through previous roles as CEO of the global pharmaceutical company Nycomed, Regional Director at Astra (now AstraZeneca) and President of Astra Draco. Under Mr. Björklund's leadership, Nycomed grew from a predominantly Scandinavian business into a global pharmaceutical company. In addition to QIAGEN, he currently serves as Chairman of the Board of Directors at Acino International AG, Swedish Orphan Biovitrum AB (Sobi), BONESUPPORT AB and Trimb Healthcare AB. Dr. Björklund earlier served as Chairman of the Board of Directors of Lundbeck A/S, and was also a Member of the Board of Directors of several international life science companies, including Alere, Atos, Coloplast and Danisco. Dr. Björklund has a Ph.D. in Neuroscience from Karolinska Institutet in Sweden.

Dr. Metin Colpan, 64, is a co-founder of QIAGEN and was the Company's Chief Executive Officer and a Managing Director from 1985 through 2003. Dr. Colpan has been a member of the Supervisory Board since 2004 and has served as Chairman of the Science and Technology Committee since 2014. He has been a member of the Selection and Appointment Committee since 2015. Dr. Colpan obtained his Ph.D. and M.S. in Organic Chemistry and Chemical Engineering from the Darmstadt Institute of Technology in 1983. Prior to founding QIAGEN, Dr. Colpan was an Assistant Investigator at the Institute for Biophysics at the University of Düsseldorf. Dr. Colpan has had wide experience in separation techniques and in the separation and purification of nucleic acids in particular, and has filed many patents in the field. Dr. Colpan also serves as a Supervisory Board member of Qalovis Farmer Automatic Energy GmbH, Laer, Germany. Dr. Colpan previously served as a Supervisory Board member of Ingenium Pharmaceuticals AG, GenPat77 Pharmacogenetics AG, GPC Biotech AG and Morphosys AG, each in Munich, Germany.

Dr. Ross L. Levine, 47, joined the Supervisory Board and its Science and Technology Committee in 2016. He is a physician-scientist focused on researching and treating blood and bone marrow cancers as the Laurence Joseph Dineen Chair in Leukemia Research, the Director of the Center for Hematologic Malignancies, and an Attending Physician at Memorial Sloan Kettering Cancer Center, as well as Professor of Medicine at Weill Cornell Medical College. He leads a research lab investigating genetics and targeted therapies in myeloid malignancies and is interested in application of next-generation sequencing technology in the practice of medicine in hematologic cancers. He trained in internal medicine at Massachusetts General Hospital and in hematology-oncology at the Dana-Farber Cancer Institute, earning board certification in these specialties. He received his M.D. from the Johns Hopkins University School of Medicine and his A.B. degree from Harvard College.

Dr. Elaine Mardis, 56, joined the Company's Supervisory Board and its Science and Technology Committee in 2014. Dr. Mardis is the Co-Executive Director of the Institute for Genomic Medicine at Nationwide Children's Hospital in Columbus, OH. She also is Professor of Pediatrics at the Ohio State University College of Medicine. Dr. Mardis has research interests in the application of genomic technologies to improve our understanding of human disease, and toward improving the precision of medical diagnosis, prognosis and treatment. Dr. Mardis is the former Robert E. and Louise F. Dunn Distinguished Professor of Medicine at Washington University School of Medicine in St. Louis, MO, where she was on the faculty for 22 years. As Co-Director of the McDonnell Genome Institute, she devised methods and automation that contributed to the Human Genome Project and has since played key roles in the 1000 Genomes Project, The Cancer Genome Atlas, and the Pediatric Cancer Genome Project. Prior to joining the Washington University faculty, she was a senior research scientist at BioRad Laboratories in Hercules, CA. Dr. Mardis is a board member of the American Association for Cancer Research, and has scientific advisory roles at the Regeneron Genomics Center, PACT Pharma LLC, and Interpreta LLC. She also serves the U.S. government as a scientific advisor to the Veteran's Administration for the Million Veterans Program. Dr. Mardis received her Bachelor

of Science degree in Zoology in 1984 and her Ph.D. in Chemistry and Biochemistry in 1989, both from the University of Oklahoma.

Lawrence A. Rosen, 61, joined the Company's Supervisory Board as well as the Audit Committee in 2013 and has served as the committee's chairman since 2014. Mr. Rosen was a member of the Board of Management and Chief Financial Officer of Deutsche Post DHL until September 2016. Holding this position since 2009, Mr. Rosen was in charge of controlling, corporate accounting and reporting, investor relations, corporate finance, corporate internal audit and security, taxes, as well as the group's global business services. Prior to joining Deutsche Post DHL, Mr. Rosen served as Chief Financial Officer of Fresenius Medical Care AG & Co. KGaA in Germany from 2003 to 2009. Prior to that, he was Senior Vice President and Treasurer for Aventis SA in Strasbourg, France. Between 1984 and 2000, Mr. Rosen held different positions at the Aventis predecessor companies Hoechst AG and American Hoechst/Hoechst Celanese Inc. Since 2015, Mr. Rosen has served as a member of the board of Lanxess AG and previously served on the board of Postbank AG from 2009 until 2015. Mr. Rosen, who is a U.S. citizen, holds a Bachelor's degree in Economics from the State University of New York and an M.B.A. from the University of Michigan.

Elizabeth E. Tallett, 69, joined the Company's Supervisory Board as well as the Audit Committee and Compensation Committee in 2011 and since 2016 has served as Chairwoman of the Compensation Committee. She is a member of the Selection and Appointment Committee. Ms. Tallett was a Principal of Hunter Partners, LLC, a management company for early to mid-stage pharmaceutical, biotechnology and medical device companies, from 2002 until February 2015. Ms. Tallett continues to consult with early stage health care companies. Her senior management experience includes President and CEO of Transcell Technologies Inc., President of Centocor Pharmaceuticals, member of the Parke-Davis Executive Committee, and Director of Worldwide Strategic Planning for Warner-Lambert Company. Ms. Tallett graduated from Nottingham University, England with dual Bachelor's degrees with honors in mathematics and economics. She is a member of the board of directors of Principal Financial Group, Inc. (where she is currently the Lead Director), Meredith Corp and is chair of the board of Anthem, Inc. She is a former director of Coventry Health Care, Inc. Ms. Tallett was a founding board member of the Biotechnology Council of New Jersey and is a Trustee of Solebury School in Pennsylvania.

Professor Dr. Manfred Karobath, 78, had been a member of the Supervisory Board since 2000 and joined the Compensation Committee in 2005. In 2016, Prof. Karobath was appointed as Chairman of the Supervisory Board. He joined the Science and Technology Committee in 2014 and the Compensation Committee in 2016. He was also the Chairman of the Selection and Appointment Committee. Prof. Dr. Karobath studied medicine, and from 1967 to 1980 he worked first in the Dept. of Biochemistry of the University of Vienna and, after a stage as postdoctoral fellow, he joined the Dept. of Psychiatry where he became Professor of Biological Psychiatry. In 1980, he joined Sandoz Pharma in Basel, first in drug discovery, and later becoming Senior Vice President and head of R&D. In 1992, Prof. Dr. Karobath joined Rhone Poulenc Rorer (RPR) as President of R&D and Executive Vice President, and later, he became a member of the boards of directors of RPR, Pasteur Mérieux Connought, Centeon and Rhone Poulenc Pharma. He has received several scientific awards and has published 92 scientific papers. Prof. Dr. Karobath did not stand for re-election at the Company's Annual General Meeting in June 2018.

Conflicts of Interest, Loans or Similar Benefits

Resolutions to enter into transactions under which members of the Supervisory Board could have a conflict of interest with QIAGEN, and which are of material significance to QIAGEN and/or the relevant member of the Supervisory Board, must be reported and require the approval of the Supervisory Board plenum. A Supervisory Director that has a personal conflict of interest will not participate in the decision making process regarding such item. In 2018 neither QIAGEN nor its Supervisory Board members have entered into any such transactions. No credit, loans or similar benefits were granted to members of the Supervisory Board. Additionally, the Supervisory Board Members did not receive any benefits from third parties that were either promised or granted in view of their position as members of the Supervisory Board.

Committees of the Supervisory Board

The Supervisory Board has established an Audit Committee, a Compensation Committee, a Selection and Appointment Committee and a Science and Technology Committee from among its members and can establish other committees as deemed beneficial. The Supervisory Board has approved charters under which each of the committees operates. These charters are published on our website www.qiagen.com. The committees are comprised of the following members:

| Name of Supervisory Director ⁽¹⁾ | Member of Audit Committee | Member of Compensation Committee | Member of Selection and Appointment Committee | Member of Science and Technology Committee |
|---|---------------------------|----------------------------------|---|--|
| Stéphane Bancel | • | • | | • |
| Dr. Håkan Björklund | | • | • (Chairman) | |
| Dr. Metin Colpan | | | • | • (Chairman) |
| Dr. Ross L. Levine | | | | • |
| Dr. Elaine Mardis | | | | • |
| Lawrence A. Rosen | • (Chairman) | | | |
| Elizabeth E. Tallett | • | • (Chairwoman) | • | |

⁽¹⁾ Prof. Dr. Manfred Karobath served as a member of the Compensation Committee, as a member of the Science and Technology Committee and as the Chairman of the Selection and Appointment Committee until June 2018.

We believe that all of our Supervisory Directors meet the independence requirements set forth in the Dutch Corporate Governance Code (the Dutch Code). We further believe that all Supervisory Board Directors qualify as independent under the independence standards set forth in the New York Stock Exchange (NYSE) Listed Company Manual. Pursuant to the NYSE rules, a majority of the Supervisory Directors must qualify as independent, as defined in the Rules.

Audit Committee

The Audit Committee currently consists of three members, Mr. Rosen (Chairman), Ms. Tallett and Mr. Bancel, and meets at least quarterly. The Audit Committee members are appointed by the Supervisory Board and serve for a term of one year. We believe that all members of our Audit Committee meet the independence requirements as set forth in Rule 10A-3 of the Securities Exchange Act of 1934, as amended, and the New York Stock Exchange Listed Company Manual. The Board has designated Mr. Rosen as an "audit committee financial expert" as that term is defined in the United States Securities and Exchange Commission rules adopted pursuant to the Sarbanes-Oxley Act of 2002 and as defined in provisions III.3.2 and III.5.7 of the Dutch Code. The Audit Committee performs a self-evaluation of its activities on an annual basis.

The Audit Committee's primary duties and responsibilities include, among other things, to serve as an independent and objective party to monitor QIAGEN's accounting and financial reporting process and internal risk management, control and compliance systems. The Audit Committee also is directly responsible for proposing the external auditor to the Supervisory Board, which then proposes the appointment of the external auditor to the General Meeting. Further, the Audit Committee is responsible for the compensation and oversight of QIAGEN's external auditor and for providing an open avenue of communication among the external auditor as well as the Management Board and the Supervisory Board. Our Internal Audit department operates under the direct responsibility of the Audit Committee. Further, the Audit Committee is responsible to establish procedures to allow for the confidential and or anonymous submission by employees of concerns. Additionally, this includes the receipt, retention and treatment of submissions received regarding accounting, internal accounting controls, or auditing matters. The Audit Committee discusses our financial accounting and reporting principles and policies and the adequacy of our internal accounting, financial

and operating controls and procedures with the external auditor and management; considers and approves any recommendations regarding changes to our accounting policies and processes; reviews with management and the external auditor our quarterly earnings reports prior to their release to the press; and reviews the quarterly and annual reports (reported on Forms 6-K and 20-F) to be furnished to or filed with the Securities and Exchange Commission and the Deutsche Boerse. The Audit Committee met seven times in 2018 and met with the external auditor excluding members of the Managing Board in July 2018. The Audit Committee reviews major financial risk exposures, pre-approves related-party transactions between the Company and Supervisory Board or Managing Board, and reviews any legal matter including compliance topics that could have a significant impact on the financial statements.

Compensation Committee

The Compensation Committee's primary duties and responsibilities include, among other things, the preparation of a proposal for the Supervisory Board concerning the Remuneration Policy for the Managing Board to be adopted by the General Meeting, the preparation of a proposal concerning the individual compensation of Managing Board members to be adopted by the Supervisory Board and the preparation of the Remuneration Report on compensation policies for the Managing Board to be adopted by the Supervisory Board. The Compensation Committee reviews and approves all equity-based compensation, reviews and approves the annual salaries, bonuses and other benefits of executive officers, and reviews general policies relating to employee compensation and benefits. The Remuneration Report reviews the implementation of the Remuneration Policy in the most recent year and provides an outline of the Remuneration Policy for the future. The Compensation Committee engages external consultants to ensure that the overall remuneration levels are benchmarked regularly, against a selected group of companies and key markets in which QIAGEN operates. The Compensation Committee currently consists of three members, Ms. Tallett (Chairwoman), Mr. Bancel and Dr. Björklund. Members are appointed by the Supervisory Board and serve for a term of one year. The Compensation Committee met five times in 2018.

Selection and Appointment Committee

The Selection and Appointment (Nomination) Committee is primarily responsible for the preparation of selection criteria and appointment procedures for members of the Supervisory Board and Managing Board as well as the periodic evaluation of the scope and composition of the Managing Board and the Supervisory Board, including the profile of the Supervisory Board. Additionally, the Selection and Appointment Committee periodically evaluates the functioning of individual members of the Managing Board and Supervisory Board, reporting these results to our Supervisory Board. It also proposes the (re-)appointments of members of our Managing Board and Supervisory Board and supervises the policy of our Managing Board in relation to selection and appointment criteria for senior management. Current members of the Selection and Appointment Committee are Dr. Björklund (Chairman), Dr. Colpan, and Ms. Tallett. Members are appointed by the Supervisory Board and serve for a one-year term. The Selection and Appointment Committee did not meet in 2018.

Science and Technology Committee

The Science and Technology Committee is primarily responsible for reviewing and monitoring research and development projects, programs, budgets, infrastructure management and overseeing the management risks related to the Company's portfolio and information technology platforms. The Science and Technology Committee provides understanding, clarification and validation of the fundamental technical basis of the Company's businesses in order to enable the Supervisory Board to make informed, strategic business decisions and vote on related matters, and to guide the Managing Board to ensure that powerful, global, world-class science is developed, practiced and leveraged throughout the Company to create shareholder value. The current members of the Science and Technology Committee are Dr. Colpan (Chairman), Dr. Levine, Mr. Bancel and Dr. Mardis. Members are appointed by the Supervisory Board and serve for a term of one year. The Science and Technology Committee met four times in 2018.

Diversity within the Management Board and Supervisory Board

The Dutch Civil Code provided for statutory provisions to ensure a balanced representation of men and women on the Management Board and Supervisory Boards until January 1, 2016. These statutory rules have expired, but a new bill entered into force on April 13, 2017, extending the provision on gender balance to December 31, 2019.

Balanced representation of men and women is deemed to exist if at least 30 percent of the seats were filled by men and at least 30 percent are filled by women. Within the meaning of the new legislation, our Management Board and Supervisory Board currently do not qualify as balanced. QIAGEN recognizes the benefits of diversity, including gender balance. In nominating candidates for these boards, QIAGEN supports the trend toward higher participation of women. QIAGEN feels that gender is only one part of diversity and strives for a diverse composition in the Managing Board and Supervisory Board also in terms of other factors such as age, nationality, public reputation, industry or academic background. QIAGEN is committed to expanding diversity while pursuing individuals for these boards with a unique blend of scientific and commercial expertise and experience that will contribute to the future success of its business. Management development programs support the career advancement of leaders regardless of gender and other factors. As a result a number of women are in key leadership roles, particularly in leading commercial and operational positions around the world. In line with this commitment, QIAGEN's Selection and Appointment committee will continue selecting future members of the Managing Board and Supervisory Board with due observance of its aim to have a diverse leadership team on the basis of gender, but also on the basis of age, wide ranging experience, backgrounds, skills, knowledge and insight. This all without compromising QIAGEN's commitment to hiring the best individuals for those positions. More information about diversity within the Board other than gender, can be found in below under the section Dutch Corporate Governance Code - Comply or explain.

Compensation of Managing Board Members and Supervisory Directors

Remuneration policy

The objective of our remuneration policy is to attract and retain the talented, highly qualified international leaders and skilled individuals, who enable QIAGEN to achieve its short and long-term strategic initiatives and operational excellence. Our remuneration policy aligns remuneration with individual performance, corporate performance and fosters sustainable growth and long-term value creation in the context of QIAGEN's social responsibility and stakeholders' interest.

The remuneration policy and overall remuneration levels are benchmarked regularly, against a selected group of companies and key markets in which QIAGEN operates, to ensure overall competitiveness. QIAGEN participates in various compensation benchmarking surveys that provide information on the level, as well as the structure, of compensation awarded by various companies and industries for a broad range of positions around the world. The companies in the peer group are selected on the basis of market capitalization, competitors for talent, similar complexity and international spread, operating in similar industries.

The performance of the Managing Board members is measured annually against a written set of goals. The remuneration of the Managing Board members is linked to the achievement of QIAGEN's strategic and financial goals. To ensure that remuneration is linked to performance, a significant proportion of the remuneration package is variable and contingent on performance of the individual and the company. These goals are set at ambitious levels each year to motivate and drive performance, with a focus on achieving both long-term strategic initiatives and short-term objectives based on the annual operative planning. Performance metrics used for these goals include the achievement of financial and non-financial targets.

The remuneration package of the Managing Board members consists of a combination of base salary, short term variable cash award and several elements of long term incentives (together, 'total direct compensation'). In addition, the members of the Managing Board receive a pension arrangement and other benefits that are standard in our industry, such as a company car.

The total target remuneration package of the Managing Board members is appropriately set against a variety of factors which includes external and internal equity, experience, complexity of the position, scope and responsibilities. We aim to provide the members of the Managing Board a total direct compensation at market median level.

The structure of the remuneration package for the Managing Board is designed to balance short-term operational excellence with long-term sustainable value creation while taking into account the interests of its stakeholders. As such a significant part of the total remuneration of the Managing Board members consist of variable remuneration which can differ substantially from year to year depending on our corporate results and individual performance and may include equity-based compensation which may be subject to vesting conditions over a period of up to 10 years.

The remuneration policies for the Managing Board and for other senior management members of QIAGEN are generally aligned and consistent.

Managing Board compensation

The compensation granted to the members of the Managing Board in 2018 consisted of a fixed salary and variable components, with the significant majority of compensation awarded in the form of QIAGEN stock units that are restricted for a long multi-year period to align management with the interests of shareholders and other stakeholders. Variable compensation included long-term equity incentives that were awarded based on individual performance as well as equity awards in lieu of the value of the annual cash bonus.

In 2014, the General Meeting of Shareholders approved a new remuneration policy for the Managing Board which provides that future annual regular equity-based compensation grants to members of the Managing Board will primarily consist of performance stock units. Grants of stock options and restricted stock units which are based on time vesting only shall no longer be granted on a regular basis and shall be reserved for use as special equity incentive rewards in certain situations.

Stock options, if granted, to the Managing Board members must have an exercise price that is higher than the market price at the time of grant. Restricted Stock Units granted to the Managing Board members, vest over a 10-year period. Performance Stock Units are subject to long-term vesting periods and contingent upon the achievement of several financial goals over a multi-year period.

In 2018, a grant of Performance Stock Units with mandatory minimum holding levels of QIAGEN shares was made under the Commitment Program linked to achievement of a three-year plan covering 2019 and 2021 including quantitative goals for net sales, earnings before interest and taxes (EBIT), QIAGEN Value Added (QVA), a steering metric that measures the ability of QIAGEN to generate returns and exceed its cost of capital and share price development as compared to peer companies. Under the Commitment Program, the financial targets for vesting are based on three-year goals as defined within QIAGEN's five-year business plan covering the period from 2019 until the end of 2023. The targets for vesting were set and approved by the Supervisory Board.

The table below state the amounts earned on an accrual basis by our Managing Board members in 2018.

| For the year ended December 31, 2018 (in US\$ thousands, except for number of award grants) | Peer M. Schatz | Roland Sackers |
|---|-----------------|----------------|
| Fixed Salary | \$ 1,281 | \$ 575 |
| Other ⁽³⁾ | \$ 5 | \$ 37 |
| Total fixed income 2018 | \$ 1,286 | \$ 612 |
| Short-term variable cash bonus ⁽¹⁾ | — | — |
| Total short-term income 2018 | \$ 1,286 | \$ 612 |
| Defined contribution on benefit plan | \$ 78 | \$ 80 |
| <i>Number of performance stock units granted 2018⁽²⁾</i> | <i>661,315</i> | <i>197,000</i> |
| Related recognized compensation expense | \$ 2,645 | \$ 763 |

(1) The Variable Cash Bonus does not include values which were converted to equity-based compensation for each Managing Board member at his election in lieu of the value of the cash bonus earned by such Managing Board member in 2018. In 2019, Mr. Schatz will receive a grant of 60,982 performance stock units and Mr. Sackers will receive a grant of 21,131 performance stock units. The performance stock units will vest 40% over three years and 60% over five years from the date of grant, with the final performance measurement aligned to achievement of 2019 performance goals.

(2) The Performance Stock Units Granted amount includes the number of performance stock units granted to each Managing Board member under the Company's Commitment Program. In 2018, Mr. Schatz received a grant of 307,000 performance stock units and Mr. Sackers received a grant of 97,000 performance stock units.

(3) Amounts include, among others, car lease and reimbursed personal expenses such as tax consulting. We also occasionally reimburse our Managing Directors' personal expenses related to attending out-of-town meetings but not directly related to their attendance. Amounts do not include the reimbursement of certain expenses relating to travel incurred at the request of QIAGEN, other reimbursements or payments that in total did not exceed \$10,000 or tax amounts paid by the Company to tax authorities in order to avoid double-taxation under multi-tax jurisdiction employment agreements.

The total recognized compensation expense in accordance with IFRS 2 in the year 2018 (2017) for stock units including recognized expenses for equity awards granted in previous years as well as for any non-periodical share-based payments in kind of a bonus amounted to \$12.3 million (\$10.7 million) for Mr. Schatz and \$3.6 million (\$3.2 million) for Mr. Sackers.

Based on such valuations the total compensation including recognized compensation expenses in the year 2018 (2017) for members of the Managing Board was \$18.0 million (\$16.7 million), and amounts \$13.7 million (\$12.6 million) for Mr. Schatz and \$4.3 million (\$4.1 million) for Mr. Sackers. Total non-periodical remuneration according Dutch Civil Code included in total compensation for the Managing Board was \$3.4 million (\$3.1 million) and amounts \$2.6 million (\$2.4 million) for Mr. Schatz and \$0.8 million (\$0.7 million) for Mr. Sackers.

Further details on the composition of remuneration for the Managing Board, and the implementation of the Remuneration Policy during 2018, are disclosed in the Remuneration Report of the Compensation Committee as published on our website at www.qiagen.com.

Supervisory Board compensation

The Supervisory Board remuneration is aligned to the applicable market standards, considering peer companies of similar size and complexity in similar industries, including biotechnology, life science supplies, diagnostics and pharmaceuticals, to reflect our nexus to the European Markets as a Dutch company as well as our U.S. focus as a NYSE listed company subject to U.S. regulations and the fact that several of the Supervisory Board members are residing in the United States.

The Supervisory Board compensation for 2018 consists of fixed retainer compensation and additional retainer amounts for Chairman and Vice Chairman. Annual remuneration of the Supervisory Board members is as follows:

| | |
|--|-----------|
| Fee payable to the Chairman of the Supervisory Board | \$150,000 |
| Fee payable to the Vice Chairman of the Supervisory Board | \$90,000 |
| Fee payable to each member of the Supervisory Board | \$57,500 |
| Additional compensation payable to members holding the following positions: | |
| Chairman of the Audit Committee | \$25,000 |
| Chairman of the Compensation Committee | \$18,000 |
| Chairman of the Selection and Appointment Committee and other board committees | \$12,000 |
| Fee payable to each member of the Audit Committee | \$15,000 |
| Fee payable to each member of the Compensation Committee | \$11,000 |
| Fee payable to each member of the Selection and Appointment Committee and other board committees | \$6,000 |

Further, the Supervisory Board members will be reimbursed for tax consulting costs incurred in connection with the preparation of their tax returns up to an amount of €5,000 per person per fiscal year.

Supervisory board members also receive a variable component, in the form of share-based compensation. We did not pay any agency or advisory service fees to members of the Supervisory Board.

The following table summarizes the total compensation paid to the members of the Supervisory Board in 2018:

| For the year ended December 31, 2018 (in thousands, except for number of share grants) | Fixed remuneration | Committee Chairman / Chairwoman | Committee membership | Total ⁽²⁾ | Number of restricted stock units granted | Related recognized compensation expense |
|--|--------------------|---------------------------------|----------------------|----------------------|--|---|
| Stéphane Bancel | \$ 57.5 | — | 32.0 | \$ 89.5 | 9,866 | \$ 58.3 |
| Dr. Håkan Björklund | \$ 103.8 | 6.0 | 14.0 | \$ 123.8 | 9,866 | \$ 58.3 |
| Dr. Metin Colpan | \$ 57.5 | 12.0 | 6.0 | \$ 75.5 | 9,866 | \$ 58.3 |
| Prof. Dr. Manfred Karobath ⁽¹⁾ | \$ 75.0 | 6.0 | 8.5 | \$ 89.5 | 9,866 | \$ 133.0 |
| Dr. Ross L. Levine | \$ 57.5 | — | 6.0 | \$ 63.5 | 9,866 | \$ 58.3 |
| Dr. Elaine Mardis | \$ 57.5 | — | 6.0 | \$ 63.5 | 9,866 | \$ 58.3 |
| Lawrence A. Rosen | \$ 57.5 | 25.0 | — | \$ 82.5 | 9,866 | \$ 58.3 |
| Elizabeth E. Tallett | \$ 57.5 | 18.0 | 21.0 | \$ 96.5 | 9,866 | \$ 158.8 |

⁽¹⁾ Prof. Dr. Manfred Karobath was a member of the Supervisory Board since 2000 and did not stand for re-election at the Company's Annual General Meeting in June 2018.

⁽²⁾ Supervisory Directors are reimbursed for travel costs and for any value-added tax to be paid on their remuneration. These reimbursements are excluded from the amounts presented herein.

The total recognized compensation expense in accordance with IFRS 2 in the year 2018 (2017) for long-term compensation of restricted stock units including recognized expenses for equity awards granted in previous years as well as for any non-periodical share-based payments in kind of a bonus amounted to \$1.5 million (\$1.6 million) and includes \$259.0 thousand (\$269.0 thousand) for Mr. Bancel, \$58.3 thousand (\$0) for Mr. Björklund, \$270.6 thousand (\$339.4 thousand) for Mr. Colpan, \$120.2 thousand (\$201.9 thousand) for Mr. Karobath, \$128.0 thousand (\$55.4 thousand) for Mr. Levine, \$227.6 thousand (\$218.8 thousand) for Ms. Mardis, \$259.0 thousand (\$268.9 thousand) for Mr. Rosen and \$201.4 thousand (\$201.9 thousand) for Ms. Tallett.

The total recognized compensation expenses for members of the Supervisory Board in 2018 (2017) for short-term and long-term compensation totaled \$2.2 million (\$2.3 million) and includes amounts of \$348.5 thousand (\$358.5 thousand) for Mr. Bancel, \$182.1 thousand (\$55.9 thousand) for Mr. Björklund, \$346.1 thousand (\$414.9 thousand) for Mr. Colpan, \$209.7 thousand (\$380.9 thousand) for Mr. Karobath, \$191.5 thousand (\$118.9

thousand) for Mr. Levine, \$291.1 thousand (\$282.3 thousand) for Ms. Mardis, \$341.5 thousand (\$351.4 thousand) for Mr. Rosen, and \$297.9 thousand (\$298.4 thousand) for Ms. Tallett.

Total non-periodical remuneration according Dutch Civil Code included in total compensation in 2018 (2017), which includes the expense related to the short-term variable cash bonus and the expense related to the long-term compensation of equity awards granted in 2018 (2017), totaled \$0.6 million (\$0.6 million) and includes amounts of \$58.3 thousand (\$55.4 thousand) for Mr. Bancel, \$58.3 thousand (\$0) for Mr. Björklund, \$58.3 thousand (\$55.4 thousand) for Mr. Colpan, \$133.0 thousand (\$147.0 thousand) for Mr. Karobath, \$58.3 thousand (\$55.4 thousand) for Mr. Levine, \$58.3 thousand (\$55.4 thousand) for Ms. Mardis, \$58.3 thousand (\$55.4 thousand) for Mr. Rosen, and \$158.8 thousand (\$147.0 thousand) for Ms. Tallett.

Share Ownership

The following table sets forth certain information as of January 31, 2019 concerning the ownership of Common Shares by our directors and officers. In preparing the following table, we have relied on information furnished by such persons.

| Name and Country of Residence | Shares Beneficially Owned ⁽¹⁾ | |
|-----------------------------------|--|-------------------|
| | Number ⁽²⁾ | Percent Ownership |
| Peer M. Schatz, Germany | 2,732,805 ⁽³⁾ | 1.21 % |
| Roland Sackers, Germany | 40,000 ⁽⁴⁾ | * |
| Stéphane Bancel, United States | 4,429 ⁽⁵⁾ | * |
| Dr. Håkan Björklund, Sweden | — | — |
| Dr. Metin Colpan, Germany | 3,539,784 ⁽⁶⁾ | 1.57% |
| Dr. Ross L. Levine, United States | — | — |
| Dr. Elaine Mardis, United States | — ⁽⁷⁾ | — |
| Lawrence A. Rosen, United States | — ⁽⁸⁾ | — |
| Elizabeth Tallett, United States | 16,103 ⁽⁹⁾ | * |

* Indicates that the person beneficially owns less than 0.5% of the Common Shares issued and outstanding as of January 31, 2019.

(1) The number of Common Shares outstanding as of January 31, 2019 was 225,512,336. The persons and entities named in the table have sole voting and investment power with respect to all shares shown as beneficially owned by them and have the same voting rights as shareholders with respect to Common Shares.

(2) Does not include Common Shares subject to options or awards held by such persons at January 31, 2019. See footnotes below for information regarding options now exercisable or that could become exercisable within 60 days of the date of this table.

(3) Does not include 505,524 shares issuable upon the exercise of options now exercisable having exercise prices ranging from \$15.59 to \$22.25 per share. Options expire in increments during the period between February 2020 and February 2023. Does not include 386,571 shares issuable upon the release of unvested stock awards that could become releasable within 60 days from the date of this table. Includes 1,477,171 shares held by PS Capital Management, of which Mr. Schatz is the sole stockholder. 350,000 of the shares beneficially owned by Mr. Schatz have been pledged by him as security for an obligation.

(4) Does not include 135,739 shares issuable upon the exercise of options now exercisable having exercise prices ranging from \$15.59 to \$22.25 per share. Options expire in increments during the period between February 2020 and February 2023. Does not include 125,688 shares issuable upon the release of unvested stock awards that could become releasable within 60 days from the date of this table.

(5) Does not include 10,296 shares issuable upon the release of unvested stock awards that could become releasable within 60 days from the date of this table.

(6) Does not include 7,893 shares issuable upon the exercise of options now exercisable having exercise prices ranging from \$15.59 to \$22.43 per share. Options expire in increments during the period between February 2019 and February 2022. Includes 2,741,579 shares held by CC Verwaltungs GmbH, of which Dr. Colpan is the sole stockholder and 770,370 shares held by Colpan GbR. Does not include 10,833 shares issuable upon the release of unvested stock awards that could become releasable within 60 days from the date of this table.

(7) Does not include 4,296 shares issuable upon the release of unvested stock awards that could become releasable within 60 days from the date of this table.

(8) Does not include 10,296 shares issuable upon the release of unvested stock awards that could become releasable within 60 days from the date of this table.

(9) Does not include 1,563 shares issuable upon the exercise of options now exercisable having exercise prices of \$15.59 per share. Options expire on February 2022. Does not include 10,296 shares issuable upon the release of unvested stock awards that could become releasable within 60 days from the date of this table.

The following table sets forth the options of our officers and directors as of January 31, 2019:

| Name | Total Vested Options | Expiration Dates | Exercise Prices |
|----------------------|----------------------|------------------------|--------------------|
| Peer M. Schatz | 505,524 | 2/26/2020 to 2/28/2023 | \$15.59 to \$22.25 |
| Roland Sackers | 135,739 | 2/26/2020 to 2/28/2023 | \$15.59 to \$22.25 |
| Dr. Metin Colpan | 7,893 | 2/27/2019 to 2/28/2022 | \$15.59 to \$22.43 |
| Elizabeth E. Tallett | 1,563 | 2/28/2022 | \$15.59 |

Additional Information

Shareholders

Our shareholders exercise their voting rights through Annual and Extraordinary General Meetings. Resolutions of the General Meeting are adopted by an absolute majority of votes cast, unless a different majority of votes or quorum is required by Dutch law or the Articles of Association. Each common share confers the right to cast one vote.

Furthermore, the Managing Board, or where appropriate, the Supervisory Board, shall provide all shareholders and other parties in the financial markets with equal and simultaneous information about matters that may influence QIAGEN's share price.

QIAGEN is required to convene an Annual General Meeting in the Netherlands no later than six months following the end of each year. The agenda for the Annual General Meeting must contain certain matters as specified in QIAGEN's Articles of Association and under Dutch law, including, among other things, the adoption of QIAGEN's annual financial statements.

Additional Extraordinary General Meetings may be convened at any time by the Managing Board, the Supervisory Board or by one or more shareholders jointly representing at least 40% of QIAGEN's issued share capital. Furthermore, one or more shareholders, who jointly represent at least 10% of QIAGEN's issued share capital may, on their application, be authorized by the district court judge having applications for interim relief, to convene a General Meeting. Shareholders are entitled to propose items for the agenda of the General Meeting provided that they hold at least 3% of the issued share capital. Proposals for agenda items for the General Meeting must be submitted at least 60 days prior to the meeting date. The notice convening a General Meeting, accompanied by the agenda, shall be sent no later than 42 days prior to the meeting. QIAGEN informs the General Meeting by means of explanatory notes to the agenda, providing all facts and circumstances relevant to the proposed resolutions.

Pursuant to the Dutch Code, all transactions between the company and legal or natural persons who hold at least ten percent of the shares in the company shall be agreed on terms that are customary in the sector concerned. Decisions to enter into transactions in which there are conflicts of interest with such persons that are of material significance to the company and/or to such persons require the approval of the Supervisory Board. QIAGEN has not entered into any such transactions in 2018.

Stock Plans

We adopted the QIAGEN N.V. Amended and Restated 2005 Stock Plan (the 2005 Plan) which was approved by our shareholders on June 14, 2005. The 2005 Plan expired by its terms in April 2015 and no further awards will be granted under the 2005 Plan. On June 25, 2014, our shareholders approved the QIAGEN N.V. 2014 Stock Plan (the 2014 Plan), which replaced the 2005 Plan in April 2015. An aggregate of 16.7 million Common Shares were reserved for issuance pursuant to the 2014 Plan, subject to certain antidilution adjustments. We issue Treasury Shares to satisfy option exercises and award releases and had approximately 19.9 million Common Shares reserved and available for issuance under the 2005 and 2014 Plans at December 31, 2018.

Pursuant to the 2014 Plan, stock rights, which include options to purchase our Common Shares, stock grants and stock-based awards, may be granted to employees and consultants of QIAGEN and its subsidiaries and to Supervisory Directors. Options granted pursuant to the 2014 Plan may either be incentive stock options within the meaning of Section 422 of the United States Internal Revenue Code of 1986, as amended (the Code), or non-qualified stock options. Options granted to members of the Supervisory Board and the Managing Board must have an exercise price that is higher than the market price at the time of grant. Generally, the stock rights and incentive stock options, as well as non-qualified options, stock grants and stock-based awards have terms of up to five or ten years, subject to earlier termination in the event of death, disability or other termination of employment. The vesting and exercisability of certain stock rights will be accelerated in the event of a Change of Control, as defined in the agreements under the 2014 Plan.

The Plan is administered by the Compensation Committee of the Supervisory Board, which selects participants from among eligible employees, consultants and directors and determines the number of shares subject to the stock-based award, the length of time the award will remain outstanding, the manner and time of the award's vesting, the price per share subject to the award and other terms and conditions of the award consistent with the Plan. The Compensation Committee's decisions are subject to the approval of the Supervisory Board.

The Compensation Committee has the power, subject to Supervisory Board approval, to interpret the plans and to adopt such rules and regulations (including the adoption of "sub plans" applicable to participants in specified jurisdictions) as it may deem necessary or appropriate. The Compensation Committee or the Supervisory Board may at any time amend the plans in any respect, subject to Supervisory Board approval, and except that (i) no amendment that would adversely affect the rights of any participant under any option previously granted may be made without such participant's consent and (ii) no amendment shall be effective prior to shareholder approval to the extent such approval is required to ensure favorable tax treatment for incentive stock options or to ensure compliance with Rule 16b-3 under the United States Securities Exchange Act of 1934, as amended (the Exchange Act) at such times as any participants are subject to Section 16 of the Exchange Act.

As of January 31, 2019, there were 0.9 million options outstanding with exercise prices ranging between \$14.91 and \$23.16 and expiring between February 27, 2019 and October 31, 2023. The exercise price of the options is the fair market value of the Common Shares as of the date of grant or a premium above fair market value. Additionally, there were 8.3 million stock unit awards outstanding as of January 31, 2019. These awards will be released between February 15, 2019 and May 31, 2028. As of January 31, 2019, options to purchase 0.7 million Common Shares and 3.8 million stock unit awards were held by the officers and directors of QIAGEN, as a group.

Further detailed information regarding stock options and awards granted under the plan can be found in Note 21 included in the Consolidated Financial Statements.

Independence

Unlike the New York Stock Exchange listing standards which require a majority of the Supervisory Board members to be independent, the Dutch Corporate Governance Code distinguishes between certain independence criteria which may be fulfilled by not more than one Supervisory Board Members (as e.g. prior employment with the Company, receiving personal financial an important business relationship with the Company) and other criteria which may not be fulfilled by more than the majority of the Supervisory Board members. In some cases the Dutch independence requirement is more stringent, such as by requiring a longer "look back" period (five years) for former executive directors. In other cases, the New York Stock Exchange rules are more stringent, such as a broader definition of disqualifying affiliations. Currently, all members of our Supervisory Board are "independent" under both the New York Stock Exchange and Dutch definitions.

Risk Management

Reference is made to the discussion in the section "Principle Risks and Uncertainties" above.

Disclosure Controls and Procedures

Our Managing Directors, with the assistance of other members of management, performed an evaluation of the effectiveness of the design and operation of our disclosure controls and procedures, as that term is defined in Rules 13a-15(e) and 15d-15(e) of the Securities Exchange Act of 1934, as amended, within 90 days of the date of this report. Based on that evaluation, they concluded that as of December 31, 2018, our disclosure controls and procedures were effective to ensure that information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms, and is accumulated and communicated to our management, including our Managing Directors, as appropriate to allow timely decisions regarding required disclosure.

There are inherent limitations to the effectiveness of any system of disclosure controls and procedures, no matter how well designed, such as the possibility of human error and the circumvention or overriding of the controls and procedures. Therefore, even those systems determined to be effective may not prevent or detect misstatements and can provide only reasonable assurance of achieving their control objectives. In addition, any determination of effectiveness of controls is not a projection of any effectiveness of those controls to future periods, as those controls may become inadequate because of changes in conditions or the degree of compliance with the policies or procedures may deteriorate.

Report of Management on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Securities Exchange Act of 1934, as amended. The Company's system of internal controls over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of the consolidated financial statements in accordance with generally accepted accounting principles.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements and even when determined to be effective can provide only reasonable assurance with respect to financial statement preparation and presentation. Projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Our management assessed the effectiveness of the Company's internal control over financial reporting as of December 31, 2018. In making this assessment, management used the updated criteria set forth in 2013 by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) in Internal Control-Integrated Framework.

Based on our assessment under the COSO Internal Control-Integrated Framework, management believes that, as of December 31, 2018, our internal control over financial reporting is effective.

Changes in Internal Control over Financial Reporting

There has been no change in our internal control over financial reporting during 2018 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Independent Auditors

In accordance with the requirements of Dutch law, our independent registered public accounting firm for our statutory consolidated financial statements prepared in accordance with International Financial Reporting Standards and filed with the Netherlands Authority for the Financial Markets (AFM), is appointed, and may be removed by, the General Meeting. The Supervisory Board nominates a candidate for the appointment as external auditor, for which purpose both the Audit Committee and the Managing Board advise the Supervisory Board. At the Annual General Meeting in 2018, KPMG Accountants N.V. was appointed as external auditor for the Company for 2018 year. The external auditor is invited to attend the meeting of the Supervisory Board at which the statutory financial statements prepared in accordance with International Financial Reporting Standards and filed with the AFM shall be approved and is furthermore invited to attend the General Meeting at which the statutory financial statements are adopted and may be questioned by the General Meeting on its statement on the fairness of our annual accounts prepared in accordance with International Financial Reporting Standards.

Following the appointment of KPMG Accountants N.V. for the audit of our statutory consolidated financial statements, the external auditor for our consolidated financial statements prepared under U.S. generally accepted accounting principles is KPMG AG Wirtschaftsprüfungsgesellschaft who audited the consolidated financial statements as of and for the year ended December 31, 2018 contained in this annual report.

The remuneration of the external auditor, and instructions to the external auditor to provide non-audit services, shall be approved by the Supervisory Board on the recommendation of the Audit Committee and after consultation with the Managing Board. At least once every four years, the Supervisory Board and the Audit Committee shall conduct a thorough assessment of the functioning of the external auditor. The main conclusions of this assessment shall be communicated to the General Meeting for the purposes of assessing the nomination for the appointment of the external auditor.

Whistleblower Policy and Code of Conduct

We have a formal Whistleblower Policy concerning the reporting of alleged irregularities within QIAGEN of a general, operational or financial nature. Furthermore, we have a published Code of Conduct that outlines business principles for our employees and rules of conduct. The Code of Conduct can be found on our website at www.qiagen.com.

Anti-Takeover Measures

In 2004, the Supervisory Board granted an option to the Dutch Foundation Stichting Preferente Aandelen QIAGEN that allows the Foundation to acquire preference shares from QIAGEN if (i) a person has (directly or indirectly) acquired or has expressed a desire to acquire more than 20% of our issued share capital, or (ii) a person holding at least a 10% interest in the share capital has been designated as a hostile person by our Supervisory Board. The option enables the Foundation to acquire preference shares equal to the number of our outstanding common shares at the time of the relevant exercise of the right, less one share. When exercising the option and exercising its voting rights on these shares, the Foundation must act in the interest of QIAGEN and the interests of our stakeholders. No preference shares are currently outstanding.

Dutch Corporate Governance Code — Comply or Explain

The corporate governance structure and compliance with the Dutch Code is the joint responsibility of the Managing Board and the Supervisory Board. They are accountable for this responsibility to the General Meeting. We continue to seek ways to improve our corporate governance by measuring itself against international best practice. The Dutch Code was last amended on December 8, 2016, and can be found at www.commissiecorporategovernance.nl.

Non-application of a specific best practice provision is not in itself considered objectionable by the Dutch Code and may well be justified because of particular circumstances relevant to a company. In accordance with Dutch law, we disclose in our Annual Report the application of the Dutch Code's principles and best practice provisions.

To the extent that we do not apply certain principles and best practice provisions, or do not intend to apply these in the current or the subsequent year, we state the reasons.

We take a positive view of the Dutch Code and apply nearly all of the best practice provisions. However, we prefer not to apply some provisions due to the international character of our business as well as the fact - acknowledged by the Commission that drafted the Dutch Code - that existing contractual agreements between QIAGEN and individual members of the Managing Board cannot be set aside at will.

The following provides an overview of exceptions that we have identified:

1. Best practice provision 2.2.2 recommends that a supervisory board member is appointed for a period of four years. A member may be reappointed for a term of additional two years, which appointment may be extended by at most two years. Best practice provision 2.2.2 does not apply to supervisory board members, who as of the date of the entry into force of this Code, have already held office for more than eight years, provided that best practice provision III.3.5 of the Dutch Code adopted in 2008, that is replaced by the Dutch Code 2016 is being complied with. Best practice provision III.3.5. of the Dutch Code 2008 recommends that a supervisory board member is appointed for a maximum of three 4-year terms.

Members of the Supervisory Board are appointed annually for a one-year period beginning on the day following the General Meeting up to and including the day of the General Meeting held in the following year. Further, Dr. Metin Colpan has joined the Supervisory Board in 2004. We value the profound industry experience of Dr. Colpan and his in-depth knowledge of QIAGEN. QIAGEN therefore supports the reappointment of Dr. Colpan beyond the eight-year term as recommended by the Dutch Code.

2. Best practice provision 2.1.5 recommends that the Supervisory Board should draw up a diversity policy for the composition of the Management Board, the Supervisory Board and, if applicable, the Executive Committee. The policy should address concrete targets relating to diversity and the diversity aspects to the Company, such as nationality, age, gender and education and work background.

While QIAGEN strives for a diverse composition of the Supervisory Board, Managing Board, Executive Committee and in all other management levels of the Company, we do not consider the definition of concrete targets relating to diversity useful. We are committed to creating an environment where all individuals have the opportunity to grow and contribute to our progress, regardless of their age, educational background, gender, nationality, physical abilities, race and ethical background, religion, or sexual orientation. We consider it to be a key success factor on the path to achieving our mission and goals. Individuals and teams alike understand the diverse needs of our customers, identify and realize cross-functional opportunities for our business areas, and can quickly adapt to a fast changing environment. In 2018, our multicultural workforce was composed of 71 nationalities with an average age of 40.1. With 49% women, we are well balanced in terms of gender on an aggregate level. Information on the composition of our Managing and Supervisory Boards can be found in Item 6.

3. Best practice provision 3.1.2 vi. recommends that when formulating the remuneration policy, it should be considered that shares awarded to management board should be held for a period of at least five years.

Pursuant to the Company's Remuneration Policy, long-term equity-based grants to members of the Managing Board under the 2014 Plan primarily consist of an award of performance stock units, i.e. long-term incentive awards which are dependent upon the achievement of pre-defined performance goals. Grants of restricted stock units, which are based on time vesting only, are no longer to be granted on a regular basis and shall be reserved for use as special equity incentive rewards in certain situations. Performance stock units and restricted stock units granted until February 2018 are basically structured so that 40% of a grant vests after three years, 50% after five years and the remaining 10% after ten years. Grants of performance stock units and restricted stock units granted after February 2018 vest 40% after three years, 60% after five years. In 2019, the members of the Managing Board elected to receive in lieu of their 2018 cash bonus the value earned in the year in performance stock units which vest over five years from the grant date.

4. Best practice provision 3.2.3 recommends that the maximum remuneration in the event of dismissal of a management board member may not exceed one year's salary (the "fixed" remuneration component).

Our Managing Board members have entered into employment agreements with QIAGEN N.V. and some QIAGEN affiliates for which they hold managing positions. In case of termination of an agreement without serious cause as defined by the applicable law, the respective affiliate would remain obliged to compensate the Managing Board member for the remaining term of the employment agreement. QIAGEN believes that these contractual arrangements are well justified due to the long tenures of the Managing Board members.

5. Best practice provision 2.2.4 recommends that the supervisory board should draw up a retirement schedule in order to avoid, as far as possible, a situation in which many supervisory board members retire simultaneously. The retirement schedule should be made generally available and should be posted on the company's website.

The Supervisory Board follows the practice to discuss retirement plans of individual members early to proactively manage continuity within the Supervisory Board. QIAGEN believes that this practice provides a more flexible and better succession planning than a fixed retirement schedule.

6. Best practice provision 3.3.2 recommends that a supervisory board member may not be granted any shares and/or rights to shares by way of remuneration.

QIAGEN has granted stock options to the members of the Supervisory Board as a remuneration component since its establishment until 2013 when we stopped granting stock options. Since 2007, Supervisory Board members have been granted restricted stock units. We believe that the reasonable level of equity-based compensation which we practice allows a positive alignment of shareholder interests with the other duties of the Supervisory Board and that this practice is necessary to attract and retain Supervisory Board members as the granting of share-based compensation to Supervisory Board members is a common practice in our industry.

NYSE Exemptions

Exemptions from the NYSE corporate governance standards are available to foreign private issuers, such as QIAGEN when those standards are contrary to a law, rule or regulation of any public authority exercising jurisdiction over such issuer or contrary to generally accepted business practices in the issuer's country of domicile. In connection with QIAGEN's listing on the NYSE, the NYSE accepted QIAGEN's exemptions from certain corporate governance standards that are contrary to the laws, rules, regulations or generally accepted business practices of The Netherlands. These exemptions and the practices followed by QIAGEN are described below:

- › QIAGEN is exempt from NYSE's quorum requirements applicable to meetings of ordinary shareholders. In keeping with the law of The Netherlands and generally accepted business practices in The Netherlands, QIAGEN's Articles of Association provide that there are no quorum requirements generally applicable to meetings of the General Meeting.
- › QIAGEN is exempt from NYSE's requirements that shareholder approval be obtained prior to the establishment of, or material amendments to, stock option or purchase plans and other equity compensation arrangements pursuant to which options or stock may be acquired by directors, officers, employees or consultants. QIAGEN is also exempt from NYSE's requirements that shareholder approval be obtained prior to certain issuances of stock resulting in a change of control, occurring in connection with acquisitions of stock or assets of another company or issued at a price less than the greater of book or market value other than in a public offering. QIAGEN's Articles of Association do not require approval of the General Meeting prior to the establishment of a stock plan. The Articles of Association also permit the General Meeting to grant the Supervisory Board general authority to issue shares without further approval of the General Meeting. QIAGEN's General Meeting has granted the Supervisory Board general authority to issue up to a maximum of our authorized capital without further approval of the General Meeting. QIAGEN plans to seek approval of the General Meetings for stock plans and stock issuances only where required under the law of The Netherlands or under QIAGEN's Articles of Association.

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FINANCIAL RESULTS

Financial Results

QIAGEN N.V. AND SUBSIDIARIES CONSOLIDATED BALANCE SHEETS (in thousands)

| | Note | As of December 31, | |
|--|----------|---------------------|---------------------|
| | | 2018 | 2017 |
| Assets | | | |
| Current assets: | | | |
| Cash and cash equivalents | (3) | \$ 1,159,079 | \$ 657,714 |
| Short-term investments | (7) | 234,606 | 359,198 |
| Accounts receivable, net of allowance for doubtful accounts of \$9,270 and \$8,008 in 2018 and 2017, respectively | (3, 23) | 351,612 | 329,138 |
| Income taxes receivable | | 34,936 | 39,509 |
| Inventories, net | (3) | 162,912 | 155,927 |
| Fair value of derivative instruments — current | (13) | 102,754 | 7,480 |
| Prepaid expenses and other current assets | (8) | 109,161 | 99,007 |
| Total current assets | | 2,155,060 | 1,647,973 |
| Long-term assets: | | | |
| Property, plant and equipment, net of accumulated depreciation of \$603,430 and \$564,588 in 2018 and 2017, respectively | (9) | 511,659 | 494,321 |
| Goodwill | (11) | 2,108,536 | 2,012,904 |
| Intangible assets, net of accumulated amortization of \$1,194,679 and \$1,117,423 in 2018 and 2017, respectively | (11) | 475,043 | 499,318 |
| Deferred income taxes | (16) | 42,896 | 39,353 |
| Fair value of derivative instruments — long-term | (13) | 295,363 | 224,398 |
| Other long-term assets (of which \$24,300 and \$17,713 in 2018 and 2017 due from related parties, respectively) | (10, 23) | 159,775 | 120,249 |
| Total long-term assets | | 3,593,272 | 3,390,543 |
| Total assets | | \$ 5,748,332 | \$ 5,038,516 |

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

QIAGEN N.V. AND SUBSIDIARIES CONSOLIDATED BALANCE SHEETS (in thousands, except par value)

| | Note | As of December 31, | |
|--|----------|---------------------|---------------------|
| | | 2018 | 2017 |
| Liabilities and equity | | | |
| Current liabilities: | | | |
| Current portion of long-term debt | (15) | \$ 503,116 | \$ — |
| Accounts payable | (22) | 69,415 | 59,205 |
| Fair value of derivative instruments — current | (13) | 106,594 | 2,424 |
| Accrued and other current liabilities (of which \$5,488 and \$9,028 due to related parties in 2018 and 2017, respectively) | (10, 22) | 263,017 | 241,690 |
| Income taxes payable | | 30,047 | 21,473 |
| Total current liabilities | | 972,189 | 324,792 |
| Long-term liabilities: | | | |
| Long-term debt, net of current portion | (15) | 1,671,090 | 1,758,258 |
| Deferred income taxes | (16) | 63,411 | 76,727 |
| Fair value of derivative instruments — long-term | (13) | 317,393 | 253,389 |
| Other long-term liabilities (of which \$3,075 due to related parties in 2017) | (10, 22) | 89,279 | 84,354 |
| Total long-term liabilities | | 2,141,173 | 2,172,728 |
| Commitments and contingencies | (19) | | |
| 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 in 2018 and 2017, respectively | | 2,702 | 2,702 |
| Additional paid-in capital | | 1,742,191 | 1,630,095 |
| Retained earnings | | 1,379,624 | 1,247,945 |
| Accumulated other comprehensive loss | (17) | (310,644) | (220,759) |
| Less treasury shares, at cost— 5,320 and 4,272 shares in 2018 and 2017, respectively | (17) | (178,903) | (118,987) |
| Total equity | | 2,634,970 | 2,540,996 |
| Total liabilities and equity | | \$ 5,748,332 | \$ 5,038,516 |

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

QIAGEN N.V. AND SUBSIDIARIES CONSOLIDATED STATEMENTS OF INCOME

(in thousands, except per share data)

| | Note | Years ended December 31, | | |
|--|------------|--------------------------|------------------|------------------|
| | | 2018 | 2017 | 2016 |
| Net sales | (3, 4, 23) | \$ 1,501,848 | \$ 1,417,536 | \$ 1,337,991 |
| Cost of sales | | 500,888 | 494,975 | 493,338 |
| Gross profit | | 1,000,960 | 922,561 | 844,653 |
| Operating expenses: | | | | |
| Research and development | (3) | 161,852 | 154,084 | 149,841 |
| Sales and marketing | | 392,281 | 375,562 | 376,321 |
| General and administrative, restructuring, integration and other, net | (3) | 141,214 | 200,098 | 180,573 |
| Acquisition-related intangible amortization | | 39,032 | 39,398 | 39,091 |
| Total operating expenses | | 734,379 | 769,142 | 745,826 |
| Income from operations | | 266,581 | 153,419 | 98,827 |
| Other income (expense): | | | | |
| Interest income | | 20,851 | 10,645 | 6,776 |
| Interest expense | | (67,293) | (49,685) | (39,022) |
| Other income (expense), net | (6) | (5,598) | (4) | (9,673) |
| Total other expense, net | | (40,844) | (39,044) | (41,919) |
| Income before income taxes | | 225,737 | 114,375 | 56,908 |
| Income taxes | (3, 16) | 35,357 | 73,981 | (23,395) |
| Net income | | 190,380 | 40,394 | 80,303 |
| Net loss attributable to noncontrolling interest | | — | — | (101) |
| Net income attributable to the owners of QIAGEN N.V. | | \$ 190,380 | \$ 40,394 | \$ 80,404 |
| Basic net income per common share attributable to the owners of QIAGEN N.V. | | \$ 0.84 | \$ 0.18 | \$ 0.34 |
| Diluted net income per common share attributable to the owners of QIAGEN N.V. | | \$ 0.82 | \$ 0.17 | \$ 0.34 |
| Weighted-average common shares outstanding | | | | |
| Basic | (18) | 226,640 | 228,074 | 234,800 |
| Diluted | (18) | 233,456 | 233,009 | 238,993 |

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

QIAGEN N.V. AND SUBSIDIARIES CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (in thousands)

| | Note | Years ended December 31, | | |
|---|------|--------------------------|----------------|-----------------|
| | | 2018 | 2017 | 2016 |
| Net income | | \$ 190,380 | \$ 40,394 | \$ 80,303 |
| Other comprehensive income (loss) to be reclassified to profit or loss in subsequent periods: | | | | |
| Gains (losses) on cash flow hedges, before tax | (13) | 25,207 | (50,067) | (3,969) |
| Reclassification adjustments on cash flow hedges, before tax | (13) | (9,774) | 26,136 | (6,228) |
| Cash flow hedges, before tax | | 15,433 | (23,931) | (10,197) |
| Losses on marketable securities, before tax | | — | (854) | (1,421) |
| Gains on pensions, before tax | | 1,325 | 886 | 929 |
| Foreign currency translation adjustments, before tax | | (108,045) | 135,945 | (65,910) |
| Other comprehensive (loss) income, before tax | | (91,287) | 112,046 | (76,599) |
| Income tax relating to components of other comprehensive income (loss) | | 460 | 1,034 | 2,562 |
| Total other comprehensive income (loss), after tax | | (90,827) | 113,080 | (74,037) |
| Comprehensive income | | 99,553 | 153,474 | 6,266 |
| Comprehensive (income) attributable to noncontrolling interest | | — | — | (545) |
| Comprehensive income attributable to the owners of QIAGEN N.V. | | \$ 99,553 | \$ 153,474 | \$ 5,721 |

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

QIAGEN N.V. AND SUBSIDIARIES CONSOLIDATED STATEMENTS OF CHANGES IN EQUITY

| (in thousands) | Note | Common Shares | | Additional Paid-In Capital | Retained Earnings | Accumulated Other Comprehensive Income (Loss) | Treasury Shares | | Equity Attributable to the Owners of QIAGEN N.V. | Non-controlling Interest | Total Equity |
|---|------|---------------|----------|----------------------------|-------------------|---|-----------------|--------------|--|--------------------------|--------------|
| | | Shares | Amount | | | | Shares | Amount | | | |
| Balance at December 31, 2015 | | 239,707 | \$ 2,812 | \$ 1,765,595 | \$ 1,209,197 | \$ (259,156) | (6,702) | \$ (152,412) | \$ 2,566,036 | \$ 2,034 | \$ 2,568,070 |
| Acquisition of QIAGEN Marseille S.A. shares from noncontrolling interests | | — | — | — | — | — | — | — | — | (2,624) | (2,624) |
| Acquisition of Exiqon A/S | (5) | — | — | — | — | — | — | — | — | 5,519 | 5,519 |
| Acquisition of Exiqon shares from noncontrolling interests | (5) | — | — | — | — | — | — | — | — | (5,474) | (5,474) |
| Net income | | — | — | — | 80,404 | — | — | — | 80,404 | (101) | 80,303 |
| Unrealized gain, net on pension | (17) | — | — | — | — | 650 | — | — | 650 | — | 650 |
| Unrealized loss, net on hedging contracts | (13) | — | — | — | — | (2,977) | — | — | (2,977) | — | (2,977) |
| Realized gain, net on hedging contracts | (13) | — | — | — | — | (4,671) | — | — | (4,671) | — | (4,671) |
| Unrealized loss, net on marketable securities | | — | — | — | — | (1,371) | — | — | (1,371) | — | (1,371) |
| Translation adjustment, net | (17) | — | — | — | — | (66,314) | — | — | (66,314) | 646 | (65,668) |
| Issuance of common shares in connection with stock plan | (21) | — | — | — | (26,137) | — | 1,555 | 32,406 | 6,269 | — | 6,269 |
| Excess tax benefit of employee stock plans | | — | — | 782 | — | — | — | — | 782 | — | 782 |
| Share-based compensation | (21) | — | — | 28,288 | — | — | — | — | 28,288 | — | 28,288 |
| Balance at December 31, 2016 | | 239,707 | \$ 2,812 | \$ 1,794,665 | \$ 1,263,464 | \$ (333,839) | (5,147) | \$ (120,006) | \$ 2,607,096 | \$ — | \$ 2,607,096 |
| Capital repayment | | (8,878) | (110) | (244,319) | — | — | 191 | — | (244,429) | — | (244,429) |
| Issuance of warrants | | — | — | 45,307 | — | — | — | — | 45,307 | — | 45,307 |
| Net income | | — | — | — | 40,394 | — | — | — | 40,394 | — | 40,394 |
| Unrealized gain, net on pension | (17) | — | — | — | — | 620 | — | — | 620 | — | 620 |
| Unrealized loss, net on hedging contracts | (13) | — | — | — | — | (42,489) | — | — | (42,489) | — | (42,489) |
| Realized loss, net on hedging contracts | (13) | — | — | — | — | 19,602 | — | — | 19,602 | — | 19,602 |
| Unrealized loss, net on marketable securities | (10) | — | — | — | — | (786) | — | — | (786) | — | (786) |
| Translation adjustment, net | (17) | — | — | — | — | 136,133 | — | — | 136,133 | — | 136,133 |
| Purchase of treasury shares | (17) | — | — | — | — | — | (1,909) | (60,970) | (60,970) | — | (60,970) |
| Issuance of common shares in connection with stock plan | (21) | — | — | — | (55,913) | — | 2,593 | 61,989 | 6,076 | — | 6,076 |
| Share-based compensation | (21) | — | — | 34,442 | — | — | — | — | 34,442 | — | 34,442 |
| Balance at December 31, 2017 | | 230,829 | \$ 2,702 | \$ 1,630,095 | \$ 1,247,945 | \$ (220,759) | (4,272) | \$ (118,987) | \$ 2,540,996 | \$ — | \$ 2,540,996 |
| Balance at January 1, 2018, as previously reported | | 230,829 | 2,702 | 1,630,095 | 1,247,945 | (220,759) | (4,272) | (118,987) | 2,540,996 | — | 2,540,996 |
| ASU 2016-01 impact of change in accounting policy | | — | — | — | (942) | 942 | — | — | — | — | — |
| ASU 2016-16 impact of change in accounting policy | | — | — | — | (16,096) | — | — | — | (16,096) | — | (16,096) |
| ASC 606 impact of change in accounting policy | | — | — | — | (1,306) | — | — | — | (1,306) | — | (1,306) |
| Adjusted balance at January 1, 2018 | (17) | 230,829 | \$ 2,702 | \$ 1,630,095 | \$ 1,229,601 | \$ (219,817) | (4,272) | \$ (118,987) | \$ 2,523,594 | \$ — | \$ 2,523,594 |
| Issuance of warrants | (17) | — | — | 71,983 | — | — | — | — | 71,983 | — | 71,983 |
| Net income | | — | — | — | 190,380 | — | — | — | 190,380 | — | 190,380 |
| Unrealized gain, net on pension | (17) | — | — | — | — | 754 | — | — | 754 | — | 754 |
| Unrealized gain, net on hedging contracts | (13) | — | — | — | — | 22,365 | — | — | 22,365 | — | 22,365 |
| Realized gain, net on hedging contracts | (13) | — | — | — | — | (7,331) | — | — | (7,331) | — | (7,331) |
| Translation adjustment, net | (17) | — | — | — | — | (106,615) | — | — | (106,615) | — | (106,615) |
| Purchase of treasury shares | (17) | — | — | — | — | — | (2,871) | (104,685) | (104,685) | — | (104,685) |
| Issuance of common shares in connection with stock plan | (21) | — | — | — | (40,357) | — | 1,823 | 44,769 | 4,412 | — | 4,412 |
| Share-based compensation | (21) | — | — | 40,113 | — | — | — | — | 40,113 | — | 40,113 |
| Balance at December 31, 2018 | | 230,829 | \$ 2,702 | \$ 1,742,191 | \$ 1,379,624 | \$ (310,644) | (5,320) | \$ (178,903) | \$ 2,634,970 | \$ — | \$ 2,634,970 |

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

QIAGEN N.V. AND SUBSIDIARIES CONSOLIDATED STATEMENTS OF CASH FLOWS

| (in thousands) | Note | Years ended December 31, | | |
|--|------|--------------------------|------------------|------------------|
| | | 2018 | 2017 | 2016 |
| Cash flows from operating activities: | | | | |
| Net income | | \$ 190,380 | \$ 40,394 | \$ 80,303 |
| Adjustments to reconcile net income to net cash provided by operating activities, net of effects of businesses acquired: | | | | |
| Depreciation and amortization | | 206,436 | 216,448 | 213,056 |
| Non-cash impairments | (6) | 17,020 | 5,137 | 44,399 |
| Amortization of debt discount and issuance costs | | 35,537 | 24,773 | 20,451 |
| Share-based compensation expense | (21) | 40,113 | 34,442 | 28,288 |
| Excess tax benefits from share-based compensation | | — | — | (782) |
| Deferred income taxes | (16) | (23,272) | 60,176 | (63,981) |
| (Gain) loss on marketable securities | | (2,725) | 1,055 | (1,360) |
| Reversals of contingent consideration | (14) | — | (3,269) | (6,501) |
| Other items, net including fair value changes in derivatives | | (8,834) | (4,521) | 19,435 |
| Net changes in operating assets and liabilities: | | | | |
| Accounts receivable | (3) | (41,813) | (34,165) | (12,238) |
| Inventories | (3) | (36,918) | (21,633) | (20,346) |
| Prepaid expenses and other current assets | (8) | (9,942) | (5,245) | 6,640 |
| Other long-term assets | | (30,312) | (16,786) | 3,549 |
| Accounts payable | | 6,993 | 4,321 | (1,466) |
| Accrued and other current liabilities | (12) | (13,317) | 2,828 | 10,618 |
| Income taxes | (16) | 14,239 | (41,266) | 13,483 |
| Other long-term liabilities | | 15,911 | 24,090 | 8,054 |
| Net cash provided by operating activities | | 359,496 | 286,779 | 341,602 |
| Cash flows from investing activities: | | | | |
| Purchases of property, plant and equipment | | (109,773) | (90,081) | (74,536) |
| Proceeds from sale of equipment | | — | 42 | 63 |
| Purchases of intangible assets | | (40,990) | (34,324) | (19,388) |
| Purchases of investments, net | | (9,398) | (4,777) | (23,448) |
| Cash paid for acquisitions, net of cash acquired | (5) | (172,832) | (50,549) | (90,490) |
| Purchases of short-term investments | (7) | (568,002) | (450,564) | (496,304) |
| Proceeds from redemptions of short-term investments | (7) | 691,765 | 189,006 | 533,847 |
| Proceeds from divestiture | (5) | 16,394 | — | — |
| Cash paid for collateral asset | (13) | (3,461) | (20,707) | (1,200) |
| Other investing activities | | (15,059) | (2,310) | (7,600) |
| Net cash used in investing activities | | (211,356) | (464,264) | (179,056) |
| Cash flows from financing activities: | | | | |
| Proceeds from long-term debt, net of issuance costs | (15) | — | 329,875 | — |

| | | | | |
|---|------|----------------|----------------|-----------------|
| Proceeds from issuance of cash convertible notes, net of issuance costs | (15) | 494,879 | 394,391 | — |
| Purchase of call option related to cash convertible notes | (15) | (97,277) | (73,646) | — |
| Proceeds from issuance of warrants, net of issuance costs | (17) | 72,406 | 45,396 | — |
| Capital repayment | (17) | — | (243,945) | — |
| Repayment of long-term debt | (15) | — | — | (6,738) |
| Principal payments on capital leases | | (1,308) | (1,402) | (1,322) |
| Excess tax benefits from share-based compensation | | — | — | 782 |
| Proceeds from issuance of common shares | | 4,412 | 6,075 | 6,269 |
| Purchase of treasury shares | (17) | (104,685) | (60,970) | — |
| Other financing activities | | (8,019) | (8,587) | (9,595) |
| Net cash provided by (used in) financing activities | | 360,408 | 387,187 | (10,604) |
| Effect of exchange rate changes on cash and cash equivalents | | (7,183) | 8,832 | (2,773) |
| Net increase in cash and cash equivalents | | 501,365 | 218,534 | 149,169 |
| Cash and cash equivalents, beginning of period | | 657,714 | 439,180 | 290,011 |
| Cash and cash equivalents, end of period | | \$ 1,159,079 | \$ 657,714 | \$ 439,180 |
| Supplemental cash flow disclosures: | | | | |
| Cash paid for interest | | \$ 25,902 | \$ 20,252 | \$ 18,227 |
| Cash paid for income taxes | | \$ 29,317 | \$ 40,499 | \$ 22,670 |
| Supplemental disclosure of non-cash investing activities: | | | | |
| Equipment purchased through capital lease | | \$ — | \$ 88 | \$ 113 |

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

FINANCIAL RESULTS

Notes to consolidated financial statements December 31, 2018

1. Corporate Information and Basis of Presentation

Corporate Information

QIAGEN N.V. 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 the leading global provider of Sample to Insight solutions that are used by over 500,000 customers worldwide to transform biological samples into valuable molecular insights. Our sample technologies are used to isolate and process DNA, RNA and proteins - the building blocks of life - from blood, tissue and other materials. Assay technologies are used to make these biomolecules visible and ready for analysis. Bioinformatics software and knowledge bases are used to analyze and interpret complex genomic data to report relevant, actionable insights. Automation solutions are used to tie these technologies together in seamless and cost-effective workflows. We provide this portfolio to four major customer classes: Molecular Diagnostics (human healthcare), Applied Testing (forensics and food safety), Pharma (pharmaceutical and biotechnology companies) and Academia (life sciences research). With approximately 5,000 employees in over 35 locations worldwide, we market our products in more than 130 countries.

Basis of Presentation

The accompanying consolidated financial statements were prepared in accordance with U.S. generally accepted accounting principles (GAAP) and all amounts are presented in U.S. dollars rounded to the nearest thousand, unless otherwise indicated. The consolidated financial statements have been prepared on a historical cost basis, except for derivative financial instruments, contingent consideration and available-for-sale financial instruments that have been measured at fair value.

We undertake acquisitions to complement our own internal product development activities. On April 27, 2018, we acquired all shares in STAT-Dx Life, S.L. (STAT-Dx), a privately-held company located in Barcelona, Spain and on April 19, 2018, we acquired all remaining shares of a privately held entity in which we held a minority interest. On January 6, 2017, we acquired OmicSoft Corporation, located in Cary, North Carolina (U.S.) and on June 28, 2016, we acquired Exiqon A/S, located in Vedbaek, Denmark. Accordingly, at their respective acquisition dates, all the assets acquired and liabilities assumed were recorded at their respective fair values and our consolidated results of operations include the operating results from the acquired companies from the acquisition dates.

2. Effects of New Accounting Pronouncements

Adoption of New Accounting Standards

The following new Financial Accounting Standards Board (FASB) Accounting Standards Updates (ASU) were effective for the year ended December 31, 2018.

ASU 2014-09, Revenue from Contracts with Customers (Topic 606) affects any entity that either enters into contracts with customers to transfer goods or services or enters into contracts for the transfer of nonfinancial assets unless those contracts are within the scope of other standards (e.g., insurance contracts or lease contracts). In August 2015, the FASB issued Accounting Standards Update No. 2015-14 (ASU 2015-14), Revenue from Contracts with Customers (Topic 606): Deferral of the Effective Date which defers the effective date of ASU 2014-09 to interim and annual reporting periods beginning after December 15, 2017. The FASB has continued to issue accounting standard updates to clarify and provide implementation guidance related to Revenue from Contracts with Customers, including ASU 2016-08 Revenue from Contract with Customers: Principal versus Agent Considerations, ASU 2016-10 Revenue from Contracts with Customers: Identifying Performance Obligations and Licensing, ASU 2016-12 Revenue from Contracts with Customers: Narrow-Scope Improvements and Practical Expedients, and ASU 2016-20 Technical Corrections and Improvements to Topic 606, Revenue from Contracts with Customers.

We adopted Topic 606 Revenue from Contracts with Customers with a date of initial application of January 1, 2018. The comparative information has not been adjusted and continues to be reported under ASC Topic 605 Revenue Recognition. As a result, we changed our accounting policy for revenue recognition as detailed below.

We applied Topic 606 using the "modified retrospective method" by recognizing the effect of initially applying Topic 606 as an \$1.3 million adjustment to the opening balance of retained earnings at January 1, 2018, for all contracts not completed at January 1, 2018. The details of the changes and quantitative impact are discussed in Note 4 "Revenue".

ASU 2016-01, Financial Instruments - Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities will impact certain aspects of recognition, measurement, presentation and disclosure of financial instruments. In February 2018, the FASB issued ASU No. 2018-03, Technical Corrections and Improvements to Financial Instruments—Overall (Subtopic 825-10), which clarified certain aspects of the previously issued ASU 2016-01. The new guidance makes targeted improvements to existing U.S. GAAP by:

- › requiring equity investments (except those accounted for under the equity method of accounting, or those that result in consolidation of the investee) to be measured at fair value with changes in fair value recognized in net income;
- › requiring public business entities to use the exit price notion when measuring the fair value of financial instruments for disclosure purposes;
- › requiring separate presentation of financial assets and financial liabilities by measurement category and form of financial asset (i.e., securities or loans and receivables) on the balance sheet or the accompanying notes to the financial statements;
- › eliminating the requirement for public business entities to disclose the method(s) and significant assumptions used to estimate the fair value that is required to be disclosed for financial instruments measured at amortized cost on the balance sheet; and
- › requiring a reporting organization to present separately in other comprehensive income the portion of the total change in the fair value of a liability resulting from a change in the instrument-specific credit risk (also referred to as "own credit") when the organization has elected to measure the liability at fair value in accordance with the fair value option for financial instruments.

The amendments became effective for our financial statements beginning in the first quarter of 2018 and require adoption using a cumulative-effect adjustment to the balance sheet as of the beginning of the fiscal year of adoption. Accordingly, upon adoption, we recorded a cumulative effect adjustment to decrease opening retained earnings at January 1, 2018, by \$0.9 million as required for our equity investments recorded at fair value. The implementation of the amendments is expected to increase the volatility of net income as gains or losses in future periods will be

recognized in net income; however, the extent of any volatility will be dependent upon the significance of the equity investments.

ASU No. 2016-15, Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments (a consensus of the FASB Emerging Issues Task Force), addresses eight classification issues related to the statement of cash flows:

- › debt prepayment or debt extinguishment costs;
- › settlement of zero-coupon bonds;
- › contingent consideration payments made after a business combination;
- › proceeds from the settlement of insurance claims;
- › proceeds from the settlement of corporate-owned life insurance policies, including bank-owned life insurance policies;
- › distributions received from equity method investees;
- › beneficial interests in securitization transactions; and
- › separately identifiable cash flows and application of the predominance principle.

We adopted ASU 2016-15 on January 1, 2018 without any impact from the adoption on our consolidated financial statements.

ASU 2016-16, Income Taxes (Topic 740): Intra-Entity Transfers of Assets Other Than Inventory, aims to improve the accounting for the income tax consequences of intra-entity transfers of assets other than inventory. This amendment requires an entity to recognize the income tax consequences of an intra-entity transfer of an asset other than inventory when the transfer occurs. We adopted ASU 2016-16 on a modified retrospective basis resulting in a cumulative-effect reclassification of \$16.1 million for unrecognized income tax effects related to intra-entity transfers of fixed assets and intellectual property rights that occurred prior to adoption from other current and non-current assets to opening retained earnings as of January 1, 2018.

ASU 2016-18, Statement of Cash Flows (Topic 230): Restricted Cash, requires entities to show the changes in the total of cash, cash equivalents, restricted cash and restricted cash equivalents in the statement of cash flows. As a result, entities will no longer present transfers between cash and cash equivalents and restricted cash and restricted cash equivalents in the statement of cash flows. We adopted ASU 2016-18 on January 1, 2018, using a retrospective transition method to each period presented. There is no impact from the adoption of ASU 2016-18 on our consolidated financial statements.

ASU 2017-01, Business Combinations (Topic 805): Clarifying the Definition of a Business, clarifies and provides a more robust framework to use in determining when a set of assets and activities is a business. The amendments in this update should be applied prospectively on or after the effective date. We adopted this update beginning January 1, 2018, without impact.

ASU 2017-09, Compensation-Stock Compensation (Topic 718): Scope of Modification Accounting, clarifies when to account for a change to the terms or conditions of a share-based payment award as a modification. Under the new guidance, modification accounting is required only if the fair value, the vesting conditions, or the classification of the award (as equity or liability) changes as a result of the change in terms or conditions. The guidance is effective prospectively and we adopted ASU 2017-09 as of January 1, 2018.

ASU 2018-02, Income Statement - Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income, permits companies to reclassify the stranded tax effects of the U.S. Tax Cuts and Jobs Act on items within accumulated other comprehensive income to retained earnings. This ASU is effective for fiscal years beginning after December 15, 2018, including interim periods within those fiscal years. Early adoption is permitted. We early adopted ASU 2018-02 as of April 1, 2018, with no impact as we had no stranded tax effects.

ASU 2018-07, Compensation-Stock Compensation (Topic 718): Improvements to Nonemployee Share-Based Payment Accounting, largely aligns the accounting for share-based payment awards issued to employees and nonemployees. ASU 2018-07 is effective for annual periods beginning January 1, 2019. Early adoption is permitted. We early adopted ASU 2018-07 as of July 1, 2018, without material impact.

New Accounting Standards Not Yet Adopted

The following new FASB Accounting Standards Updates, which are not yet adopted as of December 31, 2018, have been grouped by their required effective dates:

First Quarter of 2019

ASU 2016-02, Leases (Topic 842) aims to increase transparency and comparability among organizations by recognizing lease assets and lease liabilities on the balance sheet and disclosing key information about leasing arrangements. ASU 2016-02 is effective for us beginning in the first quarter of 2019. ASU 2018-10, Codification Improvements to Topic 842, Leases, ASU 2018-11, Leases (Topic 842), Targeted Improvements, and ASU 2018-20, Leases (Topic 842), Narrow-Scope Improvements for Lessors, are also effective at the time of adoption of ASU 2016-02. We adopted these standards as per the effective date of January 1, 2019, using the modified retrospective approach and will not restate comparative periods. Under this approach, the cumulative effect of initially applying the standard will be recognized as an adjustment to the opening balance of retained earnings on the date of initial application. As permitted under the transition guidance, we will carry forward the assessment of whether our contracts contain or are leases, classification of our leases and remaining lease terms. Based on our portfolio of leases as of December 31, 2018, approximately \$57 million of lease assets and liabilities will be recognized on our balance sheet upon adoption, primarily relating to leased office space.

ASU 2017-12, Derivatives and Hedging (Topic 815): Targeted Improvements to Accounting for Hedging Activities, will make more financial and nonfinancial hedging strategies eligible for hedge accounting. It also amends the presentation and disclosure requirements and changes how companies assess effectiveness. It is intended to more closely align hedge accounting with companies' risk management strategies, simplify the application of hedge accounting, and increase transparency as to the scope and results of hedging programs. The new guidance became effective for us beginning on January 1, 2019 by applying a modified retrospective approach to existing hedging relationships as of the adoption date. Under the modified retrospective approach, entities with cash flow or net investment hedges will make (1) a cumulative-effect adjustment to accumulated other comprehensive income so that the adjusted amount represents the cumulative change in the hedging instruments' fair value since hedge inception (less any amounts that should have been recognized in earnings under the new accounting model) and (2) a corresponding adjustment to opening retained earnings as of the most recent period presented on the date of adoption. We adopted ASU 2017-12 on January 1, 2019 without any cumulative effect.

First Quarter of 2020

ASU 2016-13, Financial Instruments-Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments, provides financial statement users with more decision-useful information about the expected credit losses on financial instruments and other commitments to extend credit held by a reporting entity at each reporting date. To achieve this objective, the amendments in ASU 2016-13 replace the incurred loss impairment methodology in current GAAP with a methodology that reflects expected credit losses and requires consideration of a broader range of

reasonable and supportable information to inform credit loss estimates. The FASB has continued to issue accounting standard updates to clarify and provide implementation guidance including ASU 2018-19, Codification Improvements to Topic 326, Financial Instruments - Credit Losses. The new guidance will become effective for us by applying the standard's provisions as a cumulative-effect adjustment to retained earnings beginning on January 1, 2020. We are currently evaluating the potential impact Topic 326 may have on our consolidated financial statements and disclosures.

ASU 2017-04, Intangibles—Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment, removes Step 2 of the goodwill impairment test. A goodwill impairment will now be the amount by which a reporting unit's carrying value exceeds its fair value, not to exceed the carrying amount of goodwill. ASU 2017-04 is effective for us for annual periods beginning January 1, 2020 and early adoption is permitted. The new guidance is required to be applied on a prospective basis. We adopted ASU 2017-04 on January 1, 2019 and will apply the new guidance prospectively as required.

ASU 2018-13, Fair Value Measurement (Topic 820): Disclosure Framework, provides guidance that eliminates, adds and modifies certain disclosure requirements for fair value measurements. ASU 2018-13 is effective for us for annual periods beginning January 1, 2020. Entities are permitted to early adopt either the entire standard or only the provisions that eliminate or modify the requirements. We adopted ASU 2018-13 on January 1, 2019 and will apply the new guidance to disclosures as required beginning in 2019.

ASU 2018-15, Intangibles—Goodwill and Other—Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract, provides guidance on a customer's accounting for implementation, set-up, and other upfront costs incurred in a cloud computing arrangement that is hosted by the vendor, i.e. a service contract. Under the new guidance, customers will apply the same criteria for capitalizing implementation costs as they would for an arrangement that has a software license. ASU 2018-15 is effective for us for annual periods beginning January 1, 2020, and early adoption is permitted and should be applied either retrospectively or prospectively to all implementation costs incurred after the date of adoption. We early adopted ASU 2018-15 on January 1, 2019, and will apply the guidance to all implementation costs prospectively.

ASU 2018-18, Collaborative Arrangements (Topic 808): Clarifying the Interaction between Topic 808 and Topic 606, precludes an entity from presenting consideration from a transaction in a collaborative arrangement as revenue from contracts with customers if the counterparty is not a customer of that transaction. The guidance amends ASC 808 to refer to unit-of-account guidance in ASC 606 and requires it to be used only when assessing whether a transaction is in the scope of ASC 606. ASU 2018-18 is effective for us for annual periods beginning on January 1, 2020. Early adoption is permitted for entities that have adopted ASC 606. Entities are required to apply the amendments retrospectively to the date they initially applied ASC 606. We are currently evaluating the potential impact ASU 2018-18 may have on our consolidated financial statements.

ASU 2018-17, Consolidation (Topic 810): Targeted Improvements to Related Party Guidance for Variable Interest Entities, amends how a decision maker or service provider determines whether its fee is a variable interest entity (VIE) when a related party under common control also has an interest in the VIE. We adopted ASU 2018-17 on January 1, 2019, without impact.

3. Summary of Significant Accounting Policies and Critical Accounting Estimates

Principles of Consolidation

The consolidated financial statements include the accounts of QIAGEN N.V. and its wholly-owned subsidiaries. All significant intercompany accounts and transactions have been eliminated. 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 as discussed under "Non-marketable Investments" below. When there is a portion of equity in an acquired subsidiary not attributable, directly or indirectly, to the Company, we record the fair value of the noncontrolling interests at the acquisition date and classify the amounts attributable to noncontrolling interests separately in equity in the consolidated financial statements. Any subsequent changes in the Company's ownership interest while the Company retains its controlling financial interest in its subsidiary are accounted for as equity transactions.

Use of Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States 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. Actual results could differ from those estimates.

Concentrations of Risk

We buy materials for products from many suppliers, and are not dependent on any one supplier or group of suppliers for the business as a whole. However, key components of certain products, including certain instrumentation components and chemicals, are available only from a single source. If supplies from these vendors were delayed or interrupted for any reason, we may not be able to obtain these materials timely or in sufficient quantities in order to produce certain products and sales levels could be negatively affected. Additionally, our customers include researchers at pharmaceutical and biotechnology companies, academic institutions, and government and private laboratories. Fluctuations in the research and development budgets of these researchers and their organizations for applications in which our products are used could have a significant effect on the demand for our products.

The financial instruments used in managing our foreign currency, equity and interest rate exposures have an element of risk in that the counterparties may be unable to meet the terms of the agreements. We attempt to minimize this risk by limiting the counterparties to a diverse group of highly-rated international financial institutions. The carrying values of our financial instruments incorporate the non-performance risk by using market pricing for credit risk. However, we have no reason to believe that any counterparties will default on their obligations. In order to minimize our exposure with any single counterparty, we have entered into master agreements which allow us to manage the exposure with the respective counterparty on a net basis.

Other financial instruments that potentially subject us to concentrations of credit risk are cash and cash equivalents, short-term investments, and accounts receivable. We attempt to minimize the risks related to cash and cash equivalents and short-term investments by dealing with highly-rated financial institutions and investing in a broad and diverse range of financial instruments. We have established guidelines related to credit quality and maturities of investments intended to maintain safety and liquidity. Concentration of credit risk with respect to accounts receivable is limited due to a large and diverse customer base, which is dispersed over different geographic areas. Allowances are maintained for potential credit losses and such losses have historically been within expected ranges.

Foreign Currency Translation

Our reporting currency is the U.S. dollar and the functional currencies of our subsidiaries are generally the local currency of the respective 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 equity at historical rates. Translation gains or losses are recorded in equity, and transaction gains and losses are reflected in net income as a component of other expense, net. Realized gains or losses on the value of derivative contracts entered into to hedge the exchange rate exposure of receivables and payables are also included in net income as a component of other expense, net. The net (loss) gain on foreign currency transactions was \$(12.3) million, \$(3.3) million, and less than \$0.1 million in 2018, 2017 and 2016, respectively, and is included in other expense, net.

The exchange rates of key currencies were as follows:

| (US\$ equivalent for one) | Closing rate at December | | Annual average rate | | |
|---------------------------|--------------------------|--------|---------------------|--------|--------|
| | 2018 | 2017 | 2018 | 2017 | 2016 |
| Euro (EUR) | 1.1450 | 1.1993 | 1.1813 | 1.1292 | 1.1068 |
| Pound Sterling (GBP) | 1.2800 | 1.3517 | 1.3356 | 1.2882 | 1.3560 |
| Swiss Franc (CHF) | 1.0161 | 1.0249 | 1.0228 | 1.0156 | 1.0153 |
| Australian Dollar (AUD) | 0.7059 | 0.7815 | 0.7478 | 0.7666 | 0.7439 |
| Canadian Dollar (CAD) | 0.7337 | 0.7975 | 0.7719 | 0.7710 | 0.7552 |
| Japanese Yen (JPY) | 0.0091 | 0.0089 | 0.0091 | 0.0089 | 0.0092 |
| Chinese Yuan (CNY) | 0.1454 | 0.1537 | 0.1514 | 0.1480 | 0.1506 |

Segment Information

We determined that we operate as one operating segment in accordance with the Financial Accounting Standards Board (FASB) Accounting Standards Codification (ASC) Topic 280, Segment Reporting. Our chief operating decision maker (CODM) makes decisions based on the Company as a whole. In addition, we have a common basis of organization and types of products and services which derive revenues and consistent product margins. Accordingly, we operate and make decisions as one reporting unit.

Revenue Recognition

Beginning January 1, 2018, we recognize revenues when control of promised goods or services transfers to our customers in an amount that reflects the consideration that is expected to be received in exchange for those goods or services. The majority of our sales revenue continues to be recognized when products are shipped to the customers. Prior to January 1, 2018, payments for milestones, generally based on the achievement of substantive and at-risk performance criteria, were recognized in full at such time as the specified milestone had been achieved according to the terms of the agreement. See Note 4 "Revenue".

Warranty

We provide warranties on our products against defects in materials and workmanship for a period of 1 year. A provision for estimated future warranty costs is recorded in cost of sales at the time product revenue is recognized. Product warranty obligations are included in accrued and other current liabilities in the accompanying consolidated balance sheets.

Research and Development

Research and product development costs are expensed as incurred. Research and development expenses consist primarily of salaries and related expenses, facility costs, and amounts paid to contract research organizations and laboratories for the provision of services and materials as well as costs for internal use or clinical trials.

Government Grants

We recognize government grants when there is reasonable assurance that all conditions will be complied with and the grant will be received. Our government grants generally represent subsidies for specified activities and are therefore recognized when earned as a reduction of the expenses recorded for the activity that the grants are intended to compensate. Thus, when the grant relates to research and development expense, the grant is recognized over the same period that the related costs are incurred. Otherwise, amounts received under government grants are recorded as liabilities in the balance sheet. When the grant relates to an asset, the nominal amount of the grant is deducted from the carrying amount of the asset and recognized over the same period that the related asset is depreciated.

Borrowing Costs

Borrowing costs directly attributable to the acquisition, construction or production of an asset that takes a substantial period of time to get ready for its intended use or sale are capitalized as part of the cost of the respective assets (qualifying asset) when such borrowing costs are significant. All other borrowing costs are expensed in the period they occur.

Shipping and Handling Income and Costs

Shipping and handling costs charged to customers are recorded as revenue in the period that the related product sale revenue is recorded. Associated costs of shipping and handling are included in sales and marketing expenses. For the years ended December 31, 2018, 2017 and 2016, shipping and handling costs totaled \$28.4 million, \$28.6 million and \$26.5 million, respectively.

Advertising Costs

The costs of advertising are expensed as incurred and are included as a component of sales and marketing expense. Advertising costs for the years ended December 31, 2018, 2017 and 2016 were \$8.1 million, \$7.2 million and \$8.4 million, respectively.

General and Administrative, Restructuring, Integration and Other

General and administrative expenses primarily represent the costs required to support administrative infrastructure. In addition, we incur indirect acquisition and business integration costs in connection with business combinations. These costs represent incremental costs that we believe would not have been incurred absent the business combinations. Major components of these costs include consulting and related fees incurred to integrate or restructure the acquired operations, payroll and related costs for employees remaining with the Company on a transitional basis and public relations, advertising and media costs for re-branding of the combined organization.

Restructuring costs include personnel costs (principally termination benefits), facility closure and contract termination costs. Termination benefits are accounted for in accordance with FASB ASC Topic 712, Compensation - Nonretirement Postemployment Benefits, and are recorded when it is probable that employees will be entitled to benefits and the amounts can be reasonably estimated. Estimates of termination benefits are based on the frequency of past termination benefits, the similarity of benefits under the current plan and prior plans, and the existence of statutory required minimum benefits. Facility closure, some termination benefits and other costs are accounted for in accordance with FASB ASC Topic 420, Exit or Disposal Cost Obligations and are recorded when the liability is incurred. The specific restructuring measures and associated estimated costs are based on management's best business judgment under the existing circumstances at the time the estimates are made. If future events require changes to these estimates, such adjustments will be reflected in the period of the revised estimate.

Income Taxes

We account for income taxes under the liability method. Under this method, total income tax expense is the amount of income taxes expected to be payable for the current year plus the change from the beginning of the year for deferred income tax assets and liabilities established for the expected further tax consequences resulting from differences in the financial reporting and tax basis of assets and liabilities. Deferred tax assets and/or liabilities are determined by multiplying the differences between the financial reporting and tax reporting bases for assets and liabilities by the enacted tax rates expected to be in effect when such differences are recovered or settled. Deferred tax assets are reduced by a valuation allowance to the amount more likely than not to be realized. The effect on deferred taxes of a change in tax rates is recognized in income in the period that includes the enactment date.

Tax benefits are initially recognized in the financial statements when it is more likely than not that the position will be sustained upon examination by the tax authorities. Such tax positions are initially and subsequently measured as the largest amount of tax benefit that is greater than 50 percent likely of being realized upon settlement with the taxing authority using the cumulative probability method, assuming the tax authority has full knowledge of the position and all relevant facts. Our policy is to recognize interest accrued related to unrecognized tax benefits in interest expense and penalties within the income tax expense.

Derivative Instruments

We enter into derivative financial instrument contracts to minimize the variability of cash flows or income statement impact associated with the anticipated transactions being hedged or to hedge fluctuating interest rates. As changes in foreign currency or interest rate impact the value of anticipated transactions, the fair value of the forward or swap contracts also changes, offsetting foreign currency or interest rate fluctuations. Derivative instruments are recorded on the balance sheet at fair value. Changes in fair value of derivatives are recorded in current earnings or other comprehensive income, depending on whether a derivative is designated as part of a hedge transaction.

Share-Based Payments

Compensation cost for all share-based payments is recorded based on the grant date fair value, less an estimate for pre-vesting forfeitures, recognized in expense over the service period using an accelerated method.

Forfeiture Rate—This is the estimated percentage of grants that are expected to be forfeited or canceled on an annual basis before becoming fully vested. We estimated the forfeiture rate based on historical forfeiture experience.

Restricted Stock Units and Performance Stock Units: Restricted stock units and performance stock units represent rights to receive Common Shares at a future date. The fair market value of restricted and performance stock units is determined based on the number of stock units granted and the fair market value of our shares on the grant date. The fair market value at the time of the grant, less an estimate for pre-vesting forfeitures, is recognized in expense over the vesting period. At each reporting period, the estimated performance achievement of the performance stock units is assessed and any change in the estimated achievement is recorded on a cumulative basis in the period of adjustment.

Cash and Cash Equivalents

Cash and cash equivalents consist of cash on deposit in banks and other cash invested temporarily in various instruments that are short-term and highly liquid, and having an original maturity of less than 90 days at the date of purchase.

| (in thousands) | 2018 | 2017 |
|----------------------------------|---------------------|-------------------|
| Cash at bank and on hand | \$ 208,083 | \$ 139,597 |
| Short-term bank deposits | 950,996 | 518,117 |
| Cash and Cash Equivalents | \$ 1,159,079 | \$ 657,714 |

Short-Term Investments

Short-term investments are classified as “available for sale” and stated at fair value, which is equivalent to the amortized cost, in the accompanying balance sheet. Interest income is accrued when earned and changes in fair market values are reflected in other income (expense), net. The amortization of premiums and accretion of discounts to maturity arising from acquisition is included in interest income. A decline in fair value that is judged to be other-than-temporary is accounted for as a realized loss and the write-down is included in the consolidated statements of income. Realized gains and losses, determined on a specific identification basis on the sale of short-term investments, are included in income.

Fair Value of Financial Instruments

The carrying amount of cash and cash equivalents, notes receivable, accounts receivable, accounts payable and accrued liabilities approximate their fair values because of the short maturities of those instruments. The carrying value of our variable rate debt and capital leases approximates their fair values because of the short maturities and/or interest rates which are comparable to those available to us on similar terms. The fair values of the Cash Convertible Notes are based on an estimation using available over-the-counter market information. The fair values of the Private Placement Senior Notes were estimated using the changes in the U.S. Treasury rates and the fair value of the German Private Placement is based on an estimation using changes in the euro swap rates.

Accounts Receivable

Our accounts receivable are unsecured and we are at risk to the extent such amounts become uncollectible. We continually monitor accounts receivable balances, and provide for an allowance for doubtful accounts at the time collection becomes questionable based on payment history or age of the receivable. Amounts determined to be uncollectible are written off against the reserve. For the years ended December 31, 2018, 2017 and 2016, write-offs of accounts receivable totaled \$2.8 million, \$3.2 million and \$1.6 million, respectively, while provisions for doubtful accounts which were charged to expense totaled \$4.4 million, \$3.1 million and \$2.1 million, respectively. For all years presented, no single customer represented more than ten percent of accounts receivable or consolidated net sales.

Inventories

Inventories are stated at the lower of cost or net realizable value, determined on either a weighted average cost basis or a standard cost basis which is regularly adjusted to actual. Inventories include material, direct labor and overhead costs and are reduced for estimated obsolescence. Inventories consisted of the following as of December 31, 2018 and 2017:

| (in thousands) | 2018 | 2017 |
|-------------------------------|-------------------|-------------------|
| Raw materials | \$ 25,819 | \$ 23,717 |
| Work in process | 38,659 | 33,153 |
| Finished goods | 98,434 | 99,057 |
| Total inventories, net | \$ 162,912 | \$ 155,927 |

Property, Plant and Equipment

Property, plant and equipment, including equipment acquired under capital lease obligations, are stated at cost less accumulated amortization. Capitalized internal-use software costs include only those direct costs associated with the actual development or acquisition of computer software solely to meet internal needs and cloud-based applications to deliver our service and comprise costs associated with the design, coding, installation and testing of the system. Costs associated with preliminary development, such as the evaluation and selection of alternatives, as well as training, maintenance and support are expensed as incurred. Costs for software to be sold, leased or otherwise marketed that are related to the conceptual formulation and design are expensed as incurred. Costs incurred to produce software products and the software components of products to be sold, leased or marketed after technological feasibility is established are capitalized and amortized in accordance with the accounting standards for the costs of software to be sold, leased, or otherwise marketed. All other depreciation is computed using the straight-line method over the estimated useful lives of the assets (3 to 40 years). Amortization of leasehold improvements is computed on a straight-line basis over the lesser of the remaining life of the lease or the estimated useful life of the improvement asset. We have a policy of capitalizing expenditures that materially increase assets' useful lives and charging ordinary maintenance and repairs to operations as incurred. When property or equipment is disposed of, the cost and related accumulated depreciation and amortization are removed from the accounts and any gain or loss is included in earnings.

Acquired Intangibles and Goodwill

Acquired intangibles with alternative future uses are carried at cost less accumulated amortization and consist of licenses to technology held by third parties and other acquired intangible assets. Amortization is computed over the estimated useful life of the underlying patents, which has historically ranged from 1 to 20 years. Purchased intangible assets acquired in business combinations, other than goodwill, are amortized over their estimated useful lives unless these lives are determined to be indefinite. Intangibles are assessed for recoverability considering the contract life and the period of time over which the intangible will contribute to future cash flow. The unamortized cost of intangible assets, where cash flows are independent and identifiable from other assets, is evaluated periodically and adjusted, if necessary, if events and circumstances indicate that a decline in value below the carrying amount has occurred. For the year ended December 31, 2016, we recorded intangible asset impairments of \$21.4 million. Intangible asset impairments recorded during the year ended December 31, 2016 are further discussed in Note 6 "Restructuring".

Amortization expense related to developed technology and patent and license rights which have been acquired in a business combination is included in cost of sales. Amortization of trademarks, customer base and non-compete agreements which have been acquired in a business combination is recorded in operating expense under the caption 'acquisition-related intangible amortization'. Amortization expenses of intangible assets not acquired in a business combination are recorded within either the cost of sales, research and development or sales and marketing line items based on the use of the asset.

The fair value of in-process research and development (IPR&D) acquired in a business combination is capitalized as an indefinite-lived intangible asset until completion or abandonment of the related research and development activities. IPR&D is tested for impairment annually or when any event or circumstance indicates that the fair value may be below the carrying value. If and when research and development is complete, the associated asset is amortized over the estimated useful life.

Goodwill represents the difference between the purchase price and the estimated fair value of the net assets acquired arising from business combinations. Goodwill is subject to impairment tests annually or earlier if indicators of potential impairment exist, using a fair-value-based approach. We have elected to perform our annual test for indications of impairment as of October 1st of each year. Following the annual impairment tests for the years ended December 31, 2018, 2017 and 2016, goodwill has not been impaired. As discussed in Note 6 "Restructuring", in 2016 we recorded a \$2.6 million disposal of goodwill associated to the 2016 restructuring initiative.

Non-Marketable Investments

We have investments in non-marketable equity securities issued by privately held companies. These investments are included in other long-term assets in the accompanying consolidated balance sheets. Non-marketable investments through which we exercise significant influence but do not have control are accounted for using the equity method. We monitor for changes in circumstances that may require a reassessment of the level of influence. Following the adoption of ASU 2016-01 on January 1, 2018, our non-marketable equity securities not accounted for under the equity method are either carried at fair value or under the measurement alternative. 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.

Investments are evaluated periodically, or when impairment indicators are noted, to determine if declines in value are other-than-temporary. In making that determination, we consider all available evidence relating to the realizable value of a security. This evidence includes, but is not limited to, the following:

- › adverse financial conditions of a specific issuer, segment, industry, region or other variables;
- › the length of time and the extent to which the fair value has been less than cost; and
- › the financial condition and near-term prospects of the issuer.

We consider whether the fair values of any of our non-marketable investments have declined below their carrying value whenever adverse events or changes in circumstances indicate that recorded values may not be recoverable. If any such decline is considered to be other than temporary (based on various factors, including historical financial results, product development activities and the overall health of the affiliate's industry), then a write-down of the investment would be recorded in operating expense to its estimated fair value.

Variable Interest Entities

We evaluate at the inception of each arrangement whether we have made an investment in an entity that is considered a variable interest entity (VIE) or if we hold other variable interests in an arrangement that is considered a variable interest entity (VIE). We consolidate VIEs when we are the primary beneficiary. The primary beneficiary of a VIE is the party that meets both of the following criteria: (1) has the power to make decisions that most significantly affect the economic performance of the VIE; and (2) has the obligation to absorb losses or the right to receive benefits that in either case could potentially be significant to the VIE. Periodically, we assess whether any changes in our interest or relationship with the entity affect our determination of whether the entity is still a VIE and, if so, whether we are the primary beneficiary. If we are not the primary beneficiary in a VIE, we account for the investment or other variable interests in a VIE as an investment in a non-marketable investment or in accordance with other applicable GAAP.

Impairment of Long-Lived Assets

We review our long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset or a group of assets may not be recoverable. We consider, amongst other indicators, a history of operating losses or a change in expected sales levels to be indicators of potential impairment. Assets are grouped and evaluated for impairment at the lowest level for which there are identifiable cash flows that are largely independent of the cash flows of other groups of assets. If an asset is determined to be impaired, the loss is measured as the amount by which the carrying amount of the asset exceeds fair value which is determined by applicable market prices, when available. When market prices are not available, we generally measure fair value by discounting projected future cash flows of the asset. Considerable judgment is necessary to estimate discounted future cash flows. Accordingly, actual results could differ from such estimates.

4. Revenue

Accounting Policies

We adopted Topic 606 Revenue from Contracts with Customers with a date of initial application of January 1, 2018. The comparative information has not been adjusted and continues to be reported under ASC Topic 605 Revenue Recognition. As a result, we changed our accounting policy for revenue recognition as detailed below.

We applied Topic 606 using the modified retrospective method by recognizing the effect of initially applying Topic 606 as an \$1.3 million adjustment to the opening balance of retained earnings at January 1, 2018 for all contracts not completed at January 1, 2018. The following table presents the impact from the adoption of Topic 606 on our consolidated balance sheet:

| (in thousands) | Balance at December 31, 2017 | Topic 606 Adjustments | Balance at January 1, 2018 |
|---------------------------------------|---------------------------------|--------------------------|-------------------------------|
| Accounts receivable | \$ 329,138 | \$ 160 | \$ 329,298 |
| Accrued and other current liabilities | \$ 244,114 | \$ 765 | \$ 244,879 |
| Long-term deferred income tax assets | \$ 39,353 | \$ 701 | \$ 40,054 |
| Retained earnings | \$ 1,247,945 | \$ (1,306) | \$ 1,246,639 |

The adoption of Topic 606 resulted in higher revenues of \$9.4 million for the year ended December 31, 2018, respectively, following primarily the change in the timing of the recognition of milestone payments. The following table summarizes the impacted line items from our consolidated statements of income for the year ended December 31, 2018:

| (in thousands, except per share amounts) | Twelve months ended December 31, 2018 under previous standard | Effect of Topic 606 | December 31, 2018 As Reported |
|--|---|---------------------|----------------------------------|
| Net sales | \$ 1,492,464 | \$ 9,384 | \$ 1,501,848 |
| Income taxes | \$ 36,827 | \$ (1,470) | \$ 35,357 |
| Net income | \$ 182,466 | \$ 7,914 | \$ 190,380 |
| Basic earnings per common share | \$ 0.81 | \$ 0.03 | \$ 0.84 |
| Diluted earnings per common share | \$ 0.79 | \$ 0.03 | \$ 0.82 |

The impact from the adoption of Topic 606 on our consolidated balance sheet as of December 31, 2018 and consolidated statements of cash flows for the year ended December 31, 2018 was not material.

Nature of Goods and Services

Our revenues are reported net of sales and value added taxes and accruals for estimated rebates and returns and are derived primarily from the sale of consumable and instrumentation products, and to a much lesser extent, from the sale of services, intellectual property and technology. Revenue is recognized upon transfer of control of promised products or services to customers in an amount that reflects the consideration we expect to receive in exchange for those products or services. We enter into contracts that can include various combinations of products and services, which are generally distinct and accounted for as separate performance obligations. The transaction price is allocated to performance obligations based on their relative stand-alone selling prices.

We offer warranties on our products. Certain of our warranties are assurance-type in nature and do not cover anything beyond ensuring that the product is functioning as intended. Based on the guidance in Topic 606,

assurance-type warranties do not represent separate performance obligations. The Company also sells separately-priced service contracts which qualify as service-type warranties and represent separate performance obligations.

We sell our products and services both directly to customers and through distributors generally under agreements with payment terms typically less than 90 days and in most cases not exceeding one year and therefore contracts do not contain a significant financing component.

Consumable and Related Revenue

Consumable Products: In the last three years, revenue from consumable product sales has accounted for approximately 78-80% of our net sales and revenue is recognized when performance obligations under the terms of a contract with a customer are satisfied. The majority of our contracts have a single performance obligation to transfer a product or multiple performance obligations to transfer multiple products concurrently. Accordingly, we recognize revenue when control of the products has transferred to the customer, which is generally at the time of shipment of products as this is when title and risk of loss have been transferred. In addition, invoicing typically occurs at this time so this is when we have a present right to payment. Revenue is measured as the amount of consideration we expect to receive in exchange for transferring products and is generally based upon a negotiated formula, list or fixed price.

Related Revenue: Revenues from related products include software-as-a-service (SaaS), licenses, intellectual property and patent sales, royalties and milestone payments and over the last three years has accounted for approximately 7-9% of our net sales.

SaaS arrangements: Revenue from SaaS arrangements, which allow customers to use hosted software over the contract period without taking possession of the software, is recognized over the duration of the agreement unless the terms of the agreement indicate that revenue should be recognized in a different pattern, for example based on usage.

Licenses: Licenses for on-site software, which allow customers to use the software as it exists when made available, are sold as perpetual licenses or subscriptions. Revenue from on-site licenses are recognized upfront at the point in time at the later of when the software is made available to the customer and the beginning of the license term. When a portion of the transaction price is allocated to a performance obligation to provide support and/or updates, revenue is recognized as the updates/support are provided, generally over the life of the license. Fees from research collaborations include payments for technology transfer and access rights. Royalties from licensees of intellectual property are based on sales of licensed products and revenues are recognized at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied).

Milestone Payments: At the inception of each companion diagnostic co-development arrangement that includes development milestone payments, which represent variable consideration, we evaluate whether the milestones are probable of being reached and estimate the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within our control, such as milestones which are achieved through regulatory approvals, are considered to be constrained and excluded from the transaction price until those approvals are received. Revenue is recognized following the input method as this is considered to best depict the timing of the transfer of control. This involves measuring actual hours incurred to date as a proportion of the total budgeted hours of the project. At the end of each subsequent reporting period, the proportion of completion is trued-up. We also re-evaluate the probability of achievement of development milestones and any related constraint on a periodic basis, and if necessary, adjust our estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect revenues and earnings in the period of adjustment.

Instruments

Revenue from instrumentation includes the instrumentation equipment, installation, training and other instrumentation services, such as extended warranty services or product maintenance contracts and over the last three years has accounted for approximately 12-13% of net sales. Revenue from instrumentation equipment is recognized when the customer obtains control of the instrument which is predominantly at the time of delivery or when title has transferred to the customer. Service revenue is recognized over the term of the service period as the customers benefit from the service throughout the service period. Revenue related to services performed on a time-and-materials basis is recognized when performed.

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 the practical expedient not to disclose the value of remaining performance obligations associated with these types of contracts. In addition, we have elected the practical expedient not to disclose the value of remaining performance obligations associated with licenses of intellectual property for which payment is based on sales of the licensed products.

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 December 31, 2018, we had \$36.6 million of remaining performance obligations for which the transaction price is not constrained related to these contracts of which we expect to recognize approximately 50% over the next 12 months and the remainder thereafter.

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, contracts for licenses of intellectual property where payment is based on sales of the licensed products and contracts with variable consideration related to undelivered performance obligations, is not material. Additionally, revenue recognized in the reporting period from performance obligations satisfied, or partially satisfied, in a previous period, 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 consolidated balance sheet.

Contract assets as of December 31, 2018 totaled \$6.9 million and are included in prepaid expenses and other current assets in the accompanying consolidated balance sheet and relate to the companion diagnostic co-development contracts discussed above. There were no material contract assets as of January 1, 2018.

Contract liabilities primarily relate to advances or deposits received from customers before revenue is recognized and is primarily related to instrument service and software subscription revenue. As of December 31, 2018 and January 1, 2018, the amount of deferred revenue reported as accrued and other current liabilities totaled to \$45.4 million and \$49.4 million, respectively, and \$9.0 million and \$6.2 million are reported as other long-term liabilities, respectively. During the year ended December 31, 2018, we satisfied the associated performance obligations and recognized revenue of \$44.5 million, respectively, related to advance customer payments previously received.

Practical Expedients and Accounting Policy Elections

We exclude from net sales any value add, sales and other taxes which we collect concurrent with revenue-producing activities. If we perform shipping and handling activities after the transfer of control to the customer (e.g., when control transfers prior to delivery), they are considered as fulfillment activities, and accordingly, the costs are accrued when the related revenue is recognized. As such, shipping and handling fees billed to customers in a sales transaction are recorded in net sales and shipping and handling costs incurred are recorded in sales and marketing expenses. We recognize the incremental costs of obtaining contracts (commissions) as an expense when incurred for contracts that have a duration of one year or less. There were no deferred contract costs recorded at December 31, 2018. We apply the practical expedient to not disclose information about remaining performance obligations from contracts that have original expected duration of one year or less, revenue that is recognized as invoiced and revenue that is recognized based on the sales of the licensed products.

Disaggregation of Revenue

We disaggregate our revenue based on product categories and customer class as shown in the tables below for the years ended December 31, 2018, 2017 and 2016:

| | 2018 | | |
|-----------------------|----------------------------|-------------------|---------------------|
| | Consumables and related | Instruments | Total |
| Molecular Diagnostics | \$ 649,602 | \$ 82,197 | \$ 731,799 |
| Applied Testing | 109,196 | 27,962 | 137,158 |
| Pharma | 258,487 | 32,061 | 290,548 |
| Academia | 298,174 | 44,169 | 342,343 |
| Total | \$ 1,315,459 | \$ 186,389 | \$ 1,501,848 |

| | 2017 | | |
|-----------------------|----------------------------|-------------------|---------------------|
| (in thousands) | Consumables and related | Instruments | Total |
| Molecular Diagnostics | \$ 605,462 | \$ 77,702 | \$ 683,164 |
| Applied Testing | 106,380 | 30,654 | 137,034 |
| Pharma | 245,187 | 29,642 | 274,829 |
| Academia | 285,686 | 36,823 | 322,509 |
| Total | \$ 1,242,715 | \$ 174,821 | \$ 1,417,536 |

| | 2016 | | |
|-----------------------|----------------------------|-------------------|---------------------|
| (in thousands) | Consumables and related | Instruments | Total |
| Molecular Diagnostics | \$ 572,300 | \$ 76,874 | \$ 649,174 |
| Applied Testing | 92,770 | 27,610 | 120,380 |
| Pharma | 226,367 | 31,089 | 257,456 |
| Academia | 274,694 | 36,287 | 310,981 |
| Total | \$ 1,166,131 | \$ 171,860 | \$ 1,337,991 |

Refer to Note 20 "Segment Information" for disclosure of revenue by geographic region.

5. Acquisitions and Divestitures

Acquisitions have been accounted for as business combinations, and 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, shared 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.

2018 Acquisition

In April 2018, we acquired all shares in STAT-Dx Life, S.L. (STAT-Dx), a privately-held company located in Barcelona, Spain, which is developing the next generation of multiplex diagnostics for one-step, fully integrated molecular analysis of common syndromes using a novel system based on real-time PCR technology and proven QIAGEN chemistries.

The cash consideration totaled \$148.8 million. The acquisition included contingent consideration which is recorded as part of the purchase price based on the acquisition date fair value. Under the purchase agreement, potential contingent payments through 2022 total \$44.3 million, of which the fair value of \$37.4 million was recorded as purchase price using a probability-weighted analysis of the future milestones applying discount rates between 6.5% and 6.9%. For the year ended December 31, 2018, acquisition-related costs total \$7.1 million, of which \$4.8 million are included in general and administrative, restructuring, integration and other expenses, net and \$2.3 million are included in cost of sales in the accompanying consolidated statements of income.

The allocation of the purchase price is preliminary and is not yet finalized. The preliminary allocation of the purchase price is based upon preliminary estimates which used information that was available to management at the time the consolidated financial statements were prepared and these estimates and assumptions are subject to change within the measurement period, up to one year from the acquisition date. Accordingly, the allocation may change. We continue to gather information about the acquired tax balances.

The preliminary purchase price allocation as of December 31, 2018 differed from the initial preliminary purchase price allocation as follows:

| (in thousands) | As of December 31, 2018 | As of April 27, 2018 | Difference |
|---|----------------------------|-------------------------|---------------|
| Purchase Price: | | | |
| Cash consideration | \$ 148,780 | \$ 148,780 | \$ — |
| Fair value of contingent consideration | 37,377 | 36,751 | 626 |
| | \$ 186,157 | \$ 185,531 | \$ 626 |
| Preliminary Allocation: | | | |
| Cash and cash equivalents | \$ 7,357 | \$ 7,357 | \$ — |
| Prepaid expenses and other current assets | 1,432 | 1,432 | — |
| Inventories | 1,868 | 1,868 | — |
| Income tax receivables | 2,213 | 2,213 | — |
| Accounts payable | (1,412) | (1,412) | — |
| Accruals and other current liabilities | (1,785) | (560) | (1,225) |
| Fixed and other long-term assets | 6,306 | 6,434 | (128) |
| Developed technology | 31,300 | 80,100 | (48,800) |
| In-process research and development | 24,300 | — | 24,300 |
| Goodwill | 117,621 | 97,268 | 20,353 |
| Deferred tax liability on fair value of identifiable intangible assets acquired | (3,043) | (9,169) | 6,126 |
| Total | \$ 186,157 | \$ 185,531 | \$ 626 |

The in-process research and development recognized relates to technologies that remain in development and have not yet obtained regulatory approval. The technologies within in-process research and development are expected to be completed within the next two years.

The changes in the values of in-process research and development assets and developed technology relate to new information obtained regarding key assumptions in the valuation model since the initial purchase price allocation. This resulted in an immaterial impact to the amortization expense recorded during 2018. The weighted average amortization period for the developed technology is 10 years. The goodwill acquired is not deductible for tax purposes.

Revenue and earnings in the reporting periods since the acquisition date have not been significant. No pro forma financial information has been provided herein as the acquisition of STAT-Dx did not have a material impact to net sales, net income or earnings per share on a pro forma basis.

Other 2018 Acquisition

In April 2018, we acquired all remaining shares of a privately held entity in which we held a minority interest. The value of the minority interest investment was revalued in connection with the acquisition by \$4.8 million and a corresponding gain was recorded in general and administrative, restructuring, integration and other, net in the accompanying consolidated statement of income for the year ended December 31, 2018. The allocation of the purchase price is preliminary and is based upon preliminary estimates which used information that was available to management at the time the financial statements were prepared and these estimates and assumptions are subject to change within the measurement period, up to one year from the acquisition date. Accordingly, the allocation may change. We continue to gather information about the acquired tax balance. This acquisition was not significant to

the overall consolidated financial statements and the acquisition did not have a material impact to net sales, net income or earnings per share and therefore no pro forma information has been provided herein.

2017 Acquisition

In January 2017, we acquired OmicSoft Corporation, a leading provider of omics data management solutions located in Cary, North Carolina (U.S.). This acquisition was not significant to the overall consolidated financial statements and as of December 31, 2017, the allocation of the purchase price was final. The acquisition did not have a material impact to net sales, net income or earnings per share and therefore no pro forma information has been provided herein.

Divestitures

2018 Divestitures

In April 2018, we sold a portfolio of veterinary testing products for a total of €15.1 million (\$18.5 million), of which \$16.4 million was received in cash and the balance due in April 2020. An \$8.0 million gain was recorded on the sale to other income (expense), net in the accompanying consolidated statements of income for the year-ended December 31, 2018.

6. Restructuring

2017 Restructuring

During the fourth quarter of 2017, we initiated restructuring initiatives to mitigate the negative impacts stemming from the U.S. tax legislation as further discussed in Note 16 "Income Taxes". Total pre-tax costs for the program were \$25 million and no additional costs will be incurred related to this program. Cumulative costs for this program were as follows:

| (in thousands) | Personnel Related | Contract and Other Costs | Inventory Write-offs & Asset Impairments | Total |
|---|----------------------|-----------------------------|---|------------------|
| Cost of sales | \$ — | \$ — | \$ 3,039 | \$ 3,039 |
| General and administrative, restructuring, integration and other, net | 6,174 | 4,583 | — | 10,757 |
| Total 2017 costs | 6,174 | 4,583 | 3,039 | 13,796 |
| Cost of sales | 424 | 1,193 | — | 1,617 |
| General and administrative, restructuring, integration and other, net | 4,207 | 4,232 | 1,610 | 10,049 |
| Total 2018 costs | 4,631 | 5,425 | 1,610 | 11,666 |
| Total cumulative costs | \$ 10,805 | \$ 10,008 | \$ 4,649 | \$ 25,462 |

The following table summarizes the cash components of the restructuring activity.

| (in thousands) | Personnel Related | Consulting Costs | Total |
|---|----------------------|---------------------|-----------------|
| Costs incurred in 2017 | \$ 6,174 | \$ 4,583 | \$ 10,757 |
| Foreign currency translation adjustment | 48 | 2 | 50 |
| Liability at December 31, 2017 | 6,222 | 4,585 | 10,807 |
| Additional costs in 2018 | 6,468 | 5,554 | 12,022 |
| Release of excess accrual | (1,837) | (129) | (1,966) |
| Payments | (6,892) | (7,149) | (14,041) |
| Foreign currency translation adjustment | (141) | (17) | (158) |
| Liability at December 31, 2018 | \$ 3,820 | \$ 2,844 | \$ 6,664 |

During 2018, fixed asset impairments of \$1.6 million were recorded in connection with this initiative and are included within general and administration, restructuring, integration and other in the accompanying consolidated statements of income. As of December 31, 2018 and 2017, liabilities of \$6.7 million and \$10.8 million, respectively, are included in accrued and other current liabilities in the accompanying consolidated balance sheets.

2016 Restructuring

During the fourth quarter of 2016, we initiated a series of targeted actions to support faster sales momentum and improve efficiency and accountability. The objective with these actions is to ensure that we grow sustainably and consistently in the coming years. Measures include simplifying our geographic presence with site reductions, focusing resources to shared service centers, and streamlining selected organizational structures. No additional costs will be incurred related to this program. Cumulative costs for this program were as follows:

| (in thousands) | Personnel Related | Facility Related | Contract and Other Costs | Asset Impairments & Disposals | Total |
|---|----------------------|---------------------|-----------------------------|-------------------------------------|------------------|
| Cost of sales | \$ 1,222 | \$ 205 | \$ 43 | \$ 10,490 | \$ 11,960 |
| General and administrative, restructuring, integration and other, net | 17,998 | 6,960 | 8,272 | 22,963 | 56,193 |
| Other income (expense), net | — | — | — | 10,946 | 10,946 |
| Total 2016 costs | 19,220 | 7,165 | 8,315 | 44,399 | 79,099 |
| Cost of sales | 1,141 | — | 238 | — | 1,379 |
| General and administrative, restructuring, integration and other, net | 8,399 | 350 | 9,612 | — | 18,361 |
| Total 2017 costs | 9,540 | 350 | 9,850 | — | 19,740 |
| General and administrative, restructuring, integration and other, net | (343) | (838) | (546) | — | (1,727) |
| Total 2018 releases | (343) | (838) | (546) | — | (1,727) |
| Total cumulative costs | \$ 28,417 | \$ 6,677 | \$ 17,619 | \$ 44,399 | \$ 97,112 |

Personnel Related expenses during 2017 and 2016 includes reductions in costs of \$0.7 million and \$2.0 million, respectively, as a result of forfeitures of share-based compensation in connection with terminations. During the year ended December 31, 2016, Asset Impairments and Disposals include \$21.4 million for intangible asset impairments, \$10.9 million for fixed asset abandonments, and \$1.1 million primarily in connection with the write-off of prepaid contract costs. The total \$10.9 million of expense included in other income (expense), net in the accompanying consolidated statements of income is composed of \$8.3 million associated with an impairment of an equity method investment and a disposal of goodwill of \$2.6 million.

The following table summarizes the cash components of the restructuring activity.

| (in thousands) | Personnel Related | Facility Related | Contract and Other Costs | Total |
|--|----------------------|---------------------|-----------------------------|---------------|
| Liability at December 31, 2016 | \$ 18,480 | \$ 7,882 | \$ 5,943 | \$ 32,305 |
| Additional costs in 2017 | 13,357 | 1,798 | 9,883 | 25,038 |
| Release of excess accrual | (3,083) | (1,448) | (30) | (4,561) |
| Payments | (25,586) | (7,478) | (14,887) | (47,951) |
| Facility deferred rent reclassified to restructuring liability | — | 241 | — | 241 |
| Foreign currency translation adjustment | 1,126 | 57 | 157 | 1,340 |
| Liability at December 31, 2017 | 4,294 | 1,052 | 1,066 | 6,412 |
| Release of excess accrual | (343) | (838) | (546) | (1,727) |
| Payments | (3,648) | (214) | (494) | (4,356) |
| Foreign currency translation adjustment | (48) | — | (26) | (74) |
| Liability at December 31, 2018 | \$ 255 | \$ — | \$ — | \$ 255 |

At December 31, 2018, \$0.3 million is included in accrued and other current liabilities in the accompanying consolidated balance sheet. At December 31, 2017, \$5.6 million of the liability is included in accrued and other current liabilities and \$0.8 million is included in other long-term liabilities in the accompanying consolidated balance sheet.

7. Short-Term Investments

At December 31, 2018 and 2017, we had \$234.3 million and \$359.2 million, respectively, of loan receivables and commercial paper due from financial institutions. These loan receivables and commercial paper are non-derivative financial assets with fixed or determinable payments that are not quoted in an active market and are carried at fair market value, which is equal to the cost. At December 31, 2018, these loans consist of \$134.1 million and €87.5 million (\$100.2 million as of December 31, 2018) which mature at various dates through October 2020. At December 31, 2017, these loans and commercial paper consist of \$308.2 million and €42.5 million (\$51.0 million as of December 31, 2017) which matured at various dates through December 2018. All instruments that have an original tenor of more than 12 months include redemption rights on at least a quarterly basis. Interest income is determined using the effective interest rate method. These loans are classified as current assets in the accompanying consolidated balance sheets since we may redeem the loans at our discretion.

For the years ended December 31, 2018, 2017 and 2016, proceeds from sales of short-term investments totaled \$691.8 million, \$189.0 million and \$533.8 million, respectively. During the years ended December 31, 2018, 2017 and 2016, realized gains (losses) totaled \$2.7 million, \$(1.1) million and \$1.4 million, respectively.

8. Prepaid Expenses and Other Current Assets

Prepaid expenses and other current assets are summarized as follows as of December 31, 2018 and 2017:

| (in thousands) | 2018 | 2017 |
|--|-------------------|------------------|
| Prepaid expenses | \$ 48,250 | \$ 41,775 |
| Cash collateral | 25,368 | 21,907 |
| Value added tax | 24,416 | 17,870 |
| Other receivables | 11,127 | 17,455 |
| Total prepaid expenses and other current assets | \$ 109,161 | \$ 99,007 |

9. Property, Plant and Equipment

Property, plant and equipment, including equipment acquired under capital lease obligations, are summarized as follows as of December 31, 2018 and 2017:

| (in thousands) | Estimated useful life (in years) | 2018 | 2017 |
|---|-------------------------------------|-------------------|-------------------|
| Land | — | \$ 17,938 | \$ 18,188 |
| Buildings and improvements | 5-40 | 322,751 | 328,938 |
| Machinery and equipment | 3-10 | 306,750 | 299,175 |
| Computer software | 3-7 | 277,006 | 243,809 |
| Furniture and office equipment | 3-10 | 109,770 | 103,257 |
| Construction in progress | — | 80,874 | 65,542 |
| | | 1,115,089 | 1,058,909 |
| Less: Accumulated depreciation and amortization | | (603,430) | (564,588) |
| Property, plant and equipment, net | | \$ 511,659 | \$ 494,321 |

Amortization of assets acquired under capital lease obligations is included within accumulated depreciation and amortization above for the years ended December 31, 2018 and 2017, respectively. For the years ended December 31, 2018, 2017 and 2016 depreciation and amortization expense totaled \$87.9 million, \$82.5 million and \$75.1 million, respectively. For the years ended December 31, 2018, 2017 and 2016 amortization related to computer software to be sold, leased or marketed totaled \$17.2 million, \$13.9 million and \$9.3 million, respectively. As of December 31, 2018 and 2017, the unamortized balance of computer software to be sold, leased or marketed was \$100.5 million and \$95.5 million, respectively.

In 2018, we recorded asset impairment charges of \$7.9 million of internal-use software of which \$1.6 million related to the 2017 Restructuring program discussed in Note 6 "Restructuring" and \$6.3 million related to strategic shifts in our business. In 2016, we recorded asset impairment charges of \$10.9 million related to the 2016 Restructuring program discussed in Note 6 "Restructuring". Impairments included \$7.5 million of computer software to be sold, leased or marketed, \$1.7 million in machinery and equipment, \$1.5 million in internal-use software, \$0.1 million in furniture and office equipment and \$0.1 million in buildings and improvements.

Repairs and maintenance expense was \$12.1 million, \$12.7 million and \$13.0 million in 2018, 2017 and 2016, respectively. For the year ended December 31, 2018 and 2017, construction in progress primarily includes amounts related to ongoing software development projects. For the years ended December 31, 2018, 2017 and 2016, interest capitalized in connection with construction projects was not significant.

10. Investments

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

Marketable Equity Securities

A summary of our investments in marketable equity securities that have readily determinable fair values that are classified as available-for-sale follows below. These investments are reported at fair value with gains and losses recorded in earnings beginning in January 2018 upon adoption of ASU 2016-01. Prior to adoption, these investments were reported at fair value with unrealized gains and losses recognized in accumulated other comprehensive income on the balance sheet. Accordingly, upon adoption, we recorded a cumulative effect adjustment to decrease opening retained earnings at January 1, 2018 by a net of tax amount of \$0.9 million (pre-tax \$1.1 million) for unrealized losses as of the adoption date.

| (in thousands, except shares held) | As of December 31, | |
|--|--------------------|----------|
| | 2018 | 2017 |
| HTG Molecular Diagnostics, Inc (HTGM) | | |
| Shares held | 833,333 | 833,333 |
| Cost basis | \$ 2,000 | \$ 2,000 |
| Fair value | \$ 2,117 | \$ 1,692 |
| Total recognized gain during the period | \$ 425 | \$ — |
| Total cumulative unrealized gain (loss) | \$ 117 | \$ (308) |

During the year ended December 31, 2018, the increase of \$0.4 million in fair market value was recognized as a gain in other income (expense), net in the accompanying consolidated statement of income. These marketable securities are included in other long-term assets in the accompanying consolidated balance sheets.

| (in thousands, except shares held) | As of December 31, | |
|---|--------------------|----------|
| | 2018 | 2017 |
| Curetis N.V. | | |
| Shares held | 204,000 | 320,424 |
| Cost basis | \$ 1,444 | \$ 2,268 |
| Fair value | \$ 350 | \$ 1,516 |
| Total recognized loss during the period | \$ (572) | \$ — |
| Total cumulative unrealized loss | \$ (1,094) | \$ (752) |

During the year ended December 31, 2018, we sold 116,424 shares of Curetis N.V. and recognized a gain of \$0.3 million in other income (expense), net in the accompanying consolidated statement of income in connection with the sale of these shares. The fair market value of shares held during the year decreased by \$0.6 million and was recognized as a loss in other income (expense), net in the accompanying consolidated statement of income. As of December 31, 2018 and 2017, these marketable securities are included in short-term investments and other long-term assets, respectively, in the accompanying consolidated balance sheets.

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

A summary of our non-marketable investments accounted for as equity method investments is as follows:

| (\$ in thousands) | Ownership Percentage | Equity investments as of December 31, | | Share of income (loss) for the years ended December 31, | | |
|---|----------------------|---------------------------------------|-----------|---|----------|----------|
| | | 2018 | 2017 | 2018 | 2017 | 2016 |
| PreAnalytiX GmbH | 50.00 % | \$ 5,405 | \$ 7,562 | \$ 4,062 | \$ 3,818 | \$ 3,067 |
| MAQGEN Biotechnology Co., Ltd | 40.00 % | 5,154 | 3,285 | (579) | (542) | — |
| Suzhou Fuda Business Management and Consulting Partnership | 33.67 % | 3,138 | — | — | — | — |
| Apis Assay Technologies Ltd | 19.00 % | 770 | — | — | — | — |
| Hombrechtikon Systems Engineering AG | 19.00 % | 378 | 1,155 | (668) | (346) | — |
| Biotype Innovation GmbH | 0.00 % | — | 3,821 | (123) | 39 | (335) |
| Pyrobett | 19.00 % | — | 2,639 | (100) | 195 | 333 |
| QIAGEN (Suzhou) Institute of Translation Research Co., Ltd. | 0.00 % | — | — | — | — | (244) |
| | | \$ 14,845 | \$ 18,462 | \$ 2,592 | \$ 3,164 | \$ 2,821 |

During the year ended December 31, 2018, we recorded impairments of \$6.1 million in other income (expense), net in the accompanying consolidated statements of income, following changes in the investee's circumstances that indicated the carrying value was no longer recoverable. Accordingly, the investments were fully impaired.

During 2017, we acquired a 40% interest in MAQGEN Biotechnology Co., Ltd. for \$4.0 million and contributed an additional \$3.2 million during 2018. We have a commitment to contribute an additional \$4.8 million in future periods. Also, during 2017, we sold our interest in QIAGEN (Suzhou) Institute of Translation Research Co., Ltd., which had no book value at the time of sale, for \$3.5 million and recorded a corresponding gain in other expense, net in the accompanying statements of income.

In connection with the 2016 restructuring activities discussed in Note 6 "Restructuring", in 2016 we transferred the research and development activities of our instrumentation business to a new company, Hombrechtikon Systems Engineering AG (HSE), in which we acquired a 19.0% interest for a total obligation of \$9.8 million payable over three years. In 2016, we recorded an impairment of the investment in HSE of \$8.3 million in other income (expense), net.

Two of our equity method investments are variable interest entities and we are not the primary beneficiary as we do not hold the power to direct the activities that most significantly impact the economic performance. Therefore, these investments are not consolidated. As of December 31, 2018 and 2017, these investments had a total carrying value of \$1.1 million and \$1.2 million, respectively, which is included in other long-term assets in the consolidated balance sheets, representing our maximum exposure to loss.

Non-Marketable Investments Not Accounted for Under the Equity Method

At December 31, 2018 and 2017, we had investments in non-publicly traded companies that do not have readily determinable fair values with carrying amounts that totaled \$59.5 million and \$33.6 million, respectively. The changes in these investments which 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 for the years ended December 31, 2018 and 2017 are as follows:

| (in thousands) | 2018 | 2017 |
|--|------------------|------------------|
| Balance at beginning of year | \$ 33,605 | \$ 38,173 |
| Cash investments in equity securities | 9,633 | 278 |
| Net increases due to observable price changes | 13,104 | — |
| Conversion of note receivable to equity securities | 11,369 | — |
| Sale of equity securities | (5,400) | — |
| Impairments | — | (5,137) |
| Full acquisition of equity securities | (2,710) | — |
| Foreign currency translation adjustments | (117) | 291 |
| Balance at end of year | \$ 59,484 | \$ 33,605 |

During 2018, we made investments of \$9.6 million in equity securities, of which \$9.3 million was an additional investment in NeuMoDx Molecular, Inc. (NeuMoDx). The investment is part of a strategic partnership with NeuMoDx to commercialize two new fully integrated systems for automation of PCR (polymerase chain reaction) testing. Under the agreement, we will initially distribute the NeuMoDx™ 288 (high-throughput version) and NeuMoDx™ 96 (mid-throughput version) in Europe and other major markets worldwide outside of the United States. NeuMoDx will distribute these instruments within the United States directly. The two companies have also entered into an agreement under which we can acquire all NeuMoDx shares not currently owned by QIAGEN at a predetermined price of approximately \$234 million, subject to the achievement of certain regulatory and operational milestones.

For the year ended December 31, 2018, we recognized a gain of \$13.1 million in other income (expense), net in the accompanying consolidated statement of income due to upward adjustments resulting from observable price changes. These adjustments were due to equity offerings at a higher price from the issuer in orderly transactions for identical or similar investments as those we hold.

During 2018, we converted a note receivable from a non-publicly traded company, considered a related party, into an equity interest in that company. This note held a balance of \$11.4 million including principal balance and accrued interest at conversion which was a non-cash investing activity and is therefore not included in the consolidated statement of cash flows. Also during 2018, we sold our interest in a non-publicly traded company which had a book value of \$5.4 million. Proceeds from the sale totaled \$10.5 million in cash resulting in a corresponding gain of \$5.1 million recorded in other income (expense), net in the accompanying consolidated statement of income. Additionally during 2018, we acquired all remaining shares of a privately held entity in which we held a minority interest as discussed in Note 5 "Acquisitions and Divestitures".

One of our non-marketable investments not accounted for under the equity method is a variable interest entity and we are not the primary beneficiary as we do not hold the power to direct the activities that most significantly impact the economic performance. Therefore, this investment is not consolidated. As of December 31, 2018 and 2017, this investment had a total carrying value of \$41.0 million and \$20.0 million, respectively, which is included in other long-term assets in the consolidated balance sheets, representing our maximum exposure to loss.

In 2017, we recorded total impairments to non-marketable investments not accounted for under the equity method of \$5.1 million in other income (expense), net in the accompanying consolidated statement of income.

11. Goodwill and Intangible Assets

The following sets forth the intangible assets by major asset class as of December 31, 2018 and 2017:

| (in thousands) | Weighted Average Life (in years) | 2018 | | 2017 | |
|---|----------------------------------|-----------------------|--------------------------|-----------------------|--------------------------|
| | | Gross Carrying Amount | Accumulated Amortization | Gross Carrying Amount | Accumulated Amortization |
| Amortized Intangible Assets: | | | | | |
| Patent and license rights | 9.07 | \$ 448,220 | \$ (310,040) | \$ 407,635 | \$ (280,434) |
| Developed technology | 11.74 | 770,955 | (561,615) | 771,893 | (544,633) |
| Customer base, trademarks, and non-compete agreements | 10.87 | 427,512 | (323,024) | 437,213 | (292,356) |
| | 10.72 | \$ 1,646,687 | \$ (1,194,679) | \$ 1,616,741 | \$ (1,117,423) |
| Unamortized Intangible Assets: | | | | | |
| In-process research and development | | \$ 23,035 | | \$ — | |
| Goodwill | | 2,108,536 | | 2,012,904 | |
| | | \$ 2,131,571 | | \$ 2,012,904 | |

The changes in intangible assets for the years ended December 31, 2018 and 2017 are as follows:

| (in thousands) | 2018 | 2017 |
|--|------------|------------|
| Balance at beginning of year | \$ 499,318 | \$ 557,159 |
| Additions | 32,159 | 15,527 |
| Additions from acquisitions | 81,200 | 28,700 |
| Amortization | (118,576) | (133,797) |
| Disposals | (4,426) | (897) |
| Foreign currency translation adjustments | (14,632) | 32,626 |
| Balance at end of year | \$ 475,043 | \$ 499,318 |

Amortization expense on intangible assets totaled approximately \$118.6 million, \$133.8 million and \$137.9 million, respectively, for the years ended December 31, 2018, 2017 and 2016.

Cash paid for purchases of intangible assets during the year ended December 31, 2018 totaled \$41.0 million, of which \$11.9 million is related to current year payments for licenses that were accrued as of December 31, 2017 and \$3.3 million is related to prepayments recorded in other long-term assets in the accompanying consolidated balance sheet. Intangible asset additions of \$32.2 million includes \$25.8 million of cash paid during the year ended December 31, 2018, together with \$4.2 million of additions that were accrued as of December 31, 2018 and \$2.2 million of additions which were previously recorded as prepayments. Cash paid for intangible assets during the year ended December 31, 2017 totaled \$34.3 million of which \$16.5 million is related to current year payments for licenses that were accrued as of December 31, 2016 and \$5.8 million is related to prepayments recorded in other long-term assets in accompanying consolidated balance sheet. Intangible asset additions of \$15.5 million includes \$12.0 million of cash paid during the year ended December 31, 2017, together with \$3.5 million of additions which were previously recorded as prepayments.

Amortization of intangibles for the next five years is expected to be approximately:

| (in thousands) | Amortization |
|--------------------------|--------------|
| Years ended December 31: | |
| 2019 | \$ 98,277 |
| 2020 | \$ 71,308 |
| 2021 | \$ 62,517 |
| 2022 | \$ 48,501 |
| 2023 | \$ 45,229 |

The changes in goodwill for the years ended December 31, 2018 and 2017 are as follows:

| (in thousands) | 2018 | 2017 |
|--|--------------|--------------|
| Balance at beginning of year | \$ 2,012,904 | \$ 1,925,518 |
| Additions from acquisitions | 142,287 | 26,934 |
| Disposals | (5,682) | — |
| Foreign currency translation adjustments | (40,973) | 60,452 |
| Balance at end of year | \$ 2,108,536 | \$ 2,012,904 |

The changes in the carrying amount of goodwill during the year ended December 31, 2018 resulted primarily from the acquisition of STAT-Dx and other acquisitions and divestitures discussed in Note 5 "Acquisitions and Divestitures" and changes in foreign currency translation. The changes in goodwill during the year ended December 31, 2017 resulted primarily from changes in foreign currency translation together with acquired goodwill from the 2017 acquisition OmicSoft.

12. Accrued and Other Current Liabilities

Accrued and other current liabilities at December 31, 2018 and 2017 consist of the following:

| (in thousands) | 2018 | 2017 |
|---|------------|------------|
| Accrued expenses and other liabilities | \$ 103,388 | \$ 85,986 |
| Payroll and related accruals | 66,871 | 63,525 |
| Deferred revenue | 45,358 | 49,357 |
| Accrued contingent consideration and milestone payments | 27,820 | 11,539 |
| Restructuring | 6,850 | 14,667 |
| Accrued interest on long-term debt | 6,200 | 5,543 |
| Accrued royalties | 5,469 | 6,714 |
| Cash collateral | 1,000 | 3,000 |
| Current portion of capital lease obligations | 61 | 1,359 |
| Total accrued and other current liabilities | \$ 263,017 | \$ 241,690 |

13. Derivatives and Hedging

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 December 31, 2018, cash collateral positions consisted of \$1.0 million recorded in accrued and other current liabilities and \$25.4 million recorded in prepaid expenses and other current assets in the accompanying consolidated balance sheet. As of December 31, 2017, we had a liability position of \$3.0 million recorded in accrued and other current liabilities and \$21.9 million recorded in prepaid expenses and other current assets in the accompanying consolidated balance sheet.

In 2017, we entered into 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 ("Schuldschein") which was issued in the total amount of \$331.1 million as described in Note 15 "Lines of Credit and Debt". Of the \$331.1 million, which is held in both U.S. dollars and Euro, €255.0 million is designated 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 income (loss). Based on the spot rate method, the unrealized loss recorded in equity as of December 31, 2018 and 2017 is \$5.9 million and \$19.8 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 December 31, 2018.

As of December 31, 2018 and 2017, 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 income (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. In 2018 and in 2017, we did not record any hedge ineffectiveness related to any cash-flow hedges in earnings. Based on their valuation as of December 31, 2018, we expect approximately \$9.5 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 consolidated statements of cash flows in the same category as the consolidated balance sheet account of the underlying item.

As of December 31, 2018 and 2017, we held derivative instruments that qualify for hedge accounting as fair value hedges. For derivative instruments that are designated and qualify as a fair value hedge, the effective portion of the gain or loss on the derivative is reflected in earnings. This earnings effect is offset by the change in the fair value of the hedged item attributable to the risk being hedged that is also recorded in earnings. In 2018 and 2017, we concluded there was no ineffectiveness. The cash flows derived from derivatives are classified in the consolidated statements of cash flows in the same category as the consolidated balance sheet account of the underlying item.

Interest Rate Derivatives

We use interest rate derivative contracts to align our portfolio of interest bearing assets and liabilities with our risk management objectives. During 2015, we entered into 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. We determined that no ineffectiveness exists related to these swaps. As of December 31, 2018, the \$180.0 million notional swap amount had a fair value of \$17.6 million recorded in fair value of derivative instruments - long-term liability and a related interest receivable of \$1.4 million recorded in prepaid expenses and other current assets, respectively, in the accompanying consolidated balance sheet. As of December 31, 2017, this swap had a fair value of \$28.9 million recorded in fair value of derivative instruments - long-term liability and a related interest receivable of \$1.2 million recorded in prepaid expenses and other current assets in the accompanying consolidated balance sheet.

During 2014, we entered into interest rate swaps, which effectively fixed the fair value of \$200.0 million of our fixed rate private placement debt and qualify for hedge accounting as fair value hedges. We determined that no ineffectiveness exists related to these swaps. As of December 31, 2018, the \$200.0 million notional swap amounts had a fair value of \$1.2 million in total, of which \$0.5 million is recorded in fair value of derivative instruments - current liability, and \$0.7 million is recorded in fair value of derivative instruments - long-term liability, with accrued and unpaid interest of \$0.1 million recorded in accrued and other current liabilities in the accompanying consolidated balance sheet. As of December 31, 2017, this swap had a net fair value of \$0.9 million, of which \$1.0 million is recorded in fair value of derivative instruments - long-term asset and \$0.2 million is recorded in fair value of derivative instruments - current liability and accrued and unpaid interest of \$0.3 million recorded in prepaid expenses and other current assets, respectively, in the accompanying balance sheet.

Call Options

We entered into Call Options in 2014 which, along with the sale of the Warrants, represent the Call Spread Overlay entered in connection with the 2019 and 2021 Cash Convertible Notes, which are more fully described in Note 15 "Lines of Credit and Debt". We used \$105.2 million of the proceeds from the issuance of the 2019 and 2021 Cash Convertible Notes to pay the premium for the Call Options, and simultaneously received \$68.9 million (net of issuance costs) from the sale of the Warrants, for a net cash outlay of \$36.3 million for the Call Spread Overlay.

We used \$73.7 million of the proceeds from the from the issuance of the 2023 Cash Convertible Notes to pay for the premium for the Call Option, and simultaneously received \$45.3 million from the sale of Warrants, for a net cash outlay of \$28.3 million for the Call Spread Overlay. Issuance costs incurred in connection with the Warrant and the Call Option were \$0.3 million and \$0.1 million respectively, which \$0.1 million was accrued as of December 31, 2017.

During 2018, we used \$97.3 million of the proceeds from the from the issuance of the 2024 Cash Convertible Notes to pay for the premium for the Call Option, and simultaneously received \$72.4 million from the sale of Warrants, for a net cash outlay of \$24.9 million for the Call Spread Overlay. Issuance costs incurred in connection with the Warrant and the Call Option were \$0.5 million and \$0.5 million respectively, which \$0.8 million was accrued as of December 31, 2018.

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.

Aside from the initial payment of a premium of \$105.2 million (2019 and 2021 Notes), \$73.7 million (2023 Notes) and \$97.3 million (2024 Notes) 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 share of our common stock 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 stock is the underlying security, are a derivative asset that requires mark-to-market accounting treatment due to the cash settlement features until the Call Options settle or expire. The Call Options are measured and reported at fair value on a recurring basis, within Level 2 of the fair value hierarchy. For further discussion of the inputs used to determine the fair value of the Call Options, refer to Note 14 "Financial Instruments and Fair Value Measurements". The fair value of the Call Options at December 31, 2018 was approximately \$395.1 million, of which \$100.1 million is recorded in fair value of derivative instruments - current asset and \$295.0 million is recorded in fair value of derivative instruments - long-term asset in the accompanying consolidated balance sheet. The fair value of the Call Options at December 31, 2017 was approximately \$223.2 million and is recorded in fair value of derivative instruments - long-term asset in the accompanying consolidated balance sheet.

The Call Options do not qualify for hedge accounting treatment. Therefore, the change in fair value of these instruments is recognized immediately in our consolidated statements of income in other expense, net. For the years ended December 31, 2018 and 2017, the changes in the fair value of the Call Options resulted in gains of \$74.7 million and \$37.4 million, respectively. Because the terms of the Call Options are substantially similar to those of the Cash Convertible Notes' embedded cash conversion option, discussed below, we expect the effect on earnings from those two derivative instruments to mostly offset each other.

Cash Convertible Notes Embedded Cash Conversion Option

The embedded cash conversion option within the Cash Convertible Notes 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 consolidated statements of income in other expense, net until the cash conversion option settles or expires. For further discussion of the Cash Convertible Notes, refer to Note 15 "Lines of Credit and Debt". The initial fair value liability of the embedded cash conversion option for the 2019 and 2021 Notes was \$105.2 million, for the 2023 Notes was \$74.5 million and for the 2024 Notes was \$98.5 million, which simultaneously reduced the carrying value of the Cash Convertible Notes (effectively an original issuance discount). The embedded cash conversion option is measured and reported at fair value on a recurring basis, within Level 2 of the fair value hierarchy. For further discussion of the inputs used to determine the fair value of the embedded cash conversion options, refer to Note 14 "Fair Value Measurements". The fair value of the embedded cash conversion options at December 31, 2018 was \$399.3 million, which \$100.2 million is recorded in fair value of derivative instruments - current liability and \$299.1 million is recorded in fair value of derivative instruments - long-term liability in the accompanying balance sheet. The fair value of the embedded cash conversion options at December 31, 2017 was \$224.3 million, which is recorded in fair value of derivative instruments - long-term liability in the accompanying balance sheet. For the years ended December 31, 2018 and 2017 the change in the fair value of the embedded cash conversion options resulted in losses of \$76.5 million and \$36.7 million, respectively, recognized in our consolidated statements of income in other expense, net.

Embedded Conversion Option

During 2017, we purchased a convertible note for \$3.0 million from a publicly listed company considered a related party. The embedded derivative, that is bifurcated and measured at fair value, associated to a convertible feature of this note had a fair value of \$0.3 million and \$0.2 million as of December 31, 2018 and 2017, respectively, included in fair value of derivative instruments - long-term asset.

Foreign Currency Derivatives

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.

Undesignated Derivative Instruments

We are party to various foreign exchange forward, option and swap arrangements which had, at December 31, 2018, an aggregate notional value of \$792.7 million and fair values of \$2.7 million and \$6.0 million included in fair value of derivative instruments - current asset and fair value of derivative instruments - current liability, respectively, which expire at various dates through November 2019. We were party to various foreign exchange forward and swap arrangements which had, at December 31, 2017, an aggregate notional value of \$587.3 million and fair values of \$7.5 million and \$2.4 million included in fair value of derivative instruments - current asset and fair value of derivative instruments - current liability, respectively, which expired at various dates through March 2018. 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 expense, net.

Fair Values of Derivative Instruments

The following table summarizes the fair value amounts of derivative instruments reported in the consolidated balance sheets as of December 31, 2018 and 2017:

| (in thousands) | Derivatives in Asset Positions Fair value | | Derivatives in Liability Positions Fair value | |
|--|--|-------------------|--|---------------------|
| | 2018 | 2017 | 2018 | 2017 |
| Derivative instruments designated as hedges | | | | |
| Interest rate contracts ¹ | \$ — | \$ 1,017 | \$ (18,768) | \$ (29,103) |
| Total derivative instruments designated as hedges | \$ — | \$ 1,017 | \$ (18,768) | \$ (29,103) |
| Undesignated derivative instruments | | | | |
| Embedded conversion option | \$ 349 | \$ 217 | \$ — | \$ — |
| Call spread overlay | 395,095 | 223,164 | (399,262) | (224,286) |
| Foreign exchange contracts | 2,673 | 7,480 | (5,957) | (2,424) |
| Total derivative instruments | \$ 398,117 | \$ 230,861 | \$ (405,219) | \$ (226,710) |

⁽¹⁾ The fair value amounts for the interest rate contracts do not include accrued interest of \$1.4 million and \$1.6 million included in prepaid expenses and other current assets in the consolidated balance sheets as of December 31, 2018 and 2017, respectively.

Gains and Losses on Derivative Instruments

The following tables summarize the classification and gains and losses on derivative instruments for the years ended December 31, 2018, 2017 and 2016:

| Year Ended December 31, 2018 (in thousands) | Gain/(loss) recognized in AOCI | Location of (gain) loss in income statement | (Gain) loss reclassified from AOCI into income | Gain (loss) recognized in income |
|--|--------------------------------------|--|--|--|
| Non-derivative instruments | | | | |
| Net investment hedge | \$ 13,839 | Other expense, net | \$ — | n/a |
| Cash flow hedges | | | | |
| Interest rate contracts | \$ 11,368 | Other expense, net | \$ (9,774) | n/a |
| Fair value hedges | | | | |
| Interest rate contracts | \$ — | Other expense, net | \$ — | \$ (2,051) |
| Undesignated derivative instruments | | | | |
| Call spread overlay | n/a | Other expense, net | n/a | \$ (1,818) |
| Foreign exchange contracts | n/a | Other expense, net | n/a | (19,857) |
| | | | | \$ (21,675) |
| Year Ended December 31, 2017 (in thousands) | | | | |
| Non-derivative instruments | | | | |
| Net investment hedge | \$ (19,757) | Other expense, net | \$ — | n/a |
| Cash flow hedges | | | | |
| Interest rate contracts | \$ (30,310) | Other expense, net | \$ 26,136 | n/a |
| Fair value hedges | | | | |
| Interest rate contracts | \$ — | Other expense, net | \$ — | \$ (2,199) |
| Undesignated derivative instruments | | | | |
| Call spread overlay | n/a | Other expense, net | n/a | \$ 1,573 |
| Foreign exchange contracts | n/a | Other expense, net | n/a | 11,813 |
| | | | | \$ 13,386 |

| Year Ended December 31, 2016 (in thousands) | Gain/(loss) recognized in AOCI | Location of (gain) loss in income statement | (Gain) loss reclassified from AOCI into income | Gain (loss) recognized in income |
|---|--------------------------------------|--|--|-------------------------------------|
| Cash flow hedges | | | | |
| Interest rate contracts | \$ (3,969) | Other expense, net | \$ (6,228) | n/a |
| Fair value hedges | | | | |
| Interest rate contracts | \$ — | Other expense, net | \$ — | \$ (1,930) |
| Undesignated derivative instruments | | | | |
| Call spread overlay | n/a | Other expense, net | n/a | \$ 118 |
| Foreign exchange contracts | n/a | Other expense, net | n/a | (6,072) |
| | | | | \$ (5,954) |

The amounts noted in the table above for accumulated other comprehensive income (AOCI) do not include any adjustment for the impact of deferred income taxes.

14. 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.

Our assets and liabilities measured at fair value on a recurring basis consist of short-term investments, which are classified in Level 1 and Level 2 of the fair value hierarchy, marketable securities discussed in Note 10 "Investments", which are classified in Level 1, derivative contracts used to hedge currency and interest rate risk and derivative financial instruments entered into in connection with the Cash Convertible Notes discussed in Note 15 "Lines of Credit and Debt", which are classified in Level 2 of the fair value hierarchy, and contingent consideration accruals which are classified in Level 3 of the fair value hierarchy, and are shown in the tables below. Non-marketable equity securities remeasured during the year ended December 31, 2018 are classified within Level 3 in the fair value hierarchy following the adoption of ASU 2016-01. There have been no transfers between levels.

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 conversion option liability. See Note 15 "Lines of Credit and Debt", and Note 13 "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 stock price, the risk-free interest rate, and the implied volatility of our common stock. 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 for which we estimate the value based on valuation methods using the observable transaction price at the transaction date and other unobservable inputs. These investments are carried at fair value or under the measurement alternative. 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 17.2%), 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 consolidated statements of income in the line items commensurate with the underlying nature of milestone arrangements.

The following table presents our fair value hierarchy for our financial assets and liabilities measured at fair value on a recurring basis:

| (in thousands) | As of December 31, 2018 | | | | As of December 31, 2017 | | | |
|----------------------------------|-------------------------|--------------|-------------|--------------|-------------------------|--------------|-------------|--------------|
| | Level 1 | Level 2 | Level 3 | Total | Level 1 | Level 2 | Level 3 | Total |
| Assets: | | | | | | | | |
| Short-term investments | \$ 350 | \$ 234,256 | \$ — | \$ 234,606 | \$ — | \$ 359,198 | \$ — | \$ 359,198 |
| Marketable equity securities | 2,117 | — | — | 2,117 | 3,208 | — | — | 3,208 |
| Non-marketable equity securities | — | — | 59,484 | 59,484 | — | — | — | — |
| Call option | — | 395,095 | — | 395,095 | — | 223,164 | — | 223,164 |
| Foreign exchange contracts | — | 2,673 | — | 2,673 | — | 7,480 | — | 7,480 |
| Embedded conversion option | — | 349 | — | 349 | — | 217 | — | 217 |
| Interest rate contracts | — | — | — | — | — | 1,017 | — | 1,017 |
| | \$ 2,467 | \$ 632,373 | \$ 59,484 | \$ 694,324 | \$ 3,208 | \$ 591,076 | \$ — | \$ 594,284 |
| Liabilities: | | | | | | | | |
| Foreign exchange contracts | \$ — | \$ (5,957) | \$ — | \$ (5,957) | \$ — | \$ (2,424) | \$ — | \$ (2,424) |
| Interest rate contracts | — | (18,768) | — | (18,768) | — | (29,103) | — | (29,103) |
| Cash conversion option | — | (399,262) | — | (399,262) | — | (224,286) | — | (224,286) |
| Contingent consideration | — | — | (48,971) | (48,971) | — | — | (11,539) | (11,539) |
| | \$ — | \$ (423,987) | \$ (48,971) | \$ (472,958) | \$ — | \$ (255,813) | \$ (11,539) | \$ (267,352) |

Refer to Note 10 "Investments" for the change in non-marketable equity securities with Level 3 inputs during the year ended December 31, 2018. For contingent consideration liabilities with Level 3 inputs, the following table summarizes the activity for the years ended December 31, 2018 and 2017:

| (in thousands) | 2018 | 2017 |
|------------------------------|-------------|------------|
| Balance at beginning of year | \$ (11,539) | \$ (8,754) |
| Additions from acquisitions | (53,962) | (10,954) |
| Payments | 16,530 | 4,900 |
| Gain included in earnings | — | 3,269 |
| Balance at end of year | \$ 48,971 | \$ 11,539 |

For the year ended December 31, 2018, of the total \$49.0 million accrued for contingent consideration, \$27.5 million is included in accrued and other current liabilities and \$21.5 million is included in other long-term liabilities in the accompanying consolidated balance sheet. During 2017, gain for the reduction in the fair value of contingent consideration related to unmet milestones of \$3.3 million was recognized in general and administrative, restructuring, integration and other, net in the accompanying consolidated statements of income.

The carrying values of financial instruments, including cash and cash equivalents, accounts receivable, accounts payable and other accrued liabilities, approximate their fair values due to their short-term maturities. The estimated fair value of long-term debt as disclosed in Note 15 "Lines of Credit and 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. There were no fair value differences in the years ended December 31, 2018 and 2017 for nonfinancial assets or liabilities required to be measured at fair value on a nonrecurring basis other than the impairment of cost-method investments as discussed in Note 10.

The table below presents the carrying values and the estimated fair values of financial instruments not presented in the tables above.

| (in thousands) | As of December 31, 2018 | | | As of December 31, 2017 | | |
|--|-------------------------|--------------|------------|-------------------------|---------|--------------|
| | Carrying Amount | Level 1 | Level 2 | Carrying Amount | Level 1 | Level 2 |
| Long-term debt including current portion: | | | | | | |
| Cash convertible notes | \$ 1,439,931 | \$ 1,794,000 | \$ — | \$ 1,008,507 | \$ — | \$ 1269,613 |
| U.S. Private placement | 398,107 | — | 391,700 | 399,939 | — | 394,669 |
| German private placement | 336,168 | — | 337,768 | 349,812 | — | 349,977 |
| | \$ 2,174,206 | \$ 1,794,000 | \$ 729,468 | \$ 1,758,258 | \$ — | \$ 2,014,259 |

The fair values of the financial instruments presented in the tables above were determined as follows:

Cash Convertible Notes: Fair value is based on an estimation using available over-the-counter market information on the Cash Convertible Notes due in 2019, 2021, 2023 and 2024. During 2018, we determined that the quoted prices were from active markets and accordingly moved the fair value from level 2 to level 1 of the fair value hierarchy.

U.S. Private Placement: Fair value of the outstanding bonds is based on an estimation using the changes in the U.S. Treasury rates.

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

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. There were no adjustments in the twelve months ended periods ended December 31, 2018 and 2017 for nonfinancial assets or liabilities required to be measured at fair value on a nonrecurring basis.

15. Lines of Credit and Debt

Our credit facilities available and undrawn at December 31, 2018 total €426.6 million (approximately \$488.5 million). This includes a €400.0 million syndicated multi-currency revolving credit facility expiring December 2021 of which no amounts were utilized at December 31, 2018 or at December 31, 2017, and three other lines of credit amounting to €26.6 million with no expiration date, none of which were utilized as of December 31, 2018 or as of December 31, 2017. The €400.0 million facility can be utilized in Euro, British pounds sterling, Swiss franc or U.S. dollar and bears interest of 0.4% to 1.2% above three months EURIBOR, or LIBOR in relation to any loan not in euro, and is offered with interest periods of one, two, three or six months. The commitment fee is calculated based on 35% of the applicable margin. In 2018 and 2017, \$1.0 million and \$0.9 million of commitment fees were paid, respectively. 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 December 31, 2018. The credit facilities are for general corporate purposes.

At December 31, 2018 and 2017, total current long-term debt, net of debt issuance costs of \$14.2 million and \$12.4 million, respectively, consists of the following:

| (in thousands) | 2018 | 2017 |
|---|---------------------|---------------------|
| 0.375% Senior Unsecured Cash Convertible Notes due 2019 | \$ 427,445 | \$ 414,843 |
| 0.875% Senior Unsecured Cash Convertible Notes due 2021 | 279,492 | 270,762 |
| 0.500% Senior Unsecured Cash Convertible Notes due 2023 | 335,201 | 322,902 |
| 1.000% Senior Unsecured Cash Convertible Notes due 2024 | 397,793 | — |
| 3.19% Series A Senior Notes due October 16, 2019 | 72,483 | 72,742 |
| 3.75% Series B Senior Notes due October 16, 2022 | 298,691 | 300,276 |
| 3.90% Series C Senior Notes due October 16, 2024 | 26,933 | 26,921 |
| German Private Placement (Schuldschein) | 336,168 | 349,812 |
| Total long-term debt | \$ 2,174,206 | \$ 1,758,258 |
| Less current portion | 503,116 | — |
| Long-term portion | \$ 1,671,090 | \$ 1,758,258 |

The notes are all unsecured obligations that rank pari passu. Interest expense on long-term debt was \$61.2 million, \$43.6 million and \$35.8 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Future maturities (stated at the carrying values) of long-term debt as of December 31, 2018, are as follows:

| Year ending December 31, | (in thousands) |
|--------------------------|---------------------|
| 2019 | \$ 503,116 |
| 2020 | — |
| 2021 | 315,732 |
| 2022 | 470,371 |
| 2023 | 335,201 |
| thereafter | 549,786 |
| | \$ 2,174,206 |

Cash Convertible Notes due 2019, 2021, 2023 and 2024

On March 19, 2014, we issued \$730.0 million aggregate principal amount of Cash Convertible Senior Notes of which \$430.0 million is due in 2019 (2019 Notes) and \$300.0 million is due in 2021 (2021 Notes). The aggregate net proceeds of the 2019 and 2021 Convertible Notes were \$680.7 million, after payment of the net cost of the Call Spread Overlay described below and transaction costs. Additionally, we used \$372.5 million of the net proceeds to repay other debt.

On September 13, 2017, we issued \$400.0 million aggregate principal amount of Cash Convertible Senior Notes which is due in 2023 (2023 Notes). The net proceeds of the 2023 Notes were \$365.6 million, after payment of the net cost of the Call Spread Overlay described below and transaction costs paid through December 31, 2018.

On November 13, 2018, we issued \$500.0 million aggregate principal amount of Cash Convertible Senior Notes which is due in 2024 (2024 Notes). The net proceeds of the 2024 Notes were \$470.0 million, after payment of the net cost of the Call Spread Overlay described below and transaction costs paid through December 31, 2018.

We refer to the 2019 Notes, 2021 Notes 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 maturity date unless repurchased or converted with their terms prior to such date. The interest rate and corresponding maturity of each Note are summarized as follows:

| Cash Convertible Notes | Annual Interest Rate | Date of Interest Payments | Interest Payment Start Date | Maturity Date |
|------------------------|----------------------|---------------------------|-----------------------------|--------------------|
| 2019 Notes | 0.375% | March 19 and September 19 | September 19, 2014 | March 19, 2019 |
| 2021 Notes | 0.875% | March 19 and September 19 | September 19, 2014 | March 19, 2021 |
| 2023 Notes | 0.500% | March 13 and September 13 | March 13, 2018 | September 13, 2023 |
| 2024 Notes | 1.000% | March 13 and November 13 | March 13, 2019 | November 13, 2024 |

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 following contingent conversion periods:

| Cash Convertible Notes | Contingent Conversion Period |
|------------------------|---|
| 2019 Notes | From April 29, 2014 to September 18, 2018 |
| 2021 Notes | From April 29, 2014 to September 18, 2020 |
| 2023 Notes | From October 24, 2017 to March 13, 2023 |
| 2024 Notes | From December 24, 2018 to August 2, 2024 |

Additionally, conversion may occur at any time following a Contingent Conversion Period through the fifth business day immediately preceding the applicable maturity date. The Contingent Conversion Period for the 2019 Notes has passed and the noteholders may convert at anytime until March 14, 2019.

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 of 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):

- › during any calendar quarter commencing after the calendar quarter (and only during such calendar quarter) ending on March 31, 2014 for 2019 and 2021 Cash Convertible Notes, on September 30, 2017 for 2023 Cash Convertible Notes, and on September 30, 2018 for 2024 Cash Convertible Notes; if the last reported sale price of our common stock for at least 20 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;
- › if we undergo certain fundamental changes as defined in the agreement;
- › during the five business day period immediately after any 10 consecutive trading day period in which the quoted price for the 2019 Cash Convertible Notes or the 2021 Cash Convertible Notes for each trading day of the measurement period was less than 98% of the product of the last reported sale price of our common stock and the conversion rate on each such trading day;
- › if parity event or trading price unavailability event, as the case maybe occurs for the 2023 Cash Convertible Notes and 2024 Cash Convertible Notes during the period of 10 days, including the first business day following the relevant trading price notification date.
- › if we elect to distribute assets or property to all or substantially all of the holders of our common stock 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 stock for the prior 20 consecutive trading days;
- › 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 Notes have been accelerated.

The Contingent Conversion Conditions in the 2019, 2021, 2023 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 2019, 2021, 2023 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. As of December 31, 2018, no contingent conversion condition was triggered.

The initial conversion rate for 2024 Notes is 4,360.3098 shares of our common stock per \$200,000 principal amount of 2024 Notes (reflecting an initial conversion price of approximately \$45.8683 per share of common stock). For the 2023 Notes, the initial conversion rate is 4,829.7279 shares of our common stock per \$200,000 principal amount of the 2023 Notes (reflecting an initial conversion price of approximately \$42.4102 per share of common stock). As adjusted by the synthetic share repurchase discussed in Note 17 "Equity", the conversion rate for the 2019 Notes and 2021 Notes is 7,063.1647 shares of our common stock per \$200,000 principal amount of Cash Convertible Notes (reflecting an adjusted conversion price of approximately \$28.32 per share of common stock). 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 stock 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 consolidated statements of income until the cash conversion option transaction settles or expires. The initial fair value liability of the embedded cash conversion option was \$105.2 million for the 2019 and 2021 Notes, \$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 an original issuance discount). For further discussion of the derivative financial instruments relating to the Cash Convertible Notes, refer to Note 13 "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, which is five and seven for the 2019 Notes and 2021 Notes, and six years for the 2023 Notes and 2024 Notes, respectively. 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 of the 2019 Notes, 2021 Notes, 2023 Notes and 2024 Notes is 2.937%, 3.809%, 3.997% and 4.782% respectively, 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.

Beginning on October 1, 2018 and ending at the close of business on December 31, 2018, the 2021 Notes became convertible pursuant to the indenture. The 2021 Notes became convertible pursuant to Section 12.01(b)(iv) of the indenture because the arithmetic mean of the last reported sale prices of our common stock, in each trading day in at least one 20 consecutive trading day period during the 30 consecutive trading day period ending on the last trading day of the preceding fiscal quarter, was greater than 130% of the conversion price in effect on such last trading day. The 2021 Notes were convertible at a conversion ratio of 7,063.1647 per \$200,000 principal amount of 2021 Notes, which is equivalent to a conversion price of approximately \$28.32 per share of our common stock. During this period, \$3.2 million of our 2021 Notes was converted and will be paid in March of 2019.

No Contingent Conversion Conditions were triggered for the Cash Convertible Notes as of December 31, 2018.

In connection with the issuance of the 2019 and 2021 Cash Convertible Notes, we incurred approximately \$13.1 million in transaction costs. We incurred approximately \$6.2 million in transaction costs for the 2023 Cash Convertible Notes. For 2024 Cash Convertible Notes, we incurred \$5.7 million transaction costs of which \$0.6 million was accrued as of December 31, 2018. 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.

Interest expense related to the Cash Convertible Notes was comprised of the following:

| (in thousands) | Year-Ended December 31 | |
|---|------------------------|------------------|
| | 2018 | 2017 |
| Coupon interest | \$ 6,890 | \$ 4,832 |
| Amortization of original issuance discount | 32,114 | 270,762 |
| Amortization of debt issuance costs | 3,485 | 2,615 |
| Total interest expense related to the Cash Convertible Notes | \$ 42,489 | \$ 28,824 |

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. During 2014, we used \$105.2 million of the proceeds from the issuance of the 2019 and 2021 Cash Convertible Notes to pay for the Call Options, and simultaneously received \$69.4 million from the sale of the Warrants, for a net cash outlay of \$35.8 million for the Call Spread Overlay.

During 2017, we used \$73.7 million of the proceeds from the from the issuance of the 2023 Cash Convertible Notes to pay for the premium for the Call Option, and simultaneously received \$45.3 million from the sale of Warrants, for a net cash outlay of \$28.3 million for the Call Spread Overlay. Issuance costs incurred in connection with the Warrant and the Call Option were \$0.3 million and \$0.1 million respectively.

In November 2018, we used \$97.3 million of the proceeds from the from the issuance of the 2024 Cash Convertible Notes to pay for the premium for the Call Option, and simultaneously received \$72.4 million from the sale of Warrants, for a net cash outlay of \$24.9 million for the Call Spread Overlay. Issuance costs incurred in connection with the Warrant and the Call Option were \$0.5 million and \$0.5 million respectively, of which \$0.8 million was accrued as of December 31, 2018.

The Call Options are derivative financial instruments and are discussed further in Note 13 "Derivatives and Hedging". The Warrants are equity instruments and are further discussed in Note 17 "Equity".

Aside from the initial payment of a premium of \$105.2 million (2019 and 2021 Notes), \$73.7 million (2023 Notes), and \$97.3 million (2024 Notes) for the Call Option, 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 share of our common stock 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 stock exceeds the applicable strike price of the Warrants. For each Warrant that is exercised, we will deliver to the holder a number of shares of our common stock 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.

U.S. Private Placement

In October 2012, we completed a private placement through the issuance of new senior unsecured notes at a total amount of \$400.0 million with a weighted average interest rate of 3.66% (settled on October 16, 2012). The notes were issued in three series: (1) \$73.0 million 7-year term due in 2019 (3.19%); (2) \$300.0 million 10-year term due in 2022 (3.75%); and (3) \$27.0 million 12-year term due in 2024 (3.90%). We paid \$2.1 million in debt issuance costs which will be amortized through interest expense using the effective interest method over the lifetime of the notes. The note purchase agreement contains certain financial and non-financial covenants, including but not limited to, restrictions on priority indebtedness and the maintenance of certain financial ratios. We were in compliance with these covenants at December 31, 2018. Based on an estimation using the changes in the U.S. Treasury rates, the Level 2 fair value of these senior notes as of December 31, 2018 and December 31, 2017 was approximately \$391.7 million and \$394.7 million, respectively. During 2014, we entered into interest rate swaps, which effectively fixed the fair value of \$200.0 million of this debt and qualify for hedge accounting as fair value hedges as described in Note 13 "Derivatives and Hedging".

German Private Placement (Schuldschein)

In 2017, we completed a German private placement bond ("Schuldschein") which was issued in several tranches totaling \$331.1 million due in various periods through 2027. The Schuldschein consists of U.S. dollar and 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 13 "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 December 31, 2018 totaled \$5.9 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 over the lifetime of the notes. A summary of the tranches as of December 31, 2018 is as follows:

| Currency | Notional Amount | Interest Rate | Maturity | Carrying Value as of December 31, 2018 (in thousands) |
|----------|-----------------|-------------------------|--------------|---|
| EUR | €11.5 million | Fixed 0.4% | March 2021 | \$ 13,143 |
| EUR | €23.0 million | Floating EURIBOR + 0.4% | March 2021 | 26,286 |
| EUR | €21.5 million | Fixed 0.68% | October 2022 | 24,561 |
| EUR | €64.5 million | Floating EURIBOR + 0.5% | October 2022 | 73,684 |
| USD | \$45.0 million | Floating LIBOR + 1.2% | October 2022 | 44,891 |
| EUR | €25.0 million | Floating EURIBOR + 0.5% | October 2022 | 28,543 |
| EUR | €64.0 million | Fixed 1.09% | June 2024 | 73,097 |
| EUR | €31.0 million | Floating EURIBOR + 0.7% | June 2024 | 35,406 |
| EUR | €14.5 million | Fixed 1.61% | June 2024 | 16,557 |
| | | | | \$ 336,168 |

The Financial Conduct Authority of the United Kingdom plans to phase out the London Interbank Offered Rate (LIBOR) by the end of 2021. Presently, the future of LIBOR is unclear, yet the Schuldschein agreements do contain language for the determination of interest rates in the event the LIBOR rate is not available. Changes to these agreements may be required should an alternative benchmark be required.

16. Income Taxes

Income before income taxes for the years ended December 31, 2018, 2017 and 2016 consisted of:

| (in thousands) | 2018 | 2017 | 2016 |
|---------------------------------------|------------|------------|-----------|
| Pretax income in The Netherlands | \$ (1,675) | \$ 42,220 | \$ 20,695 |
| Pretax income from foreign operations | 227,412 | 72,155 | 36,213 |
| | \$ 225,737 | \$ 114,375 | \$ 56,908 |

Income taxes for the years ended December 31, 2018, 2017 and 2016 are as follows:

| (in thousands) | 2018 | 2017 | 2016 |
|---|---------------|---------------|-----------------|
| Current—The Netherlands | \$ (5,794) | \$ 3,430 | \$ 6,043 |
| —Foreign | 52,835 | 10,375 | 34,543 |
| | 58,629 | 13,805 | 40,586 |
| Deferred—The Netherlands | 2,551 | 151 | 188 |
| —Foreign | (25,823) | 60,025 | (64,169) |
| | (23,272) | 60,176 | (63,981) |
| Total income tax expense (benefit) | 35,357 | 73,981 | (23,395) |

The Netherlands statutory income tax rate was 25% for the years ended December 31, 2018, 2017 and 2016. Income from foreign subsidiaries is generally taxed at the statutory income tax rates applicable in the respective countries of domicile. The principal items comprising the differences between income taxes computed at The Netherlands statutory rate and our reported income taxes and effective tax rate for the years ended December 31, 2018, 2017 and 2016 are as follows:

| | 2018 | | 2017 | | 2016 | |
|---|------------------|--------------|------------------|--------------|--------------------|----------------|
| (in thousands) | Amount | Percent | Amount | Percent | Amount | Percent |
| Income taxes at The Netherlands statutory rate | \$ 56,434 | 25.0% | \$ 28,594 | 25.0% | \$ 14,227 | 25.0% |
| Taxation of foreign operations, net ⁽¹⁾ | (33,994) | (15.1) | (38,635) | (33.8) | (43,265) | (76.0) |
| Tax impact from permanent items | 2,949 | 1.3 | (1,586) | (1.4) | 5,938 | 10.4 |
| Tax impact from tax-exempt income | (2,326) | (1.0) | (1,558) | (1.4) | (3,331) | (5.9) |
| Tax contingencies, net ⁽²⁾ | 13,570 | 6.0 | 23,189 | 20.3 | 1,761 | 3.1 |
| Changes in tax laws and rates ⁽³⁾ | 1,907 | 0.8 | 12,958 | 11.3 | 399 | 0.7 |
| Stock Compensation ⁽⁴⁾ | (4,740) | (2.1) | (5,237) | (4.6) | — | — |
| Government incentives and other deductions ⁽⁵⁾ | (2,892) | (1.2) | (4,949) | (4.3) | (2,543) | (4.5) |
| Prior year taxes | 494 | 0.2 | (2,319) | (2.0) | 1,411 | 2.5 |
| Valuation allowance ⁽³⁾ | 3,293 | 1.5 | 62,644 | 54.8 | 1,521 | 2.7 |
| Other items, net | 662 | 0.3 | 880 | 0.8 | 487 | 0.9 |
| Total income tax expense (benefit) | \$ 35,357 | 15.7% | \$ 73,981 | 64.7% | \$ (23,395) | (41.1)% |

⁽¹⁾ Our effective tax rate reflects the benefit of our global operations where certain income or loss is taxed at rates higher or lower than The Netherlands' statutory rate of 25% as well as the benefit of some income being partially exempt from income taxes due to various intercompany operating and financing activities. The most significant tax benefits from these foreign operating and financing activities are attributable to subsidiaries in Germany, Singapore, Switzerland, Ireland and Luxembourg. These foreign tax benefits are due to a combination of favorable tax laws, regulations, rulings, and exemptions in these jurisdictions. Additionally in 2016, in certain foreign jurisdictions (primarily Germany and the U.S.), we recorded acquisition related and impairment charges which reduced pretax income in these higher tax jurisdictions.

⁽²⁾ During 2018, we reassessed accruals for tax contingencies, primarily related to ongoing income tax audits.

⁽³⁾ The Netherlands' top statutory corporate income tax rate will be reduced in steps from 25% to 22.55% in 2020 and to 20.5% in 2021. In 2017, we recorded a valuation allowance of \$60.8 million against deferred tax assets related to U.S. disallowed interest carryforwards. We also recorded full valuation allowances against other deferred tax assets on tax losses due to unlikely future profits in other jurisdictions.

⁽⁴⁾ Beginning in 2017, the excess tax benefits from share-based payments activity are reflected as a reduction of income tax expense, whereas previously they were recognized directly in equity.

⁽⁵⁾ Government incentives include favorable tax regulations in the U.S. and the U.K. relating to research and development expense as well as the U.S. Internal Revenue Code Section 199 domestic production activities deduction.

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 2006 for income tax examinations by tax authorities. The German group is open to audit for the tax years starting in 2010. The U.S. consolidated group is subject to Federal and most state income tax examinations by tax authorities beginning with the year ending December 21, 2015 through the current period. Our subsidiaries, with few exceptions, are no longer subject to income tax examinations by tax authorities for years before 2014.

In February 2014, the U.S. tax authorities (Internal Revenue Service) began the audit of our U.S. Federal tax returns for 2011 and 2012 years and the audit was closed in 2016 without any tax adjustments. As a result, we released \$6.6 million of unrecognized tax benefit due to closure of the tax audit. In February 2016, German tax authorities began the audit of the German tax returns for the 2010-2013 tax years and we expect the audit to close in the first half of 2019. The German Tax authority began the audit for the 2014-2016 tax years beginning in February 2019.

Changes in the amount of unrecognized tax benefits for the years ended December 31, 2018, 2017, and 2016 are as follows:

| (in thousands) | 2018 | 2017 | 2016 |
|--|------------------|------------------|------------------|
| Balance at beginning of year | \$ 44,033 | \$ 18,294 | \$ 16,735 |
| Additions based on tax positions related to the current year | 3,359 | 12,212 | 4,218 |
| Additions for tax positions of prior years | 11,984 | 9,933 | 5,162 |
| Decrease for tax position of prior years | — | — | (6,796) |
| Reductions due to lapse of statute of limitations | (1,238) | — | (288) |
| (Decrease) increase from currency translation | (2,358) | 3,594 | (737) |
| Balance at end of year | \$ 55,780 | \$ 44,033 | \$ 18,294 |

At December 31, 2018 and 2017, our net unrecognized tax benefits totaled approximately \$55.8 million and \$44.0 million, respectively, of which \$55.8 million and \$44.0 million in benefits, if recognized, would favorably affect our effective tax rate in any future period. It is reasonably possible that approximately \$22.5 million of the unrecognized tax benefits may be released during the next 12 months due to lapse of statute of limitations or settlements with tax authorities; however, various events could cause our current expectations to change in the future. The above unrecognized tax benefits, if ever recognized in the financial statements, would be recorded in the statements of income as part of the income tax expense.

Our policy is to recognize interest accrued related to unrecognized tax benefits in interest expense and penalties within income tax expense. For the years ended December 31, 2018, 2017 and 2016, we have net interest expense and penalties of \$1.1 million, \$1.5 million and \$0.1 million, respectively. At December 31, 2018 and 2017, we have accrued interest of \$4.1 million and \$3.0 million, respectively, which are not included in the table above.

We have recorded net deferred tax liabilities of \$20.5 million and \$37.4 million at December 31, 2018 and 2017, respectively. The components of the net deferred tax asset and liability at December 31, 2018 and 2017 are as follows:

| (in thousands) | 2018 | | 2017 | |
|--|--------------------|------------------------|--------------------|------------------------|
| | Deferred Tax Asset | Deferred Tax Liability | Deferred Tax Asset | Deferred Tax Liability |
| Net operating loss and credit carryforward | \$ 27,293 | \$ — | \$ 32,530 | \$ — |
| Accrued and other liabilities | 15,480 | — | 15,748 | — |
| Bad debts, inventory and revaluation | 8,324 | (7,074) | 8,997 | (1,420) |
| Property, plant and equipment | 3,604 | (25,448) | 1,103 | (23,649) |
| Intangible assets | 1,721 | (63,990) | 1,289 | (93,771) |
| Share-based compensation | 17,998 | — | 18,143 | — |
| Deferred interest deductions | 60,458 | — | 60,790 | — |
| Convertible debt | 8,102 | — | 10,865 | — |
| Other | 4,788 | (3,120) | 3,162 | (3,313) |
| | 147,768 | (99,632) | 152,627 | (122,153) |
| Valuation allowance | (68,651) | — | (67,849) | — |
| | \$ 79,117 | \$ (99,632) | \$ 84,778 | \$ (122,153) |
| Net deferred tax assets (liabilities) | | \$ (20,515) | | \$ (37,375) |

At December 31, 2018, we had \$408.7 million in total net operating loss (NOL) carryforwards which included the Netherlands, the U.S. and other foreign net operating loss carryforwards of \$30.4 million, \$112.2 million and \$266.1 million, respectively. The entire NOL in the U.S. is subject to limitations under Section 382 of the U.S. Internal Revenue Code. The NOLs in the U.S. will expire beginning December 31, 2024 through December 31, 2034. At December 31, 2018, we recorded \$30.4 million of Netherlands net operating loss, which will expire beginning December 31, 2027. Of the total \$266.1 million foreign NOL carryforwards, \$3.8 million will expire beginning in 2027 through 2028 while the rest of NOL will not expire.

For the years ended December 31, 2018, 2017 and 2016, the net additions charged to income tax expense for the changes in the valuation allowance totaled \$0.8 million, \$62.3 million and \$1.8 million, respectively. The valuation allowance relates to disallowed interest carryforwards and net operating loss carryforwards. The Company can only recognize a deferred tax asset to the extent this is "more likely than not" that these assets will be realized. Judgments around realizability depend on the availability and weight of both positive and negative evidence.

As of December 31, 2018, a deferred tax liability has not been recognized for residual income taxes in The Netherlands on the undistributed earnings of the majority of our foreign subsidiaries as these earnings are considered to be either indefinitely reinvested or can be repatriated tax free under the Dutch participation exemption. The indefinitely reinvested earnings retained by subsidiaries amounted to \$476.2 million at December 31, 2018. Estimating the amount of the unrecognized deferred tax liability on indefinitely reinvested foreign earnings is not practicable. Should the earnings be remitted as dividends, we may be subject to taxes including withholding tax. We have \$25.3 million of undistributed earnings that we do not consider indefinitely reinvested and have recorded deferred taxes or withholding taxes at December 31, 2018 and December 31, 2017, of \$0.9 million and \$1.0 million, respectively.

In December 2017, the SEC staff issued Staff Accounting Bulletin No. 118, Income Tax Accounting Implications of the Tax Cuts and Jobs Act ("SAB 118"). In 2017, we recognized the provisional tax impacts related to the interest expense deduction limitation and the revaluation of deferred tax assets and liabilities and included these amounts in our consolidated financial statements for the year ended December 31, 2017. We completed our analysis within the SAB measurement period and determined there is no change.

17. Equity

Issuance of Warrants

In connection with the issuance of the Cash Convertible Notes as described in Note 15 "Lines of Credit and 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 consolidated balance sheets.

| Cash convertible notes | Issued on | Number of share warrants (in millions) | 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 |
|------------------------|--------------------|--|--------------------------|---|---|
| 2019 | March 19, 2014 | 15.2 | \$32.0560 | \$40.6 | December 27, 2018 |
| 2021 | March 19, 2014 | 10.6 | \$32.0560 | \$28.3 | December 29, 2020 |
| 2023 | September 13, 2017 | 9.7 | \$50.9664 | \$45.3 | June 26, 2023 |
| 2024 | November 13, 2018 | 10.9 | \$52.1639 | \$72.4 | August 27, 2024 |

The Warrants are exercisable only upon expiration. For each Warrant that is exercised, we will deliver to the holder a number of shares of our common stock 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 shares of our common stock to the extent that the market value per share of our common stock exceeds the applicable exercise price of the Warrants (as measured under the terms of the Warrants).

Share Repurchase Programs

On January 31, 2018, we announced our fifth share repurchase program of up to \$200 million of our common shares. During 2018, we repurchased 2.9 million QIAGEN shares for \$104.7 million (including transaction costs).

On April 27, 2016, we announced the launch of our fourth \$100 million share repurchase program. During 2017, 1.9 million QIAGEN shares were repurchased for \$61.0 million (including transaction costs).

The cost of repurchased shares is included in treasury stock and reported as a reduction in total equity when a repurchase occurs. Repurchased shares will be held in treasury in order to satisfy various obligations, which include exchangeable debt instruments, warrants and employee share-based remuneration plans.

Synthetic Share Repurchase

In August 2016, we announced our plan to return approximately \$250.0 million to shareholders through a synthetic share repurchase program that combines a direct capital repayment with a reverse stock split. The synthetic share repurchase was implemented through a series of amendments to our Articles of Association which were approved by our shareholders at an Extraordinary General Meeting (EGM) held on October 26, 2016. The first amendment involved an increase in share capital by an increase in the nominal value per common share from EUR 0.01 to EUR 1.04 and a corresponding reduction in additional paid in capital. The second amendment involved a reduction in stock whereby 27 existing common shares with a nominal value of EUR 1.04 each were consolidated into 26 new common shares with a nominal value of EUR 1.08 each. The third amendment was a reduction of the nominal value per common share from EUR 1.08 to EUR 0.01. As a result of these amendments, which in substance constitute a synthetic share buyback, \$243.9 million was repaid to our shareholders and the outstanding number of common shares was reduced by 8.9, or 3.7%. The capital repayment program was completed in January 2017. Expenses incurred related to the capital repayment and share consolidation amounted to \$0.5 million and were charged to equity.

Accumulated Other Comprehensive Loss

The following table is a summary of the components of accumulated other comprehensive loss as of December 31, 2018 and 2017:

| (in thousands) | 2018 | 2017 |
|--|--------------|--------------|
| Net unrealized loss on hedging contracts, net of tax | \$ (15,453) | \$ (30,487) |
| Net unrealized loss on marketable securities, net of tax | — | (942) |
| Net unrealized loss on pension, net of tax | (124) | (878) |
| Foreign currency effects from intercompany long-term investment transactions, net of tax of \$9.3 million and \$7.9 million in 2018 and 2017, respectively | (21,662) | (16,144) |
| Foreign currency translation adjustments | (273,405) | (172,308) |
| Accumulated other comprehensive loss | \$ (310,644) | \$ (220,759) |

18. Earnings per Common Share

We present basic and diluted earnings per share. Basic earnings per share is calculated by dividing the net income attributable to the owners of QIAGEN N.V. by the weighted average number of common shares outstanding. Diluted earnings per share reflect the potential dilution that would occur if all "in the money" options and warrants to issue common shares were exercised. The following schedule summarizes the information used to compute earnings per common share:

| (in thousands, except per share data) | Years ended December 31, | | |
|--|--------------------------|-----------|-----------|
| | 2018 | 2017 | 2016 |
| Net income attributable to the owners of QIAGEN N.V. | \$ 190,380 | \$ 40,394 | \$ 80,404 |
| Weighted average number of common shares used to compute basic net income per common share | 226,640 | 228,074 | 234,800 |
| Dilutive effect of stock options and restrictive stock units | 4,613 | 4,760 | 4,193 |
| Dilutive effect of outstanding warrants | 2,203 | 175 | — |
| Weighted average number of common shares used to compute diluted net income per common share | 233,456 | 233,009 | 238,993 |
| Outstanding options and awards having no dilutive effect, not included in above calculation | 272 | 52 | 210 |
| Outstanding warrants having no dilutive effect, not included in above calculation | 35,939 | 30,434 | 25,800 |
| Basic earnings per common share attributable to the owners of QIAGEN N.V. | \$ 0.84 | \$ 0.18 | \$ 0.34 |
| Diluted earnings per common share attributable to the owners of QIAGEN N.V. | \$ 0.82 | \$ 0.17 | \$ 0.34 |

19. Commitments and Contingencies

Lease Commitments

We lease facilities and equipment under operating lease arrangements expiring in various years through 2028. Certain rental commitments provide for escalating rental payments or have renewal options extending through

various years. Certain facility and equipment leases constitute capital leases expiring in various years through 2020. The accompanying consolidated balance sheets include the assets and liabilities arising from these capital lease obligations. Rent expense under operating lease agreements not including facility related costs accrued in association with the restructuring activities discussed in Note 6 "Restructuring" was \$25.1 million, \$24.5 million and \$22.4 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Minimum future obligations under capital and operating leases at December 31, 2018 are as follows:

| (in thousands) | Capital Leases | Operating Leases |
|------------------------------------|-------------------|---------------------|
| 2019 | \$ 63 | \$ 20,235 |
| 2020 | 23 | 14,845 |
| 2021 | — | 10,745 |
| 2022 | — | 6,839 |
| 2023 | — | 3,854 |
| Thereafter | — | 4,148 |
| | 86 | \$ 60,666 |
| Less: Amount representing interest | (3) | |
| | 83 | |
| Less: Current portion | (61) | |
| Long-term portion | \$ 22 | |

We have licensing agreements with companies, universities and individuals, some of which require certain up-front payments. Royalty payments are required on net product sales ranging from 0.45 percent to 25 percent of covered products or based on quantities sold. Several of these agreements have minimum royalty requirements. The accompanying consolidated balance sheets include accrued royalties relating to these agreements in the amount of \$5.5 million and \$6.7 million at December 31, 2018 and 2017, respectively. Royalty expense relating to these agreements amounted to \$14.0 million, \$16.8 million, and \$35.9 million for the years ended December 31, 2018, 2017 and 2016, respectively. Royalty expense is primarily recorded in cost of sales, with a small portion recorded as research and development expense depending on the use of the technology under license. Some of these agreements also have minimum raw material purchase requirements and requirements to perform specific types of research.

At December 31, 2018, we had commitments to purchase goods or services, and for future license and royalty payments. They are as follows:

| (in thousands) | Purchase Commitments | License & Royalty Commitments |
|----------------|-------------------------|----------------------------------|
| 2019 | \$ 93,214 | \$ 11,973 |
| 2020 | 20,804 | 11,613 |
| 2021 | 8,883 | 9,167 |
| 2022 | 2,690 | 6,731 |
| 2023 | 2,690 | 4,704 |
| Thereafter | — | 4,443 |
| | \$ 128,281 | \$ 48,631 |

As of December 31, 2018, future license payments of \$10.5 million and \$24.3 million are included in accrued and other current liabilities and other long-term liabilities, respectively.

Contingent Consideration Commitments

Pursuant to the purchase agreements for certain acquisitions and other contractual arrangements, we could be required to make additional contingent cash payments totaling up to \$57.3 million based on the achievement of certain revenue and operating results milestones as follows: \$23.7 million in 2019, \$22.7 million in 2020, \$5.9 million in 2022 and \$5.0 million, payable in any 12-month period from now until 2028 based on the accomplishment of certain revenue or other milestones, regulatory approvals or clearances. Of the \$57.3 million total contingent obligation as discussed further in Note 14 "Financial Instruments and Fair Value Measurements", we have assessed the fair value at December 31, 2018 to be \$49.0 million, of which \$27.5 million is included in accrued and other current liabilities and \$21.5 million is included in other long-term liabilities in the accompanying consolidated balance sheet.

Employment Agreements

Certain of our employment contracts contain provisions which guarantee the payments of certain amounts in the event of a change in control, as defined in the agreements, or if the executive is terminated for reasons other than cause, as defined in the agreements. At December 31, 2018, the commitment under these agreements totaled \$16.9 million. The employment agreements with the Managing Directors and the German affiliate include a clause, whereby the affiliate will compensate the Managing Directors for potential deductions under Dutch law which, since 2014, has introduced a duty to deduct from a Managing Director's remuneration any increase in the value of shares or options that were part of his pay to the extent that such increase is based on a public offer, merger or other identity changing transaction.

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. From time to time, we also make other warranties to customers, including warranties that our products are manufactured in accordance with applicable laws and not in violation of third-party rights. We provide for estimated warranty costs at the time of the product sale. We believe our warranty reserves as of December 31, 2018 and 2017 appropriately reflect the estimated cost of such warranty obligations. The changes in the carrying amount of warranty obligations for the years ended December 31, 2018 and 2017 are as follows:

| (in thousands) | 2018 | 2017 |
|--|-----------------|-----------------|
| Balance at beginning of year | \$ 3,051 | \$ 2,779 |
| Provision charged to cost of sales | 2,892 | 3,024 |
| Usage | (2,760) | (2,859) |
| Adjustments to previously provided warranties, net | (243) | (54) |
| Currency translation | (92) | 161 |
| Balance at end of year | \$ 2,848 | \$ 3,051 |

Litigation

From time to time, we may be party to legal proceedings incidental to our business. As of December 31, 2018, 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. 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 recorded in accrued and other current liabilities totaled \$6.0 million as of December 31, 2018. The estimated amount of a range of possible losses is between \$5.7 million and \$7.4 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.

For the year ended December 31, 2017, we had settlement amounts related to various acquisition-related litigation matters totaling \$49.2 million, primarily related to PCR-based biomarker disputes and patent litigation, which were settled during 2017 of which \$45.3 million was recorded to general and administrative, restructuring, integration and other expense and \$3.9 million was recorded as a license right. \$44.8 million of the settlement amounts were paid during 2017 and as of December 31, 2017, \$4.4 million was accrued in accrued and other current liabilities.

20. Segment Information

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. Considering the acquisitions made during 2018 and our continued restructuring and streamlining of the growing organization, our chief operating decision maker (CODM) continues to make decisions with regards to business operations and resource allocation based on evaluations of QIAGEN as a whole. Accordingly, we operate and make decisions as one business segment. Summarized product category and geographic information are shown in the tables below.

Product Category Information

Net sales for the product categories are attributed based on those revenues related to sample and assay products and similarly related revenues including bioinformatics solutions, and revenues derived from instrumentation sales. Refer to Note 4 "Revenue" for disaggregation of revenue based on product categories and customer class.

Geographical Information

Net sales are attributed to countries based on the location of the customer. QIAGEN operates manufacturing facilities in Germany, China, and the United States that supply products to customers as well as QIAGEN subsidiaries in other countries. The intersegment portions of such net sales are excluded to derive consolidated net sales. No single customer represents more than ten percent of consolidated net sales. Our country of domicile is the Netherlands, which reported net sales of \$15.9 million, \$15.0 million and \$12.4 million for the years ended 2018, 2017 and 2016, respectively, and these amounts are included in the line item Europe, Middle East and Africa as shown in the table below.

| (in thousands) | 2018 | 2017 | 2016 |
|---------------------------------------|---------------------|---------------------|---------------------|
| Net Sales | | | |
| Americas: | | | |
| United States | \$ 632,660 | \$ 579,906 | \$ 555,676 |
| Other Americas | 60,359 | 73,478 | 71,797 |
| Total Americas | 693,019 | 653,384 | 627,473 |
| Europe, Middle East and Africa | 490,301 | 462,980 | 428,055 |
| Asia Pacific, Japan and Rest of World | 318,528 | 301,172 | 282,463 |
| Total | \$ 1,501,848 | \$ 1,417,536 | \$ 1,337,991 |

Long-lived assets include property, plant and equipment. The Netherlands, which is included in the balances for Europe, reported long-lived assets of \$1.8 million and \$1.7 million as of December 31, 2018 and 2017, respectively.

| (in thousands) | 2018 | 2017 |
|---|-------------------|-------------------|
| Long-lived assets | | |
| Americas: | | |
| United States | \$ 152,381 | \$ 148,694 |
| Other Americas | 3,748 | 4,488 |
| Total Americas | 156,129 | 153,182 |
| Europe, Middle East and Africa: | | |
| Germany | 284,601 | 286,567 |
| Other Europe, Middle East and Africa | 50,051 | 41,188 |
| Total Europe, Middle East and Africa | 334,652 | 327,755 |
| Asia Pacific and Japan | 20,878 | 13,384 |
| Total | \$ 511,659 | \$ 494,321 |

21. Share-Based Compensation

We adopted the QIAGEN N.V. Amended and Restated 2005 Stock Plan (the 2005 Plan) in 2005 and the QIAGEN N.V. 2014 Stock Plan (the 2014 Plan) in 2014. The 2005 Plan expired by its terms in April 2015 and no further awards will be granted under the 2005 Plan. The plans allow for the granting of stock rights and incentive stock options, as well as non-qualified options, stock grants and stock-based awards, generally with terms of up to 5 or 10 years, subject to earlier termination in certain situations. The vesting and exercisability of certain stock rights will be accelerated in the event of a Change of Control, as defined in the plans. All option grants have been at the market value on the grant date or at a premium above the closing market price on the grant date. We issue Treasury Shares to satisfy option exercises and award releases and had approximately 19.9 million Common Shares reserved and available for issuance under the 2005 and 2014 Plans at December 31, 2018.

Stock Options

We have not granted stock options since 2013. A summary of the status of employee stock options as of December 31, 2018 and changes during the year then ended is presented below:

| All Employee Options | Number of Shares (in thousands) | Weighted Average Exercise Price | Weighted Average Contractual Term (in years) | Aggregate Intrinsic Value (in thousands) |
|--|------------------------------------|---------------------------------------|---|--|
| Outstanding at January 1, 2018 | 1,149 | \$ 19.54 | | |
| Exercised | (249) | \$ 17.77 | | |
| Expired | (2) | \$ 15.84 | | |
| Outstanding at December 31, 2018 | 898 | \$ 20.04 | 2.75 | \$ 12,946 |
| Vested at December 31, 2018 | 898 | \$ 20.04 | 2.75 | \$ 12,946 |
| Vested and expected to vest at December 31, 2018 | 898 | \$ 20.04 | 2.75 | \$ 12,946 |

The total intrinsic value of options exercised during the years ended December 31, 2018, 2017 and 2016 was \$5.0 million, \$3.3 million and \$3.2 million, respectively. The actual tax benefit for the tax deductions from option exercises totaled \$0.8 million, \$0.7 million, and \$0.8 million during the years ended December 31, 2018, 2017 and 2016, respectively. At December 31, 2018, there was no unrecognized share-based compensation expense related to employee stock option awards.

At December 31, 2018, 2017 and 2016, 0.9 million, 1.1 million and 1.4 million options were exercisable at a weighted average price of \$20.04, \$19.54 and \$19.84 per share, respectively. The options outstanding at December 31, 2018 expire in various years through 2023.

Stock Units

Stock units represent rights to receive Common Shares at a future date and include restricted stock units which are subject to time-vesting only and performance stock units which include performance conditions in addition to time-vesting. The final number of performance stock units earned is based on the performance achievement which for some grants can reach up to 120% of the granted shares. There is no exercise price and the fair market value at the time of the grant is recognized over the requisite vesting period, generally up to 5 or 10 years. The fair market value is determined based on the number of stock units granted and the market value of our shares on the grant date. Pre-vesting forfeitures were estimated to be approximately 6.6%. At December 31, 2018, there was \$95.2 million remaining in unrecognized compensation cost including estimated forfeitures related to these awards, which is expected to be recognized over a weighted average period of 2.40 years. The weighted average grant date fair value of stock units granted during the years ended December 31, 2018, 2017 and 2016 was \$35.37, \$31.12 and \$23.81, respectively. The total fair value of stock units that vested during the years ended December 31, 2018, 2017 and 2016 was \$54.3 million, \$69.2 million and \$27.4 million, respectively.

A summary of stock units as of December 31, 2018 and changes during the year are presented below:

| Stock Units | Stock Units (in thousands) | Weighted Average Contractual Term (in years) | Aggregate Intrinsic Value (in thousands) |
|--|-------------------------------|---|--|
| Outstanding at January 1, 2018 | 8,102 | | |
| Granted | 2,344 | | |
| Vested | (1,575) | | |
| Forfeited | (528) | | |
| Outstanding at December 31, 2018 | 8,343 | 2.40 | \$ 287,419 |
| Vested and expected to vest at December 31, 2018 | 7,238 | 2.23 | \$ 249,366 |

Compensation Expense

Share-based compensation expense before taxes for the years ended December 31, 2018, 2017 and 2016 totaled approximately \$40.1 million, \$34.4 million and \$28.3 million, respectively, as shown in the table below.

| Compensation Expense (in thousands) | 2018 | 2017 | 2016 |
|---|------------------|------------------|------------------|
| Cost of sales | \$ 2,879 | \$ 2,641 | \$ 2,553 |
| Research and development | 6,457 | 5,367 | 4,735 |
| Sales and marketing | 9,372 | 6,820 | 4,824 |
| General and administrative | 21,405 | 19,614 | 16,176 |
| Share-based compensation expense | 40,113 | 34,442 | 28,288 |
| Less: income tax benefit ⁽¹⁾ | 8,277 | 7,407 | 6,223 |
| Net share-based compensation expense | \$ 31,836 | \$ 27,035 | \$ 22,065 |

⁽¹⁾ Does not include the excess tax benefit realized for the tax deductions of the share-based payment arrangements which totaled \$4.7 million, \$5.2 million and \$0.8 million, respectively, for the years ended December 31, 2018, 2017 and 2016.

Following the 2016 restructuring program discussed in Note 6 "Restructuring", share-based compensation expense in 2017 and 2016 includes forfeitures of \$0.7 million and \$2.0 million, respectively, in connection with the restructuring terminations. No share-based compensation costs were capitalized for the years ended December 31, 2018, 2017 or 2016 as the amounts were not material.

22. Employee Benefits

We maintain various benefit plans, including defined contribution and defined benefit plans. Our U.S. defined contribution plan is qualified under Section 401(k) of the Internal Revenue Code, and covers substantially all U.S. employees. Participants may contribute a portion of their compensation not exceeding a limit set annually by the Internal Revenue Service. This plan includes a provision for us to match a portion of employee contributions. Total expense under the 401(k) plans, including the plans acquired via business acquisitions, was \$4.0 million, \$3.6 million and \$2.5 million for the years ended December 31, 2018, 2017 and 2016, respectively. We also have a defined contribution plan which covers certain executives. We make matching contributions up to an established maximum. Matching contributions made to the plan, and expensed, totaled approximately \$0.2 million in each year ended December 31, 2018 and approximately \$0.3 million in each year ended December 31, 2017 and 2016.

We have five defined benefit, non-contributory retirement or termination plans that cover certain employees in Germany, France, Japan, Italy and the United Arab Emirates. These defined benefit plans provide benefits to covered individuals satisfying certain age and/or service requirements. For certain plans, we calculate the vested benefits to which employees are entitled if they separate immediately. The benefits accrued on a pro-rata basis during the employees' employment period are based on the individuals' salaries, adjusted for inflation. The liability under the defined benefit plans was \$7.4 million at December 31, 2018 and \$8.0 million at December 31, 2017, and is included as a component of other long-term liabilities on the accompanying consolidated balance sheets.

23. Related Party Transactions

From time to time, we have transactions with other companies in which we hold an interest, all of which are individually and in the aggregate immaterial, as summarized in the table below.

| (in thousands) | For the years ended December 31, | | |
|----------------|----------------------------------|----------|----------|
| | 2018 | 2017 | 2016 |
| Net sales | \$ 23,358 | \$ 3,852 | \$ 1,360 |

Net sales with related parties primarily reflects our ventures in China including our joint venture with Sichuan Maccura Biotechnology Co., Ltd with a focus on accelerating the growth of our GeneReader NGS System as well as the partnership to externalize the HPV test franchise for cervical cancer screening in China. Accounts receivable from related parties totaled \$10.1 million and \$3.8 million as of December 31, 2018 and 2017, respectively.

| (in thousands) | As of December 31, | |
|---------------------------------------|--------------------|-----------|
| | 2018 | 2017 |
| Other long-term assets | \$ 24,300 | \$ 17,713 |
| Accrued and other current liabilities | \$ 5,488 | \$ 9,028 |
| Other long-term liabilities | \$ — | \$ 3,075 |

Other long-term assets include long-term loan receivables from companies with which we have an investment or partnership interest.

During 2018, we purchased a convertible note for \$15.0 million from a privately held company. The note is due in December 2021 and bears interest at 8%. In the event the company goes public, the note will convert into common shares in the company ranking pari-passu with existing common shares.

During 2018, we converted a note receivable from a non-publicly traded company, considered a related party, into an equity interest in that company. This note held a balance of \$11.4 million including principal balance and accrued interest at conversion.

During 2017, we purchased a convertible note for \$3.0 million from a publicly listed company considered a related party. The note is due in October 2020 and bears interest of 3.0%. As of December 31, 2018, the principal and accrued interest of this note totals \$2.9 million and is included in other long-term assets, while the remaining \$0.3 million is attributable to the embedded derivative, that is bifurcated and measured at fair value, associated to a convertible feature of this note.

As discussed in Note 10 "Investments", during 2016 we acquired a 19.0% interest in Hombrechtikon Systems Engineering AG (HSE) for a total obligation of \$9.8 million payable over 3 years. During the year ended December 31, 2018, we had research and development expense incurred with HSE for a total of \$12.2 million. As of December 31, 2018, the remaining obligation from the acquisition together with amounts payable from research and development services totaled \$5.3 million, of which \$3.5 million was included in accounts payable and \$1.8 million was included in accrued and other current liabilities in the accompanying consolidated balance sheet. As of December 31, 2017, the total remaining obligation was \$6.2 million, of which \$3.1 million was included in accrued and other current liabilities and \$3.1 million was included in other long-term liabilities in the accompanying consolidated balance sheet.

24. Subsequent Events

On January 7, 2019, we announced the acquisition of N-of-One, Inc, a privately-held U.S. molecular decision support company and pioneer in clinical interpretation services for complex genomic data. The cash consideration totaled approximately \$26.0 million. The acquisition included contingent consideration which is recorded as part of the purchase price based on the acquisition date fair value. The addition of N-of-One will enable QIAGEN to significantly expand its decision-support solutions while offering a broader range of software, content and service-based solutions. It will also enable QIAGEN to provide customers with greater access to valuable genomic data assets and service offerings. N-of-One is not expected to provide a significant contribution to our results in 2019.

January 31, 2019, we acquired the digital PCR assets of Formulatrix, Inc., a developer of laboratory automation solutions. Combining the Formulatrix assets with QIAGEN technologies and automation, we expect to bring to market a fully integrated digital PCR solution with a targeted launch in 2020. We agreed to pay Formulatrix \$125.0 million in cash upon closing and future milestone payments of \$135.9 million in 2020.

FINANCIAL RESULTS

Auditor's Report

Report of independent registered public accounting firm

To the Stockholders and Supervisory Board

QIAGEN N.V.:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of QIAGEN N.V. and subsidiaries (the "Company") as of December 31, 2018 and 2017, the related consolidated statements of income, comprehensive income, changes in equity, and cash flows for each of the years in the three-year period ended December 31, 2018, and the related notes and financial statement schedule as listed in Item 18 (A) (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2018, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated March 5, 2019 expressed an unqualified opinion on the effectiveness of the Company's internal control over financial reporting.

Change in Accounting Principle

As discussed in Note 2 to the consolidated financial statements, the Company has changed its method of accounting for revenue from contracts with customers in 2018 due to the adoption of Accounting Standards Codification Topic 606 - Revenue from Contracts with Customers.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing

procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ KPMG AG Wirtschaftsprüfungsgesellschaft

We have served as the Company's auditor since 2015.

Düsseldorf, Germany

March 5, 2019

Report of independent registered public accounting firm

To the Stockholders and Supervisory Board

QIAGEN N.V.:

Opinion on Internal Control Over Financial Reporting

We have audited QIAGEN N.V.'s and subsidiaries' (the "Company") internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2018 and 2017, the related consolidated statements of income, comprehensive income, changes in equity, and cash flows for each of the years in the three-year period ended December 31, 2018, and the related notes and financial statement schedule as listed in Item 18 (A) (collectively, the consolidated financial statements), and our report dated March 5, 2019 expressed an unqualified opinion on those consolidated financial statements.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying 'Report of Management on Internal Control over Financial Reporting'. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our

audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ KPMG AG Wirtschaftsprüfungsgesellschaft

Düsseldorf, Germany

March 5, 2019

FINANCIAL RESULTS

List of Subsidiaries

The following is a list of the Registrant's subsidiaries as of December 31, 2018, other than certain subsidiaries that did not in the aggregate constitute a significant subsidiary.

| Company Name | Jurisdiction of Incorporation |
|--|-------------------------------|
| Amnisure International, LLC | USA |
| Cellestis Pty. Ltd. | Australia |
| QIAGEN Aarhus A/S | Denmark |
| QIAGEN AB | Sweden |
| QIAGEN AG | Switzerland |
| QIAGEN Australia Holding Pty. Ltd. | Australia |
| QIAGEN Benelux B.V. | Netherlands |
| QIAGEN Beverly, LLC | USA |
| QIAGEN China (Shanghai) Co. Ltd. | China |
| QIAGEN Deutschland Finance Holding (Luxembourg) SARL | Luxembourg |
| QIAGEN Deutschland Holding GmbH | Germany |
| QIAGEN Finance (Ireland) Ltd. | Ireland |
| QIAGEN Finance (Malta) Ltd. | Malta |
| QIAGEN France S.A.S. | France |
| QIAGEN Gaithersburg, LLC | USA |
| QIAGEN GmbH | Germany |
| QIAGEN Hamburg GmbH | Germany |
| QIAGEN Inc. (Canada) | Canada |
| QIAGEN Instruments AG | Switzerland |
| QIAGEN K.K. | Japan |
| QIAGEN Lake Constance GmbH | Germany |
| QIAGEN, LLC | USA |
| QIAGEN Ltd. | UK |
| QIAGEN Manchester Ltd. | UK |
| QIAGEN Marseille SA | France |
| QIAGEN North American Holdings Inc. | USA |
| QIAGEN Pty. Ltd. | Australia |
| QIAGEN Redwood City, Inc. | USA |
| QIAGEN Sciences, LLC | USA |
| QIAGEN S.r.l. | Italy |
| QIAGEN U.S. Finance Holdings (Luxembourg) SARL | Luxembourg |
| QIAGEN U.S. Finance, Inc. | USA |

APPENDIX

Service

CORPORATE COMMUNICATIONS

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corporate.QIAGEN.com

www.facebook.com/QIAGEN

www.twitter.com/QIAGEN

www.linkedin.com/company/QIAGEN

www.youtube.com/QIAGEN

FINANCIAL CALENDAR

Annual General Meeting of Shareholders of QIAGEN N.V.

June 17, 2019

Second Quarter 2019 Results

July 2019

Third Quarter 2019 Results

November 2019

Fourth Quarter 2019 Results

January 2020

Publication Date

March 2020

TRADEMARKS

Our name together with our logo is registered as a trademark in the United States and a number of other countries: QIAGEN®.

For a complete list of QIAGEN's trademarks and disclaimers, please refer to QIAGEN's webpage under www.QIAGEN.com/trademarks_disclaimers.aspx.

In this annual report QIAGEN uses the term molecular diagnostics. The use of this term is in reference to certain countries, such as the United States, limited to products subject to regulatory requirements. As of February 2019, QIAGEN molecular diagnostics products included 20 FDA (PMA approved or 510k cleared) products, 17 clinical sample concentrator products (14 kits and 3 instruments), 69 EU CE IVD assays, 16 EU CE IVD sample preparation products, 18 EU CE IVD instruments for sample purification or detection, 31 China CFDA IVD assays/sample preparations and 13 China CFDA IVD instruments.

This Annual Report may also contain trade names or trademarks of companies other than QIAGEN.

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This document contains detailed financial information about QIAGEN prepared under generally accepted accounting standards in the U.S. (U.S. GAAP) and included in our Form 20-F annual report filed with the U.S. Securities and Exchange Commission. QIAGEN also publishes an Annual Report under IFRS accounting standards, which is available on our website at www.QIAGEN.com.

