Invitae Corp
Form 10-K
March 06, 2018

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

Form 10 K

(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2017

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from to

Commission File No. 001 36847

Invitae Corporation

(Exact name of the registrant as specified in its charter)

Delaware	27 1701898
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

1400 16th Street, San Francisco, California 94103

(Address of principal executive offices, Zip Code)

(415) 374 7782

(Registrant’s telephone number, including area code)

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

Title of each class:	Name of each exchange on which registered:
Common Stock, par value $0.0001 per share	The New York Stock Exchange

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes No

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

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10 K or any amendment to this Form 10 K.

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

Large accelerated filer		Accelerated filer
Non-accelerated filer	(Do not check if a smaller reporting company)	Smaller reporting company
		Emerging growth company

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

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

As of June 30, 2017, the aggregate market value of common stock held by non affiliates of the Registrant was approximately $252.0 million, based on the closing price of the common stock as reported on The New York Stock Exchange for that date.

The number of shares of the registrant's Common Stock outstanding as of March 2, 2018 was 53,705,786.

DOCUMENTS INCORPORATED BY REFERENCE

Items 10 (as to directors and Section 16(a) Beneficial Ownership Reporting Compliance), 11, 12, 13 and 14 of Part III incorporate by reference information from the registrant's proxy statement to be filed with the Securities and Exchange Commission in connection with the solicitation of proxies for the registrant's 2018 Annual Meeting of Stockholders.

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PART I

ITEM 1. Business.

This report contains forward looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. All statements in this report other than statements of historical fact, including statements identified by words such as “believe,” “may,” “will,” “estimate,” “continue,” “anticipate,” “intend,” “expect” and similar expressions, are forward statements. Forward looking statements include, but are not limited to, statements about:

- our views regarding the future of genetic testing and its role in mainstream medical practice;
- strategic plans for our business, products and technology, including our ability to expand our assay and develop new assays while maintaining attractive pricing, further enhance our genetic testing service and the related user experience, build interest in and demand for our tests and attract potential partners;
- the implementation of our business model;
- the expected benefits, including cost-savings and synergies, from our acquisitions;
- the rate and degree of market acceptance of our tests and genetic testing generally;
    - our ability to scale our infrastructure and operations in a cost effective manner;
- the timing of and our ability to introduce improvements to our genetic testing platform and to expand our assay to include additional genes;
- our expectations with respect to future hiring;
- the timing and results of studies with respect to our tests;
- developments and projections relating to our competitors and our industry;
- the degree to which individuals will share genetic information generally, as well as share any related potential economic opportunities with us;
- our commercial plans, including our sales and marketing expectations;
- our ability to obtain and maintain adequate reimbursement for our tests;
- regulatory developments in the United States and foreign countries;
- our ability to attract and retain key scientific or management personnel;
- our expectations regarding our ability to obtain and maintain intellectual property protection and not infringe on the rights of others;
- our expectations regarding the time during which we will be an emerging growth company under the JOBS Act;
- our ability to obtain funding for our operations and the growth of our business;
- our financial performance;
- our expectations regarding our future revenue, cost of revenue, operating expenses and capital expenditures, and our future capital requirements; and
- the impact of tax laws on our business.

Forward looking statements are subject to a number of risks and uncertainties that could cause actual results to differ materially from those expected. These risks and uncertainties include, but are not limited to, those risks discussed in Item 1A of this report. Although we believe that the expectations and assumptions reflected in the forward looking statements are reasonable, we cannot guarantee future results, level of activity, performance or achievements. In addition, neither we nor any other person assumes responsibility for the accuracy and completeness of any of these forward looking statements. Any forward looking statements in this report speak only as of the date of this report. We expressly disclaim any obligation or undertaking to update any forward looking statements.

This report contains statistical data and estimates that we obtained from industry publications and reports. These publications typically indicate that they have obtained their information from sources they believe to be reliable, but do not guarantee the accuracy and completeness of their information. Some data contained in this report is also based on our internal estimates. Although we have not independently verified the third party data, we believe it to be reasonable.

In this report, all references to “Invitae,” “we,” “us,” “our,” or “the company” mean Invitae Corporation.

Invitae and the Invitae logo are trademarks of Invitae Corporation. We also refer to trademarks of other corporations and organizations in this report.

Overview

Combining genetic testing services that support patient care throughout life’s journey – from family planning, to proactive health screening, to inherited disease diagnosis – with a unique, rapidly expanding network of patients, healthcare providers, biopharma and advocacy partners, Invitae is capturing the broad potential of genetics and helping to expand its use across the healthcare continuum. Through the custom design and application of automation, robotics and bioinformatics software solutions tailored to the complexity of sample processing and complex variant interpretation, Invitae can apply its world-class clinical expertise to medical interpretation at scale, simplifying the process of obtaining and utilizing affordable, high-quality genetic information to inform critical healthcare decisions. By pioneering new ways of sharing and understanding genetic information, Invitae is transforming the field of genetics from one-dimensional testing to complex information management.

We utilize an integrated portfolio of laboratory processes, software tools and informatics capabilities to process DNA-containing samples, analyze information about patient-specific genetic variation and generate test reports for clinicians and their patients.

Mission

Invitae’s mission is to bring comprehensive genetic information into mainstream medical practice to improve the quality of healthcare for billions of people. Our goal is to aggregate a majority of the world’s genetic information into a comprehensive network that enables sharing of data among network participants to improve healthcare and clinical outcomes.

We were founded on four core principles:

- Patients should own and control their own genetic information;
- Healthcare professionals are fundamental in ordering and interpreting genetic information;
    - Driving down the price of genetic information will increase its clinical and personal utility; and
- Genetic information is more valuable when shared.

Vision

We are focused on making comprehensive, high-quality genetic information more accessible than ever before by lowering the cost of genetic testing, by creating a network of partners to increase the utility of genetic information across the healthcare continuum, and ultimately managing that information on behalf of our customers.

As our market share grows, we expect that our business will grow in three stages:

1) Genetic testing: making genetic testing more affordable and more accessible with fast turnaround time. We believe that there is a significant market opportunity for high volume, low cost genetic testing that can allow us to serve a large number of customers.
2) Genome network: sharing genetic information on a global scale to advance science and medicine. We plan to help patients share their genetic information in a way that benefits them and us by acting as a permission-based broker on their behalf.
3) Genome management: building a secure and trusted genome management infrastructure. By generating and storing large amounts of individualized genetic information for every patient sample, we believe we can create value over the course of disease or lifetime of a customer.

We seek to differentiate our service in the market by establishing an exceptional customer experience. To that end, we believe that elevating the needs of the customer over those of our other stakeholders is essential to our success. Thus, in our decision-making processes, we will strive to prioritize, in order:

- The needs of our customers;
- Motivating our employees to serve our customers; and
- Our long-term stockholder value.

We believe that focusing on customers as our top priority rather than short-term financial goals is the best way to build and operate an organization for maximum long-term value creation.

We launched our first commercial offering in November 2013 with an offering of approximately 200 genes, growing the test menu over time to include more than 20,000 genes. In 2017, we accessioned approximately 150,000 samples and generated revenue of approximately $68.2 million reflecting more than a 150% and 170% increase over 2016 volume and revenue, respectively. In 2017, we achieved a full-year gross profit of $18.1 million, compared to a full-year gross loss of $2.8 million in 2016. In support of our efforts to reduce cost per test, expand our test menu, and develop a scalable laboratory infrastructure, we incurred research and development expenses of $46.5 million, $44.6 million and $42.8 million in 2017, 2016, and 2015, respectively.

Our rapid growth in diagnostic testing has accelerated the transition of our business from a traditional sample-by-sample, indication-by-indication, test-by-test market to what we believe will become the most extensive, accurate and accessible network focused on utilization of genetics in personal healthcare. Invitae’s value proposition for customers is simple: Genetic information is more valuable when shared.

Our products today

We are aiming to combine genetic information and clinical data into a seamless genome network to accelerate research, clinical trials and disease management.

We began by building out our initial offering in competitive and technically challenging clinical areas, including comprehensive panels for hundreds of hereditary conditions in cancer, cardiology, neurology, pediatric and rare diseases. In 2017, we expanded our platform of clinical testing services to include assays totaling over 20,000 genes, including our medical exome, and began offering tests that could be used for proactive health and wellness screening. We also established a leading position in family health genetic information services through the strategic acquisition of reproductive health testing capabilities. In August 2017, we acquired Good Start Genetics, Inc., a molecular diagnostics company focused on preimplantation and carrier screening for inherited disorders. Good Start was the first to bring next-generation sequencing to reproductive health with a suite of offerings including carrier screening and preimplantation embryo testing, which provides women, their partners and their clinicians with insightful and actionable information to promote successful pregnancies and help build healthy families. In November 2017, we completed our acquisition of CombiMatrix Corporation, a company which specializes in prenatal diagnosis, miscarriage analysis and pediatric developmental disorders. CombiMatrix’s services include advanced technologies,

such as single nucleotide polymorphism chromosomal microarray analysis, next generation sequencing, and long-standing expertise handling a variety of technically challenging sample types.

With an established footprint, growing market share and breadth of service covering genetic testing needs across all stages of life, we are focusing our efforts on partnering with patients, family members, healthcare professionals, payers, industry professionals, researchers and clinical trial sponsors to advance the development of our genome network.

In January 2017, we acquired AltaVoice, formerly PatientCrossroads, a patient-centered data company with a global platform for collecting, curating, coordinating, and delivering safeguarded data from patients and clinicians through Patient Insights Networks, also known as PINs, which enable organizations to more efficiently build engaged, research-ready patient communities, recruit for trials, educate, and track patient outcomes.

This acquisition was subsequently complemented by the acquisition of Ommdom, Inc. in June 2017, the provider of a highly efficient, end-to-end platform for collecting and managing genetic family histories, CancerGene Connect.

CancerGene Connect was developed by clinicians for clinicians to streamline the collection, analysis, and management of patient family history information. The platform uses a cloud-based, mobile friendly patient interface to gather family history information prior to a clinician appointment. Once completed, powerful analysis tools using the latest research on hereditary risk analyze a patient’s predisposition to disease and provide actionable analysis to inform therapeutic decisions, such as genetic testing or treatment approaches. In addition, the platform provides clinicians with the ability to look beyond the individual to understand trends across all their patients.

In addition to investing in informatics solutions and infrastructure to support network development, we have begun partnering with biopharmaceutical companies, including Alnylam Pharmaceuticals, Inc., Ariad Pharmaceuticals, Inc. (a subsidiary of Takeda Pharmaceutical Company Limited), AstraZeneca and Merck & Co., Inc., BioMarin Pharmaceutical Inc., Blueprint Medicines Corporation, Jazz Pharmaceuticals plc, MyoKardia, Inc., Parion Sciences, Inc. and others to support clinical trial recruitment and other research-related initiatives. Our biopharmaceutical industry partnerships are complemented by partnerships with leading health systems, executive health programs and leading research institutions, including the Geisinger Health System, the Mayo Clinic, Memorial Sloan Kettering Cancer Center, MedCan, NorthShore University HealthSystem, and Stanford Health Care, among others.

Our goal is to build a network through which individuals can access, aggregate and customize information based on their genotype and phenotype and participate in new research, clinical trials, treatment planning or other related purposes that may benefit the individual and/or their clinician. Individuals can also decide to share information if they feel it will benefit them or will contribute more broadly to furthering knowledge about their conditions.

Performance statement

We believe the value of the network we are building can best be expressed as the total number of individuals multiplied by the amount of information per individual multiplied by the number of connections available through the network. Through December 31, 2017, Invitae's ongoing testing business has served more than 220,000 individuals, can generate more than 20,000 potential data points per person and connects over 200,000 individuals through patient insight networks and commercial partners.

Competition

Our competitors include companies that offer molecular genetic testing services, including specialty and reference laboratories that offer traditional single and multi gene tests. Principal competitors include companies such as Ambry Genetics, a subsidiary of Konica Minolta Inc.; Athena Diagnostics, a subsidiary of Quest Diagnostics Incorporated; Baylor Genetics; Blueprint Genetics, Inc.; Centogene AC; Color Genomics, Inc.; Connective Tissue Gene Test LLC; Cooper Surgical; Counsyl, Inc.; Eurofins Scientific; GeneDx, a subsidiary of OPKO Health, Inc.; MNG Laboratories, LLC; Myriad Genetics, Inc.; Laboratory Corporation of America Holdings; Natera, Inc.; PreventionGenetics, LLC; Quest Diagnostics Incorporated; and Progenity, Inc. as well as other commercial and academic labs. In addition to the

companies that currently offer traditional genetic testing services and research centers, other established and emerging healthcare, information technology and service companies may commercialize competitive products including informatics, analysis, integrated genetic tools and services for health and wellness.

We believe the principal competitive factors in our market are:

- breadth and depth of content;
- quality;
- accessibility of results;
- turnaround time of testing results;
- price and quality of tests;
- coverage and reimbursement arrangements with third party payers;
- convenience of testing;
- brand recognition of test provider;
- additional value added services and informatics tools;
- customer service; and
- utility of website content.

We believe that we compare favorably with our competitors on the basis of these factors. However, many of our competitors and potential competitors have longer operating histories, larger customer bases, greater brand recognition and market penetration, substantially greater financial, technological and research and development resources and selling and marketing capabilities, and more experience dealing with third party payers. As a result, they may be able to respond more quickly to changes in customer requirements, devote greater resources to the development, promotion and sale of their tests, or sell their tests at prices designed to win significant levels of market share. We may not be able to compete effectively against these organizations.

Regulation

Reimbursement

In September 2014, the American Medical Association, or AMA, published new Current Procedural Terminology, or CPT, codes for genomic sequencing procedures that are effective for dates of service on or after January 1, 2015. These include genomic sequencing procedure codes for panels, including hereditary colon cancer syndromes, targeted genomic sequence analysis panels for solid organ neoplasms, targeted genomic sequence analysis panels for hematolymphoid neoplasm or disorders, whole exome analyses, and whole genome analyses. In a final determination under the Medicare Clinical Laboratory Fee Schedule, or CLFS, published in November 2014, the Centers for Medicare and Medicaid Services, or CMS, set the 2015 payment rate for these codes by the gap fill process. Under the gap fill process, local Medicare Administrative Contractors, or MACs, establish rates for those codes that each MAC believes meet the criteria for Medicare coverage and considering laboratory charges and discounts to charges, resources, amounts paid by other payers for the tests, and amounts paid by the MAC for similar tests. In 2015, gap-filled payment rates were established for some, but not all, of the above referenced codes. For those codes for which local gap filled rates were established in 2015, a national limitation amount for Medicare was established for 2016. Codes for which local gap filled rates were not established in 2015 were priced by the local MACs in 2016 insofar as an individual MAC determined that such codes should be covered. Where available, the national limitation amount serves as a cap on the Medicare and Medicaid payment rates for a test procedure. If we are required to report our tests under these codes, there can be no guarantees that Medicare (or its contractors) has or will set adequate reimbursement rates for these codes.

The AMA also released several CPT codes effective January 2016 that may be appropriate to report certain of our tests. In a November 2015 final determination, CMS set the calendar year 2016 CLFS payment rate for these new codes by the gap-fill process. CMS and the local MACs went through the gap-fill process in 2016 and announced final gap-filled rates for 2017 on September 30, 2016. The calendar year 2017 national limitation amounts for certain codes were significantly less than the rates at which we have historically offered our tests.

In April 2014, Congress passed the Protecting Access to Medicare Act of 2014, or PAMA, which included substantial changes to the way in which clinical laboratory services will be paid under Medicare. Under the regulations

implementing PAMA, laboratories that realize at least $12,500 in Medicare CLFS revenues during the six month reporting period and that receive the majority of their Medicare revenue from payments made under the

CLFS or the Physician Fee Schedule must report, beginning in 2017, and then every three years thereafter (or annually for "advanced diagnostic laboratory tests"), private payer payment rates and volumes for their tests. We do not believe that our tests meet the current definition of advanced diagnostic laboratory tests, and therefore believe we are required to report private payer rates for our tests on an every three years basis. CMS uses the rates and volumes reported by laboratories to develop Medicare payment rates for the tests equal to the volume weighted median of the private payer payment rates for the tests. Laboratories that fail to report the required payment information may be subject to substantial civil money penalties.

As set forth under the regulations implementing PAMA, for tests furnished on or after January 1, 2018, Medicare payments for clinical diagnostic laboratory tests will be paid based upon these reported private payer rates. For clinical diagnostic laboratory tests that are assigned a new or substantially revised code, initial payment rates for clinical diagnostic laboratory tests that are not advanced diagnostic laboratory tests will be assigned by the cross walk or gap fill methodology, as under prior law. Initial payment rates for new advanced diagnostic laboratory tests will be based on the actual list charge for the laboratory test.

The payment rates calculated under PAMA went into effect starting January 1, 2018. Reductions to payment rates resulting from the new methodology are limited to 10% per test per year in each of the years 2018 through 2020 and to 15% per test per year in each of 2021 through 2023.

PAMA codified Medicare coverage rules for laboratory tests by requiring any local coverage determination to be made following the local coverage determination process. PAMA also authorizes CMS to consolidate coverage policies for clinical laboratory tests among one to four laboratory specific MACs. These same contractors may also be designated to process claims if CMS determines that such a model is appropriate. It is unclear whether CMS will proceed with contractor consolidation under this authorization.

PAMA also authorized the adoption of new, temporary billing codes and/or unique test identifiers for FDA cleared or approved tests as well as advanced diagnostic laboratory tests. The American Medical Association has created a new section of billing codes, Proprietary Laboratory Analyses, to facilitate implementation of this section of PAMA. At this time, it is unclear how these codes would apply to our tests.

Clinical Laboratory Improvement Amendments of 1988, or CLIA

Our clinical reference laboratories in California and Massachusetts are required to hold certain federal certificates to conduct our business. Under CLIA, we are required to hold certificates applicable to the type of laboratory examinations we perform and to comply with standards covering personnel, facilities administration, inspections, quality control, quality assurance and proficiency testing.

We have current certifications under CLIA to perform testing at our laboratory locations in San Francisco, California, Irvine, California and Cambridge, Massachusetts. To renew our CLIA certifications, we are subject to survey and inspection every two years to assess compliance with program standards. Moreover, CLIA inspectors may make random inspections of our clinical reference laboratories. The regulatory and compliance standards applicable to the testing we perform may change over time, and any such changes could have a material effect on our business.

If our clinical reference laboratories are out of compliance with CLIA requirements, we may be subject to sanctions such as suspension, limitation or revocation of our CLIA certificates, as well as directed plan of correction, state on site monitoring, civil money penalties, civil injunctive suit or criminal penalties. We must maintain CLIA compliance and certifications to be eligible to bill for diagnostic services provided to Medicare and Medicaid beneficiaries. If we were to be found out of compliance with CLIA requirements and subjected to sanction, our business could be harmed.

State laboratory licensure

We are required to maintain in-state licenses to conduct testing in California and Massachusetts. California laws establish standards for day to day operations of our laboratories in San Francisco and Irvine, and Massachusetts laws establish standards applicable to our laboratory in Cambridge. California and Massachusetts laws, respectively, mandate proficiency testing, which involves testing of specimens that have been specifically prepared for the laboratories. If our clinical reference laboratories are out of compliance with California standards, the California Department of Health Services, or DHS, may suspend, restrict or revoke our licenses to operate our clinical reference laboratories, assess substantial civil money penalties, or impose specific corrective action plans.

Similarly, if our Cambridge laboratory does not meet Massachusetts standards, the Massachusetts Department of Public Health, or DPH, may suspend, modify, or revoke our license to operate such laboratory, assess fines, or issue an order requiring certain corrective action. Any such actions could materially affect our business. We maintain current licenses in good standing with DHS and DPH. However, we cannot provide assurance that DHS and/or DPH will at all times in the future find us to be in compliance with all such laws.

Several states require the licensure of out of state laboratories that accept specimens from those states and/or receive specimens from laboratories in those states. Our laboratories hold the required out of state laboratory licenses for Florida, Maryland, New York, Pennsylvania Rhode Island, and our Cambridge laboratory maintains an our-of-state laboratory license from California.

In addition to having laboratory licenses in New York, our clinical reference laboratories in California and in Massachusetts are also required to obtain approval on a test specific basis by the New York State Department of Health, or NYDOH, before specific testing is performed on samples from New York.

Other states may adopt similar licensure requirements in the future, which may require us to modify, delay or stop our operations in such jurisdictions. Complying with licensure requirements in new jurisdictions may be expensive, time consuming, and subject us to significant and unanticipated delays. If we identify any other state with such requirements, or if we are contacted by any other state advising us of such requirements, we intend to follow instructions from the state regulators as to how we should comply with such requirements.

We may also be subject to regulation in foreign jurisdictions as we seek to expand international utilization of our tests or such jurisdictions adopt new licensure requirements, which may require review of our tests in order to offer them or may have other limitations such as restrictions on the transport of human blood necessary for us to perform our tests that may limit our ability to make our tests available outside of the United States.

U.S. Food and Drug Administration, or FDA

We provide our tests as laboratory developed tests, or LDTs. CMS and certain state agencies regulate the performance of LDTs (as authorized by CLIA and state law, respectively).

Historically, the FDA has exercised enforcement discretion with respect to most LDTs and has not required laboratories that furnish LDTs to comply with the agency's requirements for medical devices (e.g., establishment registration, device listing, quality systems regulations, premarket clearance or premarket approval, and post market controls). In recent years, however, the FDA has stated it intends to end its policy of general enforcement discretion and regulate certain LDTs as medical devices. To this end, on October 3, 2014, the FDA issued two draft guidance documents, entitled "Framework for Regulatory Oversight of Laboratory Developed Tests (LDTs)" and "FDA Notification and Medical Device Reporting for Laboratory Developed Tests (LDTs)", respectively, that set forth a proposed risk based regulatory framework that would apply varying levels of FDA oversight to LDTs. The FDA has indicated that it does not intend to modify its policy of enforcement discretion until the draft guidance documents are finalized. Subsequently, on January 13, 2017, the FDA published a "discussion paper" in which the agency outlined a substantially revised "possible approach" to the oversight of LDTs. The discussion paper explicitly states that it is not a final version of the 2014 draft guidance and that it does not represent the agency's "formal position"; rather, the discussion paper represents the latest iteration of the agency's thinking on LDTs, which the agency posted to "spur further dialogue". Notably, in the discussion paper, the agency expressed its willingness to consider "grandfathering" currently marketed LDTs from most or all FDA regulatory requirements. It is unclear at this time when, or if, the FDA will finalize its plans to end enforcement discretion, and even then, the new regulatory requirements are expected to be phased in over time. Nevertheless, the FDA may decide to regulate certain LDTs on a case by case basis at any time.

Legislative proposals addressing the FDA's oversight of LDTs have been introduced in previous Congresses, and we expect that new legislative proposals will be introduced from time to time. The likelihood that Congress will pass such

legislation and the extent to which such legislation may affect the FDA's plans to regulate certain LDTs as medical devices is difficult to predict at this time.

If the FDA ultimately regulates certain LDTs as medical devices, whether via final guidance, final regulation, or as instructed by Congress, our tests may be subject to certain additional regulatory requirements. Complying with the FDA's requirements for medical devices can be expensive, time consuming, and subject us to significant or unanticipated delays. Insofar as we may be required to obtain premarket clearance or approval to perform or continue performing an LDT, we cannot assure you that we will be able to obtain such authorization. Even if we

obtain regulatory clearance or approval where required, such authorization may not be for the intended uses that we believe are commercially attractive or are critical to the commercial success of our tests. As a result, the application of the FDA's medical device requirements to our tests could materially and adversely affect our business, financial condition, and results of operations.

Notwithstanding the FDA's current position with respect to oversight of our tests, we may voluntarily decide to pursue FDA pre market review for our current tests and/or tests we may offer in the future if we determine that doing so would be appropriate from a strategic perspective – e.g., if CMS indicated that it no longer intended to cover tests offered as LDTs. In November 2017, CMS published a draft national coverage determination, or NCD, for next generation sequencing, or NGS, tests for patients with advanced cancer, under which CMS proposed to provide full coverage for FDA-approved tests performed in patients that fall within the test's FDA-approved labeling, but proposed significant limits on coverage for NGS-based tests offered as LDTs. It is unclear whether CMS will finalize the NCD as proposed. While we do not believe the draft NCD was intended to apply to our tests, it could arguably be interpreted to apply to such tests. If CMS issues a final NCD that applies to our tests and is substantively similar to the draft NCD, our current and future tests may effectively be non-covered under Medicare unless and until we obtain FDA clearance or approval (as applicable).

Failure to comply with applicable FDA regulatory requirements may trigger a range of enforcement actions by the FDA including warning letters, civil monetary penalties, injunctions, criminal prosecution, recall or seizure, operating restrictions, partial suspension or total shutdown of operations, and denial of or challenges to applications for clearance or approval, as well as significant adverse publicity.

In addition, in November 2013, the FDA issued final guidance regarding the distribution of products labeled for research use only. Certain of the reagents and other products we use in our tests are labeled as research use only products. Certain of our suppliers may cease selling research use only products to us and any failure to obtain an acceptable substitute could significantly and adversely affect our business, financial condition and results of operations.

HIPAA and HITECH

Under the administrative simplification provisions of the Health Insurance Portability and Accountability Act of 1996, or HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, or HITECH, the U.S. Department of Health and Human Services issued regulations that establish uniform standards governing the conduct of certain electronic healthcare transactions and requirements for protecting the privacy and security of protected health information used or disclosed by most healthcare providers and other covered entities and their respective business associates, including the business associates' subcontractors. Four principal regulations with which we are required to comply have been issued in final form under HIPAA and HITECH: privacy regulations, security regulations, the breach notification rule, and standards for electronic transactions, which establish standards for common healthcare transactions.

The privacy regulations cover the use and disclosure of protected health information by covered entities as well as business associates, which are defined to include subcontractors that create, receive, maintain, or transmit protected health information on behalf of a business associate. A subcontractor means any person to whom a business associate delegates a function, activity, or service, other than in the capacity of the business associate's workforce. As a general rule, a covered entity or business associate may not use or disclose protected health information except as permitted under the privacy regulations. The privacy regulations also set forth certain rights that an individual has with respect to his or her protected health information maintained by a covered entity or business associate, including the right to access or amend certain records containing his or her protected health information, or to request restrictions on the use or disclosure of his or her protected health information.

Covered entities and business associates also must comply with the security regulations, which establish requirements for safeguarding the confidentiality, integrity, and availability of protected health information that is electronically transmitted or electronically stored. In addition, HITECH established, among other things, certain breach notification requirements with which covered entities and business associates must comply. In particular, a covered entity must notify any individual whose unsecured protected health information is breached according to the specifications set forth in the breach notification rule. A covered entity must also notify the Secretary of the U.S. Department of Health and Human Services and, under certain circumstances, the media.

The HIPAA privacy, security, and breach notification regulations establish a uniform federal "floor" and do not supersede state laws that are more stringent or provide individuals with greater rights with respect to the privacy or security of, and access to, their records containing protected health information or insofar as such state laws apply to personal information that is broader in scope than protected health information as defined under HIPAA. Massachusetts, for example, has a state law that protects the privacy and security of personal information of Massachusetts residents. Many states also have laws or regulations that specifically apply to the use or disclosure of genetic information and that are more stringent than the standards under HIPAA.

There are significant civil and criminal fines and other penalties that may be imposed for violating HIPAA. A covered entity or business associate is also liable for civil money penalties for a violation that is based on an act or omission of any of its agents, including a downstream business associate, as determined according to the federal common law of agency. Additionally, to the extent that we submit electronic healthcare claims and payment transactions that do not comply with the electronic data transmission standards established under HIPAA and HITECH, payments to us may be delayed or denied.

Federal and State Consumer Protection Laws

The Federal Trade Commission, or FTC, is an independent U.S. law enforcement agency charged with protecting consumers and enhancing competition across broad sectors of the economy. The FTC's primary legal authority comes from Section 5 of the FTC Act, which prohibits unfair or deceptive practice in the marketplace. The FTC has increasingly used this broad authority to police data privacy and security, using its powers to investigate and bring lawsuits. Where appropriate, the FTC can seek a variety of remedies, including the implementation of comprehensive privacy and security programs, biennial assessments by independent experts, monetary redress to consumers, and provision of robust notice and choice mechanisms to consumers. In addition to its enforcement mechanisms, the FTC uses a variety of tools to protect consumers' privacy and personal information, including enforcement actions to stop violations of law, conducting studies and issuing reports, hosting public workshops, developing educational materials, and testifying before the U.S. Congress on issues that affect consumer privacy.

The vast majority of cases brought by the FTC fall under the "deceptive" prong of Section 5. These cases often involve a failure on the part of a company to adhere to its own privacy and data protection principles set forth in its policies. To avoid Section 5 violations, the FTC encourages companies to build privacy protections and safeguards into relevant portions of the business, and consider privacy and data protection as the company grows and evolves. In addition, privacy notices should clearly and accurately disclose the type(s) of information the company collects, how the company uses and shares the information, and the security measures used by the company to protect the information.

In recent years, the FTC's enforcement under Section 5 has included alleged violations of the "unfairness" prong. Many of these cases have alleged that companies were unfair to consumers because they failed to take reasonable and necessary measures to protect consumer data. The FTC has not provided bright line rules defining what constitutes "reasonable and necessary measures" for implementing a cybersecurity program, but it has provided guidance, tips and advice for companies. The FTC has also published past complaints and consent orders, which it urges companies use as examples to help avoid an FTC enforcement action, even if a data breach or loss occurs.

In addition to the FTC Act, most U.S. states have unfair and deceptive acts and practices statues, or UDAP statutes, that substantially mirror the FTC Act and have been applied in the privacy and data security context. These vary in substance and strength from state to state. Many have broad prohibitions against unfair and deceptive acts and practices, while New York's UDAP statute, for instance, is limited to only deceptive acts and practice. These statutes generally allow for private rights of action and are enforced by the states' Attorneys General. In addition, almost every U.S. state has a data breach notification law that requires entities to report certain security incidents to affected consumers and state regulators.

International Privacy and Data Protection Laws

There are a growing number of jurisdictions all over the world that have privacy and data protection laws. These laws are typically triggered by a company's establishment or physical location in the jurisdiction, data processing activities that take place in the jurisdiction, and/or the processing of personal information about residents of citizens of that jurisdiction. Certain international privacy and data protection laws, such as those in the European Union, can be more restrictive and prescriptive than those in the U.S., while other jurisdictions can have laws less restrictive or prescriptive than those in the U.S. Enforcement of these laws vary from jurisdiction to jurisdiction, with a variety of civil or criminal penalties.

Federal, state and foreign fraud and abuse laws

In the United States, there are various fraud and abuse laws with which we must comply, and we are potentially subject to regulation by various federal, state and local authorities, including CMS, other divisions of the U.S. Department of Health and Human Services (e.g., the Office of Inspector General), the U.S. Department of Justice, and individual U.S. Attorney offices within the Department of Justice, and state and local governments. We also may be subject to foreign fraud and abuse laws.

In the United States, the federal Anti Kickback Statute prohibits knowingly and willfully offering, paying, soliciting or receiving remuneration, directly or indirectly, overtly or covertly, in cash or in kind, to induce or in return for the referral of an individual for the furnishing of or arranging for the furnishing of any item or service for which payment may be made in whole or in part by a federal healthcare program, or the purchasing, leasing, ordering or arranging for or recommending purchasing, leasing or ordering of any good, facility, service or item for which payment may be made in whole or in part by a federal healthcare program. Many courts have held that the Anti Kickback Statute may be violated if any one purpose of the remuneration is to induce or reward patient referrals or other federal healthcare program business, regardless of whether there are other legitimate purposes for the arrangement. The definition of "remuneration" has been broadly interpreted to include anything of value, including gifts, discounts, credit arrangements, payments of cash, consulting fees, waivers of co payments, ownership interests, and providing anything at less than its fair market value. The Anti Kickback Statute is broad and may technically prohibit many innocuous or beneficial arrangements within the healthcare industry. The Anti-Kickback Statute includes several statutory exceptions, and the U.S. Department of Health and Human Services has issued a series of regulatory "safe harbors." These exceptions and safe harbor regulations set forth certain requirements for various types of arrangements, which, if met, will protect the arrangement from potential liability under the Anti Kickback Statute. Although full compliance with the statutory exceptions or regulatory safe harbors ensures against liability under the federal Anti Kickback Statute, the failure of a transaction or arrangement to fit within a specific statutory exception or regulatory safe harbor does not necessarily mean that the transaction or arrangement is illegal or that prosecution under the federal Anti Kickback Statute will be pursued. Penalties for violations of the Anti Kickback Statute are severe, and include imprisonment, criminal fines, civil money penalties, and exclusion from participation in federal healthcare programs. Many states also have anti kickback statutes, some of which may apply to items or services reimbursed by any third party payer, including commercial insurers.

There are also federal laws related to healthcare fraud and false statements, among others, that apply to healthcare matters. The healthcare fraud statute prohibits, among other things, knowingly and willfully executing a scheme to defraud any healthcare benefit program, including private payers. A violation of this statute is a felony and may result in fines, imprisonment, or exclusion from governmental payer programs such as the Medicare and Medicaid programs. The false statements statute prohibits, among other things, knowingly and willfully falsifying, concealing or covering up a material fact, or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items, or services. A violation of this statute is a felony and may result in fines, imprisonment, or exclusion from governmental payer programs.

Another development affecting the healthcare industry is the increased enforcement of the federal False Claims Act and, in particular, actions brought pursuant to the False Claims Act's "whistleblower" or "qui tam" provisions. The False Claims Act imposes liability on any person or entity that, among other things, knowingly presents, or causes to be presented, a false or fraudulent claim for payment by a federal governmental payer program. The qui tam provisions of the False Claims Act allow a private individual to bring actions on behalf of the federal government alleging that the defendant has defrauded the federal government by presenting or causing to be presented a false claim to the federal government and permit such individuals to share in any amounts paid by the entity to the government in fines or settlement. When an entity is determined to have violated the False Claims Act, it may be required to pay up to three times the actual damages sustained by the government, plus civil penalties for

each false claim. For penalties assessed after January 29, 2018, whose associated violations occurred after November 2, 2015, the penalties range from $11,181 to $22,363 for each false claim. The minimum and maximum per claim penalty amounts are subject to annual increases for inflation.

In addition, various states have enacted false claim laws analogous to the federal False Claims Act, and some of these state laws apply where a claim is submitted to any third party payer and not only a governmental payer program.

Additionally, the civil monetary penalties statute imposes penalties against any person or entity that, among other things, is determined to have presented or caused to be presented a claim to a federal health program that the person knows or should know is for an item or service that was not provided as claimed or for a claim that is false or fraudulent. This law also prohibits the offering or transfer of remuneration to a Medicare or state healthcare program beneficiary if the person knows or should know it is likely to influence the beneficiary's selection of a particular provider, practitioner, or supplier for items or services reimbursable by Medicare or a state healthcare program. There are several exceptions to the prohibition on beneficiary inducement.

In Europe various countries have adopted anti bribery laws providing for severe consequences, in the form of criminal penalties and/or significant fines, for individuals and/or companies committing a bribery offence. Violations of these anti bribery laws, or allegations of such violations, could have a negative impact on our business, results of operations and reputation. For instance, in the United Kingdom, under the Bribery Act 2010, which went into effect in July 2011, a bribery occurs when a person offers, gives or promises to give a financial or other advantage to induce or reward another individual to improperly perform certain functions or activities, including any function of a public nature. Bribery of foreign public officials also falls within the scope of the Bribery Act 2010. Under the new regime, an individual found in violation of the Bribery Act 2010, faces imprisonment of up to ten years. In addition, the individual can be subject to an unlimited fine, as can commercial organizations for failure to prevent bribery.

Physician referral prohibitions

A federal law directed at "self referrals," commonly known as the "Stark Law," prohibits a physician from referring a patient to an entity for certain Medicare-covered designated health services, including laboratory services, if the physician, or an immediate family member, has a financial relationship with the entity, unless an exception applies. The Stark Law also prohibits an entity from billing for services furnished pursuant to a prohibited referral. A physician or entity that engages in a scheme to circumvent the Stark Law's referral prohibition may be fined up to $100,000 for each such arrangement or scheme. In addition, any person who presents or causes to be presented a claim to the Medicare program in violation of the Stark Law is subject to civil monetary penalties of up to $15,000 per service, an assessment of up to three times the amount claimed and possible exclusion from participation in federal healthcare programs. Bills submitted in violation of the Stark Law may not be paid by Medicare, and any person collecting any amounts with respect to any such prohibited bill is obligated to refund such amounts. Many states have comparable laws that apply to services covered by other third-party payers. The Stark Law also prohibits state receipt of Federal Medicaid matching funds for services furnished pursuant to a prohibited referral. This provision of the Stark Law has not been implemented by regulations, but some courts have held that the submission of claims to Medicaid that would be prohibited as self referrals under the Stark Law for Medicare could implicate the False Claims Act.

Corporate practice of medicine

Numerous states have enacted laws prohibiting business corporations, such as us, from practicing medicine and employing or engaging clinicians to practice medicine, generally referred to as the prohibition against the corporate practice of medicine. These laws are designed to prevent interference in the medical decision making process by anyone who is not a licensed physician. For example, California's Medical Board has indicated that determining what diagnostic tests are appropriate for a particular condition and taking responsibility for the ultimate overall care of the patient, including providing treatment options available to the patient, would constitute the unlicensed practice of

medicine if performed by an unlicensed person. Violation of these corporate practice of medicine laws may result in civil or criminal fines, as well as sanctions imposed against us and/or the professional through licensure proceedings.

Intellectual property

We rely on a combination of intellectual property rights, including trade secrets, copyrights, trademarks, customary contractual protections and, to a lesser extent, patents, to protect our core technology and intellectual property. With respect to patents, we believe that the practice of patenting individual genes, along with patenting tools and methods specific to individual genes, has impeded the progress of the genetic testing industry beyond single gene tests and is antithetical to our core principle that patients should own and control their own genomic information. In recent years the U.S. Supreme Court has issued a series of unanimous (9 0) decisions setting forth limits on the patentability of natural phenomena, natural laws, abstract ideas and their applications—i.e., Mayo Collaborative v. Prometheus Laboratories (2012), or Mayo, Association for Molecular Pathology v. Myriad Genetics (2013), or Myriad, and Alice Corporation v. CLS Bank (2014), or Alice. As discussed below, we believe the Mayo, Myriad and Alice decisions bring clarity to the limits to which patents may cover specific genes, mutations of such genes, or gene specific technology for determining a patient's genomic information.

Patents

Recent U.S. Supreme Court cases have clarified that naturally occurring DNA sequences are natural phenomena, which should not be patentable. On June 13, 2013, the U.S. Supreme Court decided Myriad, a case challenging the validity of patent claims held by Myriad relating to the cancer genes BRCA1 and BRCA2. The Myriad Court held that genomic DNAs that have been isolated from, or have the same sequence as, naturally occurring samples, such as the DNA constituting the BRCA1 and BRCA2 genes or fragments thereof, are not eligible for patent protection. Instead, the Myriad Court held that only those complementary DNAs (cDNAs) which have a sequence that differs from a naturally occurring fragment of genomic DNA may be patent eligible. Because it will be applied by other courts to all gene patents, the holding in Myriad also invalidates patent claims to other genes and gene variants. Prior to Myriad, on August 16, 2012, the U.S. Court of Appeals for the Federal Circuit had held that certain patent claims of Myriad directed to methods of comparing or analyzing BRCA1 and BRCA2 sequences to determine whether or not a person has a variant or mutation are unpatentable abstract processes, and Myriad did not appeal such ruling.

We do not currently have any patents or patent applications directed to the sequences of specific genes or variants of such genes, nor do we rely on any such in licensed patent rights of any third party. We believe that correlations between specific gene variants and a person's susceptibility to certain conditions or diseases are natural laws that are not patentable under the U.S. Supreme Court's decision in Mayo. The Mayo case involved patent claims directed to optimizing, on a patient specific basis, the dosage of a certain drug by measuring its metabolites in a patient. The Mayo Court determined that patent claims directed at detection of natural correlations, such as the correlation between drug metabolite levels in a patient and that drug's optimal dosage for such patient, are not eligible for patent protection. The Mayo Court held that claims based on this type of comparison between an observed fact and an understanding of that fact's implications represent attempts to patent a natural law and, moreover, when the processes for making the comparison are not themselves sufficiently inventive, claims to such processes are similarly patent ineligible. On June 19, 2014, the U.S. Supreme Court decided Alice, where it amplified its Mayo and Myriad decisions and clarified the analytical framework for distinguishing between patents that claim laws of nature, natural phenomena and abstract ideas and those that claim patent eligible applications of such concepts. According to the Alice Court, the analysis depends on whether a patent claim directed to a law of nature, a natural phenomenon or an abstract idea contains additional elements, an "inventive concept," that "is sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself;" (citing Mayo).

We believe that Mayo, Myriad and Alice not only render as unpatentable genes, gene fragments and the detection of a person's sequence for a gene, but also have the same effect on generic applications of conventional technology to specific gene sequences. For example, we believe that generic claims to primers or probes directed to specific gene sequences and uses of such primers and probes in determining a person's genetic information are not patentable. We do not currently have any patents or patent applications directed to such subject matter nor have we in licensed such patents rights of any third party.

Unlike patents directed to specific genes, we do rely upon, in part, patent protection to protect technology that is not gene specific and that provides us with a potential competitive advantage as we focus on making comprehensive genetic information less expensive and more broadly available to our customers. In this regard, we have issued U.S. patents, pending U.S. utility patent applications, a pending PCT application, and pending non U.S. applications directed to various aspects of our laboratory, analytic and business practices. We intend to pursue further patent protection where appropriate.

Trade secrets

In addition to seeking patent protection for some of our laboratory, analytic and business practices, we also rely on trade secrets, including unpatented know how, technology and other proprietary information, to maintain and develop our competitive position. We have developed proprietary procedures for both the laboratory processing of patient samples and the analysis of the resulting data to generate clinical reports. For example, we have automated aspects of our processes for curating information about known variants, identifying variants in an individual's sequence information, associating those variants with known information about their potential effects on disease, and presenting that information for review by personnel responsible for its interpretation and for the delivery of test reports to clinicians. We try to protect these trade secrets, in part, by taking reasonable steps to keep them confidential. This includes entering into nondisclosure and confidentiality agreements with parties who have access to them, such as our employees and certain third parties. We also enter into invention or patent assignment agreements with our employees and consultants that obligate them to assign to us any inventions developed in the course of their work for us. However, we may not enter into such agreements with all relevant parties, and these parties may not abide by the terms of their agreements. Despite measures taken to protect our intellectual property, unauthorized parties might copy or independently develop and commercially exploit aspects of our technology or obtain and use information that we regard as proprietary.

Trademarks

We work hard to achieve a high level of quality in our operations and to provide our customers with a superior experience when interacting with us. As a consequence, our brand is very important to us, as it is a symbol of our reputation and representative of the goodwill we seek to generate with our customers. As a consequence, we have invested significant resources in protection of our trademarks.

Environmental matters

Our operations require the use of hazardous materials (including biological materials) that subject us to a variety of federal, state and local environmental and safety laws and regulations. Some of these regulations provide for strict liability, holding a party potentially liable without regard to fault or negligence. We could be held liable for damages and fines as a result of our, or others', business operations should contamination of the environment or individual exposure to hazardous substances occur. We cannot predict how changes in laws or new regulations will affect our business, operations or the cost of compliance.

Raw materials and suppliers

We rely on a limited number of suppliers, or, in some cases, sole suppliers, including Illumina, Inc., Integrated DNA Technologies Incorporated, Qiagen N.V., Roche Holdings Ltd. and Twist Bioscience Corporation for certain laboratory reagents, as well as sequencers and other equipment and materials which we use in our laboratory operations. We rely on Illumina as the sole supplier of next generation sequencers and associated reagents and as the sole provider of maintenance and repair services for these sequencers. Our laboratory operations could be interrupted if we encounter delays or difficulties in securing these reagents, sequencers or other equipment or materials, and if we cannot obtain an acceptable substitute. Any such interruption could significantly affect our business, financial condition, results of operations and reputation. We believe that there are only a few other manufacturers that are currently capable of supplying and servicing the equipment necessary for our laboratory operations, including sequencers and various associated reagents. The use of equipment or materials provided by these replacement suppliers would require us to alter our laboratory operations. Transitioning to a new supplier would be time consuming and expensive, may result in interruptions in our laboratory operations, could affect the performance specifications of our laboratory operations or could require that we revalidate our tests. We cannot assure you that we would be able to secure alternative equipment, reagents and other materials, or bring such equipment, reagents and materials on line and revalidate them without experiencing interruptions in our workflow. If we encounter delays or

difficulties in securing, reconfiguring or revalidating the equipment and reagents we require for our tests, our business and reputation could be adversely affected.

Customer and geographic concentrations

For the years ended December 31, 2017, 2016 and 2015 the percentages of our revenue attributable to sources in the United States were 92%, 83% and 65% respectively; the percentages of our revenue attributable to sources in Canada were 5%, 10% and 25% respectively; and the percentages of our revenue attributable to countries excluding the United States and Canada were 3%, 7%and 10% respectively.

As of December 31, 2017 and 2016, our long lived assets of $30.3 million and $23.8 million, respectively, were located in the United States.

As of December 31, 2017, substantially all our revenue has been derived from test reports generated from our assays. A single customer accounted for 13% of our revenue for the year ended December 31, 2017 and 11% of our revenue for the year ended December 31, 2016, and a second single customer accounted for 13% of our revenue for the year ended December 31, 2015.

Employees

We had 594 employees as of December 31, 2017.

General Information

We were incorporated in the State of Delaware on January 13, 2010 under the name Locus Development, Inc. and changed our name to Invitae Corporation in 2012. In February 2015 we completed an initial public offering of our common stock.

Our principal executive offices are located at 1400 16th Street, San Francisco, California 94103, and our telephone number is (415) 374 7782. Our website address is www.invitae.com. The information contained on, or that can be accessed through, our website is not part of this annual report on Form 10 K.

We make available free of charge on our website our annual reports on Form 10 K, quarterly reports on Form 10 Q, current reports on Form 8 K and amendments to those reports, as soon as reasonably practicable after we electronically file or furnish such materials to the Securities and Exchange Commission, or SEC. You may obtain a free copy of these reports in the Investor Relations section of our website, www.invitae.com. All reports that we file with the SEC may be read and copied at the SEC's Public Reference Room at 100 F Street, N.E., Washington, DC, 20549. Information about the operation of the Public Reference Room can be obtained by calling the SEC at 1 800 SEC 0330. All reports that we file are also available at www.sec.gov.

ITEM 1A. Risk Factors.

Risks related to our business and strategy

We expect to continue incurring significant losses, and we may not successfully execute our plan to achieve or sustain profitability.

We have incurred substantial losses since our inception. For the years ended December 31, 2017, 2016 and 2015, our net losses were $123.4 million, $100.3 million and $89.8 million, respectively. At December 31, 2017, our accumulated deficit was $398.6 million. To date, we have generated limited revenue, and we expect to continue to incur significant losses. In addition, these losses may increase as we focus on scaling our business and operations and expanding our testing capabilities. Our prior losses and expected future losses have had and will continue to have an

adverse effect on our stockholders' equity, working capital and stock price. Our failure to achieve and sustain profitability in the future would negatively affect our business, financial condition, results of operations and cash flows, and could cause the market price of our common stock to decline.

We began operations in January 2010, and commercially launched our initial assay in late November 2013; accordingly, we have a relatively limited operating history upon which you can evaluate our business and prospects. Our limited commercial history makes it difficult to evaluate our current business and makes predictions about our future results, prospects or viability subject to significant uncertainty. Our prospects must be considered in light of the risks and difficulties frequently encountered by companies in their early stage of development, particularly companies in new and rapidly evolving markets such as ours. These risks include an evolving and unpredictable business model and the management of growth. To address these risks, we must, among other things, increase our customer base, implement and successfully execute our business and marketing strategy, continue to expand,

automate and upgrade our laboratory, technology and data systems, obtain and maintain coverage and reimbursement by healthcare payers, provide rapid test turnaround times with accurate results at low prices, provide superior customer service, respond to competitive developments and attract, retain and motivate qualified personnel. We cannot assure you that we will be successful in addressing these risks, and the failure to do so could have a material adverse effect on our business, prospects, financial condition and results of operations.

We have acquired and may continue to acquire businesses or assets, form joint ventures or make investments in other companies or technologies that could harm our operating results, dilute our stockholders' ownership, or cause us to incur debt or significant expense.

As part of our business strategy, we have pursued and may continue to pursue acquisitions of complementary businesses or assets, as well as technology licensing arrangements. We also may pursue strategic alliances that leverage our core technology and industry experience to expand our offerings or distribution, or make investments in other companies. As an organization, we have limited experience with respect to acquisitions as well as the formation of strategic alliances and joint ventures.

In January 2017, we acquired AltaVoice (formerly PatientCrossroads), a privately-owned, patient-centered data company. In June 2017, we acquired Ommdom, Inc., a privately-held company that develops and operates hereditary risk assessment and management software, including CancerGene Connect, a cancer genetic counseling platform. In August 2017, we acquired Good Start Genetics, a privately-held company focused on preimplantation and carrier screening for inherited disorders. In November 2017, we acquired CombiMatrix Corporation, a publicly-traded company which specializes in prenatal diagnosis, miscarriage analysis and pediatric developmental disorders.

With respect to AltaVoice, Ommdom, Good Start, CombiMatrix, and any acquisitions we may make in the future, we may not be able to integrate these acquisitions successfully into our existing business, and we could assume unknown or contingent liabilities. Any acquisitions by us also could result in significant write-offs or the incurrence of debt and contingent liabilities, any of which could harm our operating results. Furthermore, the loss of customers, payers, partners or suppliers following the completion of any acquisitions by us could harm our business. For example, we have experienced a reduction in Good Start's sales as a result of the termination of a contract by a third-party laboratory that had performed expanded carrier screening for Good Start. Changes in services, sources of revenue, and branding or rebranding initiatives may involve substantial costs and may not be favorably received by customers, resulting in an adverse impact on our financial results, financial condition and stock price. Integration of an acquired company or business also may require management's time and resources that otherwise would be available for ongoing development of our existing business. For example, we have diverted resources from other projects in order to develop an expanded carrier screening test as a result of the termination of the third-party laboratory contract with Good Start, and we may experience difficulties or delays in launching this test. We may also need to divert cash from other uses in order to fund these integration activities. Ultimately, we may not realize the anticipated benefits of any acquisition, technology license, strategic alliance, joint venture or investment, or these benefits may take longer to realize than we expected.

To finance any acquisitions or investments, we may choose to raise additional funds. If we raise funds by issuing equity securities, dilution to our stockholders could result. Any equity securities issued also may provide for rights, preferences or privileges senior to those of holders of our common stock. In August 2017, in a private placement to certain accredited investors, we offered and sold common stock and Series A convertible preferred stock for gross proceeds of approximately $73.5 million. The Series A preferred stock is a non-voting common stock equivalent and conversion of the Series A preferred stock is prohibited if the holder exceeds a specified threshold of voting security ownership. The Series A preferred stock is convertible into common stock on a one-for-one basis, subject to adjustment for events such as stock splits, combinations and the like. If we raise funds by issuing debt securities, these debt securities would have rights, preferences and privileges senior to those of holders of our common stock. The terms of debt securities issued or borrowings could impose significant restrictions on our operations. If we raise funds through collaborations and licensing arrangements, we might be required to relinquish significant rights to our

technologies or products, or grant licenses on terms that are not favorable to us. If the price of our common stock is low or volatile, we may not be able to acquire other companies for stock. In addition, our stockholders may experience substantial dilution as a result of additional securities we may issue for acquisitions. Open market sales of substantial amounts of our common stock issued to stockholders of companies we acquire could also depress our share price. Alternatively, it may be necessary for us to raise additional funds for our acquisition activities through public or private financings. Additional funds may not be available on terms that are favorable to us, or at all. In addition, our Amended 2017 Loan Agreement limits our ability to merge with or acquire other entities, incur debt, incur liens, pay dividends or other distributions to holders of our capital stock and make investments, in each case subject to certain exceptions.

If third-party payers, including managed care organizations, private health insurers and government health plans do not provide adequate reimbursement for our tests or we are unable to comply with their requirements for reimbursement, our commercial success could be negatively affected.

Our ability to increase the number of billable tests and our revenue will depend on our success achieving reimbursement for our tests from third-party payers. Reimbursement by a payer may depend on a number of factors, including a payer's determination that a test is appropriate, medically necessary, and cost-effective.

Since each payer makes its own decision as to whether to establish a policy or enter into a contract to cover our tests, as well as the amount it will reimburse for a test, seeking these approvals is a time-consuming and costly process. In addition, the determination by a payer to cover and the amount it will reimburse for our tests will likely be made on an indication by indication basis. To date, we have obtained policy-level reimbursement approval or contractual reimbursement for some indications for our test from many of the large commercial third-party payers in the United States, and the Centers for Medicare and Medicaid Services provides reimbursement for our multi-gene tests for hereditary breast cancer-related disorders as well as colon cancer. We believe that establishing adequate reimbursement from Medicare is an important factor in gaining adoption from healthcare providers. Our claims for reimbursement from third-party payers may be denied upon submission, and we must appeal the claims. The appeals process is time consuming and expensive, and may not result in payment. In cases where there is not a contracted rate for reimbursement, there is typically a greater co-insurance or co-payment requirement from the patient, which may result in further delay or decreased likelihood of collection.

In cases where we have established reimbursement rates with third-party payers, we face additional challenges in complying with their procedural requirements for reimbursement. These requirements may vary from payer to payer, and it may be time-consuming and require additional resources to meet these requirements. We may also experience delays in or denials of coverage if we do not adequately comply with these requirements. In addition, we have experienced, and may continue to experience delays in reimbursement when we transition to being an in-network provider with a payer.

We expect to continue to focus our resources on increasing adoption of, and expanding coverage and reimbursement for, our current tests and any future tests we may develop. If we fail to expand and maintain broad adoption of, and coverage and reimbursement for, our tests, our ability to generate revenue could be harmed and our future prospects and our business could suffer.

Our inability to raise additional capital on acceptable terms in the future may limit our ability to develop and commercialize new tests and expand our operations.

We expect capital expenditures and operating expenses to increase over the next several years as we expand our infrastructure, commercial operations and research and development activities. We believe our existing cash and cash equivalents as of December 31, 2017, revenue from the sale of our tests, and term loans available to us pursuant to the Amended 2017 Loan Agreement, will be sufficient to meet our anticipated cash requirements for our currently-planned operations for the 12-month period following the filing date of this report. We may need additional funding to finance operations prior to achieving profitability, or should we make additional acquisitions. We may seek to raise additional capital through equity offerings, debt financings, collaborations or licensing arrangements. Additional funding may not be available to us on acceptable terms, or at all. If we raise funds by issuing equity securities, dilution to our stockholders would result. Any equity securities issued also may provide for rights, preferences or privileges senior to those of holders of our common stock. The terms of debt securities issued or borrowings, if available, could impose significant restrictions on our operations. Our obligations under our Amended 2017 Loan Agreement are subject to covenants, including quarterly covenants to achieve certain volume and revenue levels as well as additional covenants, including limits on our ability to dispose of assets, undergo a change in control, merge with or acquire other entities, incur debt, incur liens, pay dividends or other distributions to holders of our capital stock, repurchase stock and make investments, in each case subject to certain exceptions. The incurrence of

additional indebtedness or the issuance of certain equity securities could result in increased fixed payment obligations and could also result in restrictive covenants, such as limitations on our ability to incur additional debt or issue additional equity, limitations on our ability to acquire or license intellectual property rights, and other operating restrictions that could adversely affect our ability to conduct our business. In addition, the issuance of additional equity securities by us, or the possibility of such issuance, may cause the market price of our common stock to decline. In the event that we enter into collaborations or licensing arrangements to raise capital, we may be required to accept unfavorable terms. These agreements may require that we relinquish or license to a third party on unfavorable terms our rights to tests we otherwise would seek to develop or commercialize ourselves, or

reserve certain opportunities for future potential arrangements when we might be able to achieve more favorable terms. If we are not able to secure additional funding when needed, we may have to delay, reduce the scope of or eliminate one or more research and development programs or selling and marketing initiatives. In addition, we may have to work with a partner on one or more aspects of our tests or market development programs, which could lower the economic value of those tests or programs to our company.

We will need to scale our infrastructure in advance of demand for our tests, and our failure to generate sufficient demand for our tests would have a negative impact on our business and our ability to attain profitability.

Our success will depend in large part on our ability to extend our market position, to provide customers with high quality test reports quickly and at a lower price than our competitors, and to achieve sufficient test volume to realize economies of scale. In order to execute our business model, we intend to continue to invest heavily in order to significantly scale our infrastructure, including our testing capacity and information systems, expand our commercial operations, customer service, billing and systems processes and enhance our internal quality assurance program. We need to continue to hire and retain sufficient numbers of skilled personnel, including software developers, geneticists, biostatisticians, certified laboratory scientists and other scientific and technical personnel to process and interpret our genetic tests. In addition, we may in the future need to expand our sales force with qualified and experienced personnel. We expect that much of this growth will be in advance of demand for our tests. Our current and future expense levels are to a large extent fixed and are largely based on our investment plans and our estimates of future revenue. Because the timing and amount of revenue from our tests is difficult to forecast, when revenue does not meet our expectations we may not be able to adjust our spending promptly or reduce our spending to levels commensurate with our revenue. Even if we are able to successfully scale our infrastructure and operations, we cannot assure you that demand for our tests will increase at levels consistent with the growth of our infrastructure. If we fail to generate demand commensurate with this growth or if we fail to scale our infrastructure sufficiently in advance of demand to successfully meet such demand, our business, prospects, financial condition and results of operations could be adversely affected.

We face intense competition, which is likely to intensify further as existing competitors devote additional resources to, and new participants enter, the market. If we cannot compete successfully, we may be unable to increase our revenue or achieve and sustain profitability.

With the development of next generation sequencing, the clinical genetics market is becoming increasingly competitive, and we expect this competition to intensify in the future. We face competition from a variety of sources, including:

- dozens of relatively specialized competitors focused on inherited clinical genetics and gene sequencing, such as Ambry Genetics, Inc., a subsidiary of Konica Minolta Inc., Athena Diagnostics, a subsidiary of Quest Diagnostics Incorporated, Baylor Genetics, Blueprint Genetics, Inc., Centogene AC, Color Genomics, Inc., Connective Tissue Gene Test LLC, Cooper Surgical, Counsyl, Inc., Eurofins Scientific, GeneDx, a subsidiary of OPKO Health, Inc., MNG Laboratories, LLC, Myriad Genetics, Inc., or Myriad, Natera, Inc., PreventionGenetics, LLC and Progenity, Inc.;
- a few large, established general testing companies with large market share and significant channel power, such as Laboratory Corporation of America Holdings and Quest Diagnostics Incorporated;
- a large number of clinical laboratories in an academic or healthcare provider setting that perform clinical genetic testing on behalf of their affiliated institutions and often sell and market more broadly; and
- a large number of new entrants into the market for genetic information ranging from informatics and analysis pipeline developers to focused, integrated providers of genetic tools and services for health and wellness including Illumina, Inc., who is also one of our suppliers.

Hospitals, academic medical centers and eventually physician practice groups and individual clinicians may also seek to perform at their own facilities the type of genetic testing we would otherwise perform for them. In this regard, continued development of equipment, reagents, and other materials as well as databases and interpretation services may enable broader direct participation in genetic testing and analysis.

Participants in closely related markets such as clinical trial or companion diagnostic testing could converge on offerings that are competitive with the type of tests we perform. Instances where potential competitors are aligned with key suppliers or are themselves suppliers could provide such potential competitors with significant advantages.

In addition, the biotechnology and genetic testing fields are intensely competitive both in terms of service and price, and continue to undergo significant consolidation, permitting larger clinical laboratory service providers to increase cost efficiencies and service levels, resulting in more intense competition.

We believe the principal competitive factors in our market are:

- breadth and depth of content;
- reliability;
- accessibility of results;
- turnaround time of testing results;
- price and quality of tests;
- coverage and reimbursement arrangements with third-party payers;
- convenience of testing;
- brand recognition of test provider;
- additional value-added services and informatics tools;
- client service; and
- quality of website content.

Many of our competitors and potential competitors have longer operating histories, larger customer bases, greater brand recognition and market penetration, higher margins on their tests, substantially greater financial, technological and research and development resources and selling and marketing capabilities, and more experience dealing with third-party payers. As a result, they may be able to respond more quickly to changes in customer requirements, devote greater resources to the development, promotion and sale of their tests than we do, or sell their tests at prices designed to win significant levels of market share. We may not be able to compete effectively against these organizations. Increased competition and cost-saving initiatives on the part of governmental entities and other third-party payers are likely to result in pricing pressures, which could harm our sales, profitability or ability to gain market share. In addition, competitors may be acquired by, receive investments from or enter into other commercial relationships with larger, well-established and well-financed companies as use of next generation sequencing for clinical diagnosis and preventative care increases. Certain of our competitors may be able to secure key inputs from vendors on more favorable terms, devote greater resources to marketing and promotional campaigns, adopt more aggressive pricing policies and devote substantially more resources to website and systems development than we can. In addition, companies or governments that control access to genetic testing through umbrella contracts or regional preferences could promote our competitors or prevent us from performing certain services. If we are unable to compete successfully against current and future competitors, we may be unable to increase market acceptance and sales of our tests, which could prevent us from increasing our revenue or achieving profitability and could cause our stock price to decline.

We may not be able to manage our future growth effectively, which could make it difficult to execute our business strategy.

Our expected future growth could create a strain on our organizational, administrative and operational infrastructure, including laboratory operations, quality control, customer service, marketing and sales, and management. We may not be able to maintain the quality of or expected turnaround times for our tests, or satisfy customer demand as it grows. We may need to continue expanding our sales force to facilitate our growth and we may have difficulties locating, recruiting, training and retaining sales personnel. Our ability to manage our growth properly will require us to continue to improve our operational, financial and management controls, as well as our reporting systems and

procedures. We plan to implement new enterprise software systems in a number of areas affecting a broad range of business processes and functional areas. The time and resources required to implement

these new systems is uncertain, and failure to complete these activities in a timely and efficient manner could adversely affect our operations. If we are unable to manage our growth effectively, it may be difficult for us to execute our business strategy and our business could be harmed. Future growth in our business could also make it difficult for us to maintain our corporate culture.

Our success will depend in part on our ability to generate sales using our internal sales team and through alternative marketing strategies.

We may not be able to market or sell our current tests and any future tests we may develop effectively enough to drive demand sufficient to support our planned growth. We currently sell our tests in the United States through our internal sales force and outside the United States with the assistance of distributors. Historically, our sales efforts have been focused primarily on hereditary cancer and our efforts to sell our tests to clinicians outside of oncology may not be successful, or may be difficult to do successfully without significant additional selling and marketing efforts and expense. We significantly increased the size of our sales force in 2017, especially late in 2017 with the integration of the sales forces from our acquired companies and the hiring of new sales personnel. Our future sales will also depend in large part on our ability to develop and substantially expand awareness of our company and our tests through alternative strategies including through education of key opinion leaders, through social media-related and online outreach, education and marketing efforts, and through focused channel partner strategies designed to drive demand for our tests. We have limited experience implementing these types of alternative marketing efforts. We may not be able to drive sufficient levels of revenue using these sales and marketing methods and strategies necessary to support our planned growth, and our failure to do so could limit our revenue and potential profitability.

Outside the United States we use distributors to assist with sales, logistics, education, and customer support. Sales practices utilized by our distributors that are locally acceptable may not comply with sales practices standards required under U.S. laws that apply to us, which could create additional compliance risk. If our sales and marketing efforts are not successful outside the United States, we may not achieve significant market acceptance for our tests outside the United States, which could adversely impact our business.

We rely on highly skilled personnel in a broad array of disciplines and, if we are unable to hire, retain or motivate these individuals, or maintain our corporate culture, we may not be able to maintain the quality of our services or grow effectively.

Our performance, including our research and development programs and laboratory operations, largely depend on our continuing ability to identify, hire, develop, motivate, and retain highly skilled personnel for all areas of our organization, including scientists, biostatisticians, technicians and software developers. Competition in our industry for qualified employees is intense, and we may not be able to attract or retain qualified personnel in the future, including scientists, biostatisticians, technicians and software developers, due to the competition for qualified personnel among life science businesses as well as universities and public and private research institutions, particularly in the San Francisco Bay Area. In addition, our compensation arrangements, such as our equity award programs, may not always be successful in attracting new employees and retaining and motivating our existing employees. If we are not able to attract and retain the necessary personnel to accomplish our business objectives, we may experience constraints that could adversely affect our ability to scale our business, support our research and development efforts and our clinical laboratory. We believe that our corporate culture fosters innovation, creativity and teamwork. However, as our organization grows, we may find it increasingly difficult to maintain the beneficial aspects of our corporate culture. This could negatively impact our ability to retain and attract employees and our future success.

If we are not able to continue to generate substantial demand of our tests, our commercial success will be negatively affected.

Our business model assumes that we will be able to generate significant test volume, and we may not succeed in continuing to drive clinical adoption of our test to achieve sufficient volumes. Inasmuch as detailed genetic data from broad-based testing panels such as our tests have only recently become available at relatively affordable prices, the continued pace and degree of clinical acceptance of the utility of such testing is uncertain. Specifically, it is uncertain how much genetic data will be accepted as necessary or useful, as well as how detailed that data should be, particularly since medical practitioners may have become accustomed to genetic testing that is specific to one or a few genes. Given the substantial amount of additional information available from a broad-based testing panel such

as ours, there may be distrust as to the reliability of such information when compared with more limited and focused genetic tests. To generate further demand for our tests, we will need to continue to make clinicians aware of the benefits of our tests, including the price, the breadth of our testing options, and the benefits of having additional genetic data available from which to make treatment decisions. Because broad-based testing panels are relatively new, it may be more difficult or take more time for us to expand clinical adoption of our assay beyond our current customer base. In addition, clinicians in other areas of medicine may not adopt genetic testing for hereditary disease as readily as it has been adopted in hereditary cancer and our efforts to sell our tests to clinicians outside of oncology may not be successful. A lack of or delay in clinical acceptance of broad-based panels such as our tests would negatively impact sales and market acceptance of our tests and limit our revenue growth and potential profitability. Genetic testing is expensive and many potential customers may be sensitive to pricing. In addition, potential customers may not adopt our tests if adequate reimbursement is not available, or if we are not able to maintain low prices relative to our competitors. If we are not able to generate demand for our tests at sufficient volume, or if it takes significantly more time to generate this demand than we anticipate, our business, prospects, financial condition and results of operations could be materially harmed.

Our success will depend on our ability to use rapidly changing genetic data to interpret test results accurately and consistently, and our failure to do so would have an adverse effect on our operating results and business, harm our reputation and could result in substantial liabilities that exceed our resources.

Our success depends on our ability to provide reliable, high-quality tests that incorporate rapidly evolving information about the role of genes and gene variants in disease and clinically relevant outcomes associated with those variants. Errors, such as failure to detect genomic variants with high accuracy, or mistakes, such as failure to identify, or incompletely or incorrectly identifying, gene variants or their significance, could have a significant adverse impact on our business.

In August 2017, a client reported a discrepancy between an Invitae test report and a test report issued by another laboratory for the presence of a single rare variant in the MSH2 gene known as the Boland inversion. This gene is associated with Lynch syndrome, which is a familial cancer syndrome that significantly increases the risk of colorectal and other cancers. Our assay had reliably detected the Boland inversion event since its first validation. However, during the implementation of an update to the assay, we omitted the components designed specifically to identify the Boland inversion event. As soon as we learned of the error, we quickly rectified it and implemented three new quality checks designed to ensure this type of error does not happen again. We notified all potential patients impacted by this incident and reanalyzed our previous test results to ensure their accuracy. Less than 10 patients were affected by this incident.

Hundreds of genes can be implicated in some disorders, and overlapping networks of genes and symptoms can be implicated in multiple conditions. As a result, a substantial amount of judgment is required in order to interpret testing results for an individual patient and to develop an appropriate patient report. We classify variants in accordance with published guidelines as benign, likely benign, variants of uncertain significance, likely pathogenic or pathogenic, and these guidelines are subject to change. In addition, it is our practice to offer support to clinicians and geneticists ordering our tests regarding which genes or panels to order as well as interpretation of genetic variants. We also rely on clinicians to interpret what we report and to incorporate specific information about an individual patient into the physician’s treatment decision.

The marketing, sale and use of our genetic tests could subject us to liability for errors in, misunderstandings of, or inappropriate reliance on, information we provide to clinicians or geneticists, and lead to claims against us if someone were to allege that a test failed to perform as it was designed, if we failed to correctly interpret the test results, or if the ordering physician were to misinterpret test results or improperly rely on them when making a clinical decision. A product liability or professional liability claim could result in substantial damages and be costly and time-consuming for us to defend. Although we maintain liability insurance, including for errors and omissions, we cannot assure you that such insurance would fully protect us from the financial impact of defending against these types of claims or any

judgments, fines or settlement costs arising out of any such claims. Any liability claim, including an errors and omissions liability claim, brought against us, with or without merit, could increase our insurance rates or prevent us from securing insurance coverage in the future. Additionally, any liability lawsuit could cause injury to our reputation or cause us to suspend sales of our tests. The occurrence of any of these events could have an adverse effect on our, reputation and results of operations.

Our industry is subject to rapidly changing technology and new and increasing amounts of scientific data related to genes and genetic variants and their role in disease. Our failure to develop tests to keep pace with these changes could make us obsolete.

In recent years, there have been numerous advances in methods used to analyze very large amounts of genomic information and the role of genetics and gene variants in disease and treatment therapies. Our industry has and will continue to be characterized by rapid technological change, increasingly larger amounts of data, frequent new testing service introductions and evolving industry standards, all of which could make our tests obsolete. Our future success will also depend on our ability to keep pace with the evolving needs of our customers on a timely and cost-effective basis and to pursue new market opportunities that develop as a result of technological and scientific advances. Our tests could become obsolete unless we continually update our offerings to reflect new scientific knowledge about genes and genetic variations and their role in diseases and treatment therapies.

Security breaches, loss of data and other disruptions could compromise sensitive information related to our business or prevent us from accessing critical information and expose us to liability, which could adversely affect our business and our reputation.

In the ordinary course of our business, we collect and store sensitive data, including protected health information, personally identifiable information, intellectual property and proprietary business information owned or controlled by ourselves or our customers, payers, and other parties. We manage and maintain our applications and data utilizing a combination of on-site systems, managed data center systems, and cloud-based data center systems. We also communicate sensitive patient data through our Invitae Family History Tool, Patient Insights Network, or PIN, and CancerGene Connect platform. In addition to storing and transmitting sensitive personal information that is subject to myriad legal protections, these applications and data encompass a wide variety of business-critical information including research and development information, commercial information, and business and financial information. We face a number of risks relative to protecting this critical information, including loss of access risk, inappropriate disclosure, inappropriate modification, and the risk of our being unable to adequately monitor and modify our controls over our critical information. Any technical problems that may arise in connection with our data and systems, including those that are hosted by third-party providers, could result in interruptions in our business and operations. These types of problems may be caused by a variety of factors, including infrastructure changes, human or software errors, viruses, security attacks, fraud, spikes in customer usage and denial of service issues. From time to time, large third-party web hosting providers have experienced outages or other problems that have resulted in their systems being offline and inaccessible. Such outages could materially impact our business and operations.

The secure processing, storage, maintenance and transmission of this critical information are vital to our operations and business strategy, and we devote significant resources to protecting such information. Although we take what we believe to be reasonable and appropriate measures to protect sensitive information from unauthorized access or disclosure, our information technology and infrastructure may be vulnerable to attacks by hackers or viruses or breached due to employee error, malfeasance, or other disruptions. Any such breach or interruption could compromise our networks and the information stored there could be accessed by unauthorized parties, altered, publicly disclosed, lost, or stolen. Any such access, disclosure or other loss of information could result in legal claims or proceedings, liability under federal or state laws that protect the privacy of personal information, such as but not limited to the Health Insurance Portability and Accountability Act of 1996, or HIPAA, the Health Information Technology for Economic and Clinical Heath Act, or HITECH, state data security and data breach notification laws, and related regulatory penalties. Although we have implemented security measures and a formal, dedicated enterprise security program to prevent unauthorized access to patient data, our Invitae Family History Tool, PIN and CancerGene Connect platform are currently accessible through our online portal and/or through our mobile applications, and there is no guarantee we can protect our online portal or our mobile applications from breach. Unauthorized access, loss or dissemination could also disrupt our operations (including our ability to conduct our analyses, provide test results, bill payers or patients, process claims and appeals, provide customer assistance, conduct research and development activities, collect, process, and prepare company financial information, provide information about our tests and other

patient and physician education and outreach efforts through our website, and manage the administrative aspects of our business) and damage our reputation, any of which could adversely affect our business.

In addition to security risks, we also face privacy risks. While we have policies that govern our privacy practices and procedures that aim to keep our practices consistent with such policies, such procedures are not

invulnerable to human error. Should we inadvertently break the privacy promises we make to patients or consumers, we could receive a complaint from an affected individual or interested privacy regulator, such as the FTC or a state Attorney General. This risk is heightened given the sensitivity of the data we collect.

Penalties for failure to comply with a requirement of HIPAA and HITECH vary significantly, and include civil monetary penalties of up to $1.5 million per calendar year for each provision of HIPAA that is violated. A person who knowingly obtains or discloses individually identifiable health information in violation of HIPAA may face a criminal penalty of up to $50,000 and up to one-year imprisonment. The criminal penalties increase if the wrongful conduct involves false pretenses or the intent to sell, transfer, or use identifiable health information for commercial advantage, personal gain, or malicious harm. Penalties for unfair or deceptive acts or practices under the FTC Act or state UDAP statutes may also vary significantly.

There has been unprecedented activity in the development of data protection regulation around the world. As a result, the interpretation and application of consumer, health-related, and data protection laws in the United States, Europe and elsewhere are often uncertain, contradictory, and in flux. For example, the European Union’s forthcoming General Data Protection Regulation, or GDPR, takes effect in May 2018. While the text of the GDPR has been published, the European authorities have only begun to issue guidance and interpretations of the text, leaving companies in and outside of Europe to interpret the majority of the GDPR on their own. With this new EU law and many others all over the world, it is possible that laws may be interpreted and applied in a manner that is inconsistent with our practices. If so, this could result in government-imposed fines or orders requiring that we change our practices, which could adversely affect our business. In addition, these privacy regulations may differ from country to country, and may vary based on whether testing is performed in the United States or in the local country. Complying with these various laws could cause us to incur substantial costs or require us to change our business practices and compliance procedures in a manner adverse to our business. We can provide no assurance that we are or will remain in compliance with diverse privacy and security requirements in all of the jurisdictions in which we do business. Failure to comply with privacy and security requirements could result in civil or criminal penalties, which could have a material adverse effect on our business.

We rely on a limited number of suppliers or, in some cases, sole suppliers, for some of our laboratory instruments and materials, and we may not be able to find replacements or immediately transition to alternative suppliers.

We rely on a limited number of suppliers, or, in some cases, sole suppliers, including Illumina, Inc., Integrated DNA Technologies Incorporated, Qiagen N.V., Roche Holdings Ltd., and Twist Bioscience Corporation for certain laboratory substances used in the chemical reactions incorporated into our processes, which we refer to as reagents, as well as sequencers and other equipment and materials which we use in our laboratory operations. We do not have any short- or long-term agreements with our suppliers, and our suppliers could cease supplying these materials and equipment at any time, or fail to provide us with sufficient quantities of materials or materials that meet our specifications. Our laboratory operations could be interrupted if we encounter delays or difficulties in securing these reagents, sequencers or other equipment or materials, and if we cannot obtain an acceptable substitute. Any such interruption could significantly affect our business, financial condition, results of operations and reputation. We rely on Illumina as the sole supplier of next generation sequencers and associated reagents and as the sole provider of maintenance and repair services for these sequencers. Any disruption in Illumina’s operations could impact our supply chain and laboratory operations as well as our ability to conduct our tests, and it could take a substantial amount of time to integrate replacement equipment into our laboratory operations.

We believe that there are only a few other manufacturers that are currently capable of supplying and servicing the equipment necessary for our laboratory operations, including sequencers and various associated reagents. The use of equipment or materials provided by these replacement suppliers would require us to alter our laboratory operations. Transitioning to a new supplier would be time consuming and expensive, may result in interruptions in our laboratory operations, could affect the performance specifications of our laboratory operations or could require that we revalidate our tests. We cannot assure you that we will be able to secure alternative equipment, reagents and other materials, and

bring such equipment, reagents and materials on line and revalidate them without experiencing interruptions in our workflow. In the case of an alternative supplier for Illumina, we cannot assure you that replacement sequencers and associated reagents will be available or will meet our quality control and performance requirements for our laboratory operations. If we encounter delays or difficulties in securing, reconfiguring or revalidating the equipment and reagents we require for our tests, our business, financial condition, results of operations and reputation could be adverse affected.

If our laboratories in California and Massachusetts become inoperable due to disasters or for any other reason, we will be unable to perform our tests and our business will be harmed.

We perform all of our tests at our production facilities in San Francisco, California, Irvine, California and Cambridge, Massachusetts. Our laboratories and the equipment we use to perform our tests would be costly to replace and could require substantial lead time to replace and qualify for use. Our laboratories may be harmed or rendered inoperable by natural or man-made disasters, including earthquakes, flooding, fire and power outages, which may render it difficult or impossible for us to perform our tests for some period of time. The inability to perform our tests or the backlog that could develop if our laboratories are inoperable for even a short period of time may result in the loss of customers or harm our reputation. Although we maintain insurance for damage to our property and the disruption of our business, this insurance may not be sufficient to cover all of our potential losses and may not continue to be available to us on acceptable terms, if at all.

The loss of any member or change in structure of our senior management team could adversely affect our business.

Our success depends in large part upon the skills, experience and performance of members of our executive management team and others in key leadership positions. The efforts of these persons will be critical to us as we continue to develop our technologies and test processes and focus on scaling our business. If we were to lose one or more key executives, we may experience difficulties in competing effectively, developing our technologies and implementing our business strategy. All of our executives and employees are at-will, which means that either we or the executive or employee may terminate their employment at any time. We do not carry key man insurance for any of our executives or employees. In addition, we do not have a long-term retention agreement in place with our president and chief executive officer. In early 2017, we announced that our former chief executive officer and chairman of the board was appointed executive chairman and our former president and chief operating officer was appointed president and chief executive officer. In March 2018, our executive chairman ceased to be an employee, but continues to serve as chairman of the board. We may experience difficulties as our organization continues to adapt to this new leadership structure.

Development of new tests is a complex process, and we may be unable to commercialize new tests on a timely basis, or at all.

We cannot assure you that we will be able to develop and commercialize new tests on a timely basis. Before we can commercialize any new tests, we will need to expend significant funds in order to:

- conduct research and development;
- further develop and scale our laboratory processes; and
- further develop and scale our infrastructure to be able to analyze increasingly larger and more diverse amounts of data.

Our testing service development process involves risk, and development efforts may fail for many reasons, including:

- failure of any test to perform as expected;
- lack of validation or reference data; or
- failure to demonstrate utility of a test.

As we develop tests, we will have to make significant investments in development, marketing and selling resources. In addition, competitors may develop and commercialize competing tests faster than we are able to do so.

We depend on our information technology systems, and any failure of these systems could harm our business.

We depend on information technology and telecommunications systems for significant elements of our operations, including our laboratory information management system, our bioinformatics analytical software systems, our database of information relating to genetic variations and their role in disease process and drug metabolism, our clinical report optimization systems, our customer-facing web-based software, our customer

reporting, our Patient Insights Networks, or PINs, and our family history and risk assessment tools. We have installed, and expect to expand, a number of enterprise software systems that affect a broad range of business processes and functional areas, including for example, systems handling human resources, financial controls and reporting, customer relationship management, regulatory compliance, and other infrastructure operations. In addition, we intend to extend the capabilities of both our preventative and detective security controls by augmenting the monitoring and alerting functions, the network design, and the automatic countermeasure operations of our technical systems. These information technology and telecommunications systems support a variety of functions, including laboratory operations, test validation, sample tracking, quality control, customer service support, billing and reimbursement, research and development activities, scientific and medical curation, and general administrative activities, including financial reporting.

Information technology and telecommunications systems are vulnerable to damage from a variety of sources, including telecommunications or network failures, malicious human acts and natural disasters. Moreover, despite network security and back-up measures, some of our servers are potentially vulnerable to physical or electronic break-ins, computer viruses, and similar disruptive problems. Despite the precautionary measures we have taken to prevent unanticipated problems that could affect our information technology and telecommunications systems, failures or significant downtime of our information technology or telecommunications systems or those used by our third-party service providers could prevent us from conducting tests, preparing and providing reports to clinicians, billing payers, processing reimbursement appeals, handling physician or patient inquiries, conducting research and development activities, and managing the administrative and financial aspects of our business. Any disruption or loss of information technology or telecommunications systems on which critical aspects of our operations depend could have an adverse effect on our business.

Any technical problems that may arise in connection with our data and systems, including those that are hosted by third-party providers, could result in interruptions in our business and operations. These types of problems may be caused by a variety of factors, including infrastructure changes, human or software errors, viruses, security attacks, fraud, spikes in customer usage and denial of service issues. From time to time, large third-party web hosting providers have experienced outages or other problems that have resulted in their systems being offline and inaccessible. Such outages could materially impact our business and operations.

Ethical, legal and social concerns related to the use of genetic information could reduce demand for our tests.

Genetic testing has raised ethical, legal, and social issues regarding privacy and the appropriate uses of the resulting information. Governmental authorities could, for social or other purposes, limit or regulate the use of genetic information or genetic testing or prohibit testing for genetic predisposition to certain conditions, particularly for those that have no known cure. Similarly, these concerns may lead patients to refuse to use, or clinicians to be reluctant to order, genomic tests even if permissible. These and other ethical, legal and social concerns may limit market acceptance of our tests or reduce the potential markets for our tests, either of which could have an adverse effect on our business, financial condition, or results of operations.

Our international business exposes us to business, regulatory, political, operational, financial, and economic risks associated with doing business outside of the United States.

We currently have distribution arrangements in several countries outside of the United States. Doing business internationally involves a number of risks, including:

- multiple, conflicting and changing laws and regulations such as privacy regulations, tax laws, export and import restrictions, employment laws, regulatory requirements, and other governmental approvals, permits and licenses;
- failure by us or our distributors to obtain regulatory approvals for the use of our tests in various countries;
- complexities and difficulties in obtaining protection and enforcing our intellectual property;
- difficulties in staffing and managing foreign operations;

- complexities associated with managing multiple payer reimbursement regimes, government payers, or patient self-pay systems;

- logistics and regulations associated with shipping samples, including infrastructure conditions and transportation delays;
- limits on our ability to penetrate international markets if we do not to conduct our tests locally;
- natural disasters, political and economic instability, including wars, terrorism, and political unrest, outbreak of disease, boycotts, curtailment of trade and other business restrictions; and
- regulatory and compliance risks that relate to maintaining accurate information and control over activities that may fall within the purview of the U.S. Foreign Corrupt Practices Act, or FCPA, its books and records provisions, or its anti-bribery provisions.

Any of these factors could significantly harm our international operations and, consequently, our revenue and results of operations.

In addition, applicable export or import laws and regulations such as prohibitions on the export of samples imposed by countries outside of the United States, or international privacy or data restrictions that are different or more stringent than those of the United States, may require that we build additional laboratories or engage in joint ventures or other business partnerships in order to offer our tests internationally in the future. Any such restrictions would impair our ability to offer our tests in such countries and could have an adverse effect on our business, financial condition and results of operations.

Changes in U.S. tax laws could adversely impact us.

On December 22, 2017, President Trump signed The Tax Cuts and Jobs Act (the "Tax Act") into law. The Tax Act contains significant changes to U.S. federal corporate income taxation, including reduction of the corporate tax rate from 35% to 21% for U.S. taxable income, resulting in a one-time remeasurement of deferred taxes to reflect their value at a lower tax rate of 21%, limitation of the deduction for net operating losses to 80% of current year taxable income and elimination of net operating loss carrybacks, deemed repatriation, resulting in one-time taxation of offshore earnings at reduced rates, elimination of U.S. tax on foreign earnings (subject to certain exceptions), and immediate deductions for certain new investments instead of deductions for depreciation expense over time. Although the Tax Act is generally effective January 1, 2018, GAAP requires recognition of the tax effects of new legislation during the reporting period that includes the enactment date, which was December 22, 2017. As a result of the lower corporate tax rate enacted as part of the Tax Act, we recorded a provisional estimate to reduce deferred tax assets by $48.8 million. The reduction in deferred tax assets was offset by a corresponding reduction in our valuation allowance resulting in no net impact to tax expense. We have determined that the adjustment to the deferred tax assets and valuation allowance recorded in connection with the remeasurement of certain deferred tax assets and liabilities is a reasonable estimate at December 31, 2017. Any subsequent adjustment to these amounts will be adjusted accordingly in the quarter of 2018 when the analysis is complete. Any such adjustment could adversely affect our tax positions, tax rate, or results of operations.

Impairment in the value of our goodwill or other intangible assets could have a material adverse effect on our operating results and financial condition.

We record goodwill and intangible assets at fair value upon the acquisition of a business. Goodwill represents the excess of amounts paid for acquiring businesses over the fair value of the net assets acquired. Goodwill and indefinite-lived intangible assets are evaluated for impairment annually, or more frequently if conditions warrant, by comparing the carrying value of a reporting unit to its estimated fair value. Intangible assets with definite lives are reviewed for impairment when events or circumstances indicate that their carrying value may not be recoverable. Declines in operating results, divestitures, sustained market declines and other factors that impact the fair value of a reporting unit could result in an impairment of goodwill or intangible assets and, in turn, a charge to net income. Any such charges could have a material adverse effect on our results of operations or financial condition.

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Risks related to government regulation

If the FDA regulates our tests as medical devices, we could incur substantial costs and our business, financial condition, and results of operations could be adversely affected.

We provide our tests as laboratory-developed tests, or LDTs. The Centers for Medicare and Medicaid Services, or CMS, and certain state agencies regulate the performance of LDTs (as authorized by the Clinical Laboratory Improvement Amendments of 1988, or CLIA, and state law, respectively).

Historically, the U.S. Food and Drug Administration, or FDA, has exercised enforcement discretion with respect to most LDTs and has not required laboratories that furnish LDTs to comply with the agency's requirements for medical devices (e.g., establishment registration, device listing, quality systems regulations, premarket clearance or premarket approval, and post-market controls). In recent years, however, the FDA has stated it intends to end its policy of general enforcement discretion and regulate certain LDTs as medical devices. To this end, on October 3, 2014, the FDA issued two draft guidance documents, entitled "Framework for Regulatory Oversight of Laboratory Developed Tests (LDTs)" and "FDA Notification and Medical Device Reporting for Laboratory Developed Tests (LDTs)", respectively, that set forth a proposed risk-based regulatory framework that would apply varying levels of FDA oversight to LDTs. Subsequently, on January 13, 2017, the FDA published a "discussion paper" in which it outlined a substantially revised "possible approach" to the oversight of LDTs. In March 2017, a draft bill titled "The Diagnostics Accuracy and Innovation Act" was released for discussion. The draft bill proposes a risk-based approach to regulate LDTs and creates a new in vitro clinical test category of regulated products, which includes LDTs, and a regulatory structure under the FDA. As proposed, the draft bill grandfathers many existing tests and phases in FDA oversight over a period of years (e.g., companies would have two years from the date the FDA promulgates final implementing regulations before such regulations became effective). We cannot predict if this draft bill will be enacted in its current (or any other) form and cannot quantify the effect of this draft bill on our business.

Legislative proposals addressing the FDA's oversight of LDTs have been introduced in previous Congresses, and we expect that new legislative proposals will be introduced from time-to-time. The likelihood that Congress will pass such legislation and the extent to which such legislation may affect the FDA's plans to regulate certain LDTs as medical devices is difficult to predict at this time.

If the FDA ultimately regulates certain LDTs as medical devices, whether via individualized enforcement action, or more generally, as outlined in final guidance or final regulation, or as instructed by Congress, our tests may be subject to certain additional regulatory requirements. Complying with the FDA's requirements for medical devices can be expensive, time-consuming, and subject us to significant or unanticipated delays. Insofar as we may be required to obtain premarket clearance or approval to perform or continue performing an LDT, we cannot assure you that we will be able to obtain such authorization. Even if we obtain regulatory clearance or approval where required, such authorization may not be for the intended uses that we believe are commercially attractive or are critical to the commercial success of our tests. As a result, the application of the FDA's medical device requirements to our tests could materially and adversely affect our business, financial condition, and results of operations.

Failure to comply with applicable FDA regulatory requirements may trigger a range of enforcement actions by the FDA including warning letters, civil monetary penalties, injunctions, criminal prosecution, recall or seizure, operating restrictions, partial suspension or total shutdown of operations, and denial of or challenges to applications for clearance or approval, as well as significant adverse publicity.

In addition, in November 2013, the FDA issued final guidance regarding the distribution of products labeled for research use only. Certain of the reagents and other products we use in our tests are labeled as research use only products. Certain of our suppliers may cease selling research use only products to us and any failure to obtain an acceptable substitute could significantly and adversely affect our business, financial condition and results of operations.

If we fail to comply with federal, state and foreign laboratory licensing requirements, we could lose the ability to perform our tests or experience disruptions to our business.

We are subject to CLIA, a federal law that regulates clinical laboratories that perform testing on specimens derived from humans for the purpose of providing information for the diagnosis, prevention, or treatment of disease. CLIA regulations establish specific standards with respect to personnel qualifications, facility administration, proficiency testing, quality control, quality assurance, and inspections. CLIA certification is also required in order

for us to be eligible to bill state and federal healthcare programs, as well as many private third-party payers, for our tests. We have current CLIA certifications to conduct our tests at our laboratories in San Francisco and Irvine, California and Cambridge, Massachusetts. To renew these certifications, we are subject to survey and inspection every two years. Moreover, CLIA inspectors may make random inspections of our clinical reference laboratories.

We are also required to maintain licenses to conduct testing in California. California laws establish standards for day-to-day operation of our clinical reference laboratories in San Francisco and Irvine, including the training and skills required of personnel and quality control. We also maintain a Massachusetts clinical laboratory license to conduct testing at our laboratory in Cambridge, Massachusetts. We also maintain out-of-state laboratory licenses to conduct testing on specimens from Florida, Maryland, New York, Pennsylvania and Rhode Island, as well as California with respect to our laboratory in Cambridge.

In addition to having laboratory licenses in New York, our clinical reference laboratories are approved on test-specific bases by the New York State Department of Health, or NYDOH. Other states may adopt similar licensure requirements in the future, which may require us to modify, delay or stop our operations in such jurisdictions. We may also be subject to regulation in foreign jurisdictions as we seek to expand international utilization of our tests or such jurisdictions adopt new licensure requirements, which may require review of our tests in order to offer them or may have other limitations such as restrictions on the transport of samples necessary for us to perform our tests that may limit our ability to make our tests available outside of the United States. Complying with licensure requirements in new jurisdictions may be expensive, time-consuming, and subject us to significant and unanticipated delays.

Failure to comply with applicable clinical laboratory licensure requirements may result in a range of enforcement actions, including license suspension, limitation, or revocation, directed plan of action, onsite monitoring, civil monetary penalties, criminal sanctions, and cancellation of the laboratory's approval to receive Medicare and Medicaid payment for its services, as well as significant adverse publicity. Any sanction imposed under CLIA, its implementing regulations, or state or foreign laws or regulations governing clinical laboratory licensure, or our failure to renew our CLIA certificate, a state or foreign license, or accreditation, could have a material adverse effect on our business, financial condition and results of operations. Even if we were able to bring our laboratory back into compliance, we could incur significant expenses and potentially lose revenue in doing so.

The College of American Pathologists, or CAP, maintains a clinical laboratory accreditation program. CAP asserts that its program is "designed to go well beyond regulatory compliance" and helps laboratories achieve the highest standards of excellence to positively impact patient care. While not required to operate a CLIA-certified laboratory, many private insurers require CAP accreditation as a condition to contracting with clinical laboratories to cover their tests. In addition, some countries outside the United States require CAP accreditation as a condition to permitting clinical laboratories to test samples taken from their citizens. We have CAP accreditations for our San Francisco and Cambridge laboratories. Failure to maintain CAP accreditation could have a material adverse effect on the sales of our tests and the results of our operations.

Complying with numerous statutes and regulations pertaining to our business is an expensive and time-consuming process, and any failure to comply could result in substantial penalties.

Our operations are subject to other extensive federal, state, local and foreign laws and regulations, all of which are subject to change. These laws and regulations currently include, among others:

- HIPAA, which established comprehensive federal standards with respect to the privacy and security of protected health information and requirements for the use of certain standardized electronic transactions;
- amendments to HIPAA under HITECH, which strengthen and expand HIPAA privacy and security compliance requirements, increase penalties for violators and expand vicarious liability, extend enforcement authority to state attorneys general, and impose requirements for breach notification;
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the federal Anti-Kickback Statute, which prohibits knowingly and willfully offering, paying, soliciting, or receiving remuneration, directly or indirectly, overtly or covertly, in cash or in kind, to induce or in return for the referral of an individual, for the furnishing of or arrangement for the furnishing of any item or service for which payment may be made in whole or in part by a federal healthcare program, or the purchasing, leasing, ordering, arranging for, or recommend purchasing, leasing or ordering, any good, facility, item or service for which payment may be made, in whole or in part, under a federal healthcare program;

- the federal physician self-referral law, known as the Stark Law, which prohibits a physician from making a referral to an entity for certain designated health services covered by the Medicare program, including laboratory and pathology services, if the physician or an immediate family member has a financial relationship with the entity unless an exception applies, and prohibits an entity from billing for designated health services furnished pursuant to a prohibited referral;
- the federal false claims laws, which impose liability on any person or entity that, among other things, knowingly presents, or causes to be presented, a false or fraudulent claim for payment to the federal government;
- the federal Civil Monetary Penalties Law, which prohibits, among other things, the offering or transfer of remuneration to a Medicare or state healthcare program beneficiary if the person knows or should know it is likely to influence the beneficiary's selection of a particular provider, practitioner, or supplier of services reimbursable by Medicare or a state healthcare program, unless an exception applies;
- the HIPAA fraud and abuse provisions, which created new federal criminal statutes that prohibit, among other things, defrauding health care benefit programs, willfully obstructing a criminal investigation of a healthcare offense and falsifying or concealing a material fact or making any materially false statements in connection with the payment for healthcare benefits, items or services;
- other federal and state fraud and abuse laws, such as anti-kickback laws, prohibitions on self-referral, fee-splitting restrictions, insurance fraud laws, anti-markup laws, prohibitions on the provision of tests at no or discounted cost to induce physician or patient adoption, and false claims acts, which may extend to services reimbursable by any third-party payer, including private insurers;
- the prohibition on reassignment of Medicare claims, which, subject to certain exceptions, precludes the reassignment of Medicare claims to any other party;
- state laws that prohibit other specified practices, such as billing clinicians for testing that they order; waiving coinsurance, copayments, deductibles, and other amounts owed by patients; billing a state Medicaid program at a price that is higher than what is charged to one or more other payers; and
- similar foreign laws and regulations that apply to us in the countries in which we operate or may operate in the future.

We have adopted policies and procedures designed to comply with these laws and regulations. In the ordinary course of our business, we conduct internal reviews of our compliance with these laws. Our compliance is also subject to governmental review. The growth of our business and our expansion outside of the United States may increase the potential of violating these laws or our internal policies and procedures. The risk of our being found in violation of these or other laws and regulations is further increased by the fact that many have not been fully interpreted by the regulatory authorities or the courts, and their provisions are open to a variety of interpretations. Any action brought against us for violation of these or other laws or regulations, even if we successfully defend against it, could cause us to incur significant legal expenses and divert our management's attention from the operation of our business. If our operations are found to be in violation of any of these laws and regulations, we may be subject to any applicable penalty associated with the violation, including administrative, civil and criminal penalties, damages, fines, individual imprisonment, exclusion from participation in Federal healthcare programs, refunding of payments received by us, and curtailment or cessation of our operations. Any of the foregoing consequences could seriously harm our business and our financial results.

Healthcare policy changes, including legislation reforming the U.S. healthcare system, may have a material adverse effect on our financial condition, results of operations and cash flows.

In March 2010, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, collectively referred to as the Affordable Care Act, was enacted in the United States, which made a number of substantial changes in the way healthcare is financed by both governmental and private insurers. Among other things, the Affordable Care Act requires each medical device manufacturer to pay a sales tax equal to 2.3% of the price for which such manufacturer sells its medical devices, and applied to sales of taxable medical devices from January 1, 2013 through December 31, 2015. The medical device tax has been suspended for 2016 through 2019, but is scheduled to return beginning in 2020. It is unclear at this time when, or if, the provision of our LDTs will trigger the medical device tax if the FDA ends its policy of general enforcement discretion and regulates certain LDTs as

medical devices. It is possible, however, that this tax will apply to some or all of our tests or tests that are in development.

Many of the Current Procedure Terminology, or CPT, procedure codes that we use to bill our tests were revised by the American Medical Association, effective January 1, 2013. Moreover, effective January 1, 2015, the AMA released several new codes to report genomic sequencing procedures. In a final determination under the Medicare Clinical Laboratory Fee Schedule, or CLFS, published in November 2014, CMS set the 2015 payment rate for these codes by the gap-fill process. Under the gap-fill process, local Medicare Administrative Contractors, or MACs, establish rates for those codes that each MAC believes meet the criteria for Medicare coverage and considering laboratory charges and discounts to charges, resources, amounts paid by other payers for the tests, and amounts paid by the MAC for similar tests. In 2015, gap-filled payment rates were established for some, but not all, of the above-described codes. For those codes for which local gap-filled rate(s) were established in 2015, a national limitation amount for Medicare was established for 2016. Codes for which local gap-filled rates were not established in 2015 were priced by the local MACs in 2016 insofar as an individual MAC determines that such codes should be covered. Where available, the national limitation amount serves as a cap on the Medicare and Medicaid payment rates for a test procedure.

The AMA also released several CPT codes effective January 1, 2016 that may be appropriate to report certain of our tests. In a November 2015 final determination, CMS set the calendar year 2016 CLFS payment rate for these new codes by the gap-fill process. CMS and the local MACs went through the gap-fill process in 2016 and announced final gap-filled rates for 2017 on September 30, 2016. The calendar year 2017 national limitation amounts for certain codes were significantly less than the rates at which we have historically offered our tests.

In April 2014, Congress passed the Protecting Access to Medicare Act of 2014, or PAMA, which included substantial changes to the way in which clinical laboratory services will be paid under Medicare. Under the final rule that implements PAMA, which was promulgated by CMS in June 2016, clinical laboratories must report to CMS private payer rates beginning in 2017 and every three years thereafter for clinical diagnostic laboratory tests that are not advanced diagnostic laboratory tests and every year for advanced diagnostic laboratory tests.

We do not believe that our tests meet the definition of advanced diagnostic laboratory tests, but in the event that we seek designation for one or more of our tests as an advanced diagnostic laboratory test and the tests are determined by CMS to meet these criteria or new criteria developed by CMS, we would be required to report private payer data for those tests annually. Otherwise, we will be required to report private payer rates for our tests on an every three years basis. Laboratories that fail to timely report the required payment information may be subject to substantial civil money penalties.

As set forth in the PAMA final rule, for tests furnished on or after January 1, 2018, Medicare payments for clinical diagnostic laboratory tests will be paid based upon these reported private payer rates. For clinical diagnostic laboratory tests that are assigned a new or substantially revised code, initial payment rates for clinical diagnostic laboratory tests that are not advanced diagnostic laboratory tests will be assigned by the cross-walk or gap-fill methodology, similar to prior law. Initial payment rates for new advanced diagnostic laboratory tests will be based on the actual list charge for the laboratory test. In April 2016, we announced that CMS had begun providing payments for our multi-gene tests for hereditary breast cancer-related disorders at an interim payment per test of $622.53. On October 3, 2016, we announced that CMS had priced our multi-gene tests for hereditary breast cancer-related disorders at $925.00 per test. The 2017 CLFS National Limitation Amount, or NLA, for this test was set at $931.47.

In November 2017, CMS posted a “final” file that summarized the 2018 CLFS payment rates calculated under the PAMA final rule. This file indicates that the median of private payer rates reported to Medicare for the code used to report our multi-gene test for hereditary breast cancer-related disorders was $136.47. The PAMA final rule caps the annual reduction in the calendar year 2018, 2019, and 2020 CLFS payment rates for any test to 10% of the previous year’s rates, so the proposed CLFS payment rate for this test will be substantially higher than the median for at least the next three years (i.e., $838.33 in 2018, $754.50 in 2019, and $679.05 in 2020). The PAMA final rule also caps the annual percentage reduction in 2021, 2022 and 2023 rates to 15% of the previous year’s rate, further phasing-in any reduction required calculated using data reported during 2020. Nevertheless, we expect to experience 10% decreases in Medicare reimbursement per test per year for at least the next three years.

PAMA also authorized the adoption of new, temporary billing codes and/or unique test identifiers for FDA-cleared or approved tests as well as advanced diagnostic laboratory tests. The CPT® Editorial Panel approved a proposal to create a new section of billing codes to facilitate implementation of this section of PAMA, but it is unclear how these codes would apply to our tests.

In November 2017, CMS published a draft national coverage determination, or NCD, for next generation sequencing, or NGS, tests for patients with advanced cancer, under which CMS proposed to provide full coverage for FDA-approved tests performed in patients that fall within the test's FDA-approved labeling, but proposed significant limits on coverage for NGS-based tests offered as LDTs. It is unclear whether CMS will finalize the NCD as proposed. While we do not believe the draft NCD was intended to apply to our tests, it could arguably be interpreted to apply to such tests. If CMS issues a final NCD that applies to our tests and is substantively similar to the draft NCD, our current and future tests may effectively be non-covered under Medicare unless and until we obtain FDA clearance or approval (as applicable).

We cannot predict whether future healthcare initiatives will be implemented at the federal or state level, or how any future legislation or regulation may affect us. For instance, the payment reductions imposed by the Affordable Care Act and the expansion of the federal and state governments' role in the U.S. healthcare industry as well as changes to the reimbursement amounts paid by payers for our tests and future tests or our medical procedure volumes may reduce our profits and have a materially adverse effect on our business, financial condition, results of operations, and cash flows. Notably, Congress enacted legislation in 2017 that eliminates the Affordable Care Act's "individual mandate" beginning in 2019, which may significantly impact the number of covered lives participating in exchange plans. Moreover, Congress has proposed on several occasions to impose a 20% coinsurance on patients for clinical laboratory tests reimbursed under the clinical laboratory fee schedule, which would increase our billing and collecting costs and decrease our revenue.

If we use hazardous materials in a manner that causes injury, we could be liable for resulting damages.

Our activities currently require the use of hazardous chemicals and biological material. We cannot eliminate the risk of accidental contamination or injury to employees or third parties from the use, storage, handling, or disposal of these materials. In the event of contamination or injury, we could be held liable for any resulting damages, and any liability could exceed our resources or any applicable insurance coverage we may have. Additionally, we are subject on an ongoing basis to federal, state, and local laws and regulations governing the use, storage, handling and disposal of these materials and specified waste products. The cost of compliance with these laws and regulations may become significant, and our failure to comply may result in substantial fines or other consequences, and either could negatively affect our operating results.

We could be adversely affected by violations of the FCPA and other worldwide anti-bribery laws.

We are subject to the FCPA, which prohibits companies and their intermediaries from making payments in violation of law to non-U.S. government officials for the purpose of obtaining or retaining business or securing any other improper advantage. Our reliance on independent distributors to sell our tests internationally demands a high degree of vigilance in maintaining our policy against participation in corrupt activity, because these distributors could be deemed to be our agents, and we could be held responsible for their actions. Other U.S. companies in the medical device and pharmaceutical fields have faced criminal penalties under the FCPA for allowing their agents to deviate from appropriate practices in doing business with these individuals. We are also subject to similar anti-bribery laws in the jurisdictions in which we operate, including the United Kingdom's Bribery Act of 2010, which also prohibits commercial bribery and makes it a crime for companies to fail to prevent bribery. These laws are complex and far-reaching in nature, and, as a result, we cannot assure you that we would not be required in the future to alter one or more of our practices to be in compliance with these laws or any changes in these laws or the interpretation thereof. Any violations of these laws, or allegations of such violations, could disrupt our operations, involve significant management distraction, involve significant costs and expenses, including legal fees, and could result in a material adverse effect on our business, prospects, financial condition, or results of operations. We could also incur severe penalties, including criminal and civil penalties, disgorgement, and other remedial measures.

Risks related to our intellectual property

Litigation or other proceedings or third-party claims of intellectual property infringement or misappropriation may require us to spend significant time and money, and could in the future prevent us from selling our tests or impact our stock price.

Our commercial success will depend in part on our avoiding infringement of patents and proprietary rights of third parties, including for example the intellectual property rights of competitors. As we continue to commercialize our tests in their current or an updated form, launch different and expanded tests, and enter new markets,

competitors might claim that our tests infringe or misappropriate their intellectual property rights as part of business strategies designed to impede our successful commercialization and entry into new markets. Our activities may be subject to claims that we infringe or otherwise violate patents or other intellectual property rights owned or controlled by third parties. We cannot assure you that our operations do not, or will not in the future, infringe existing or future patents. We may be unaware of patents that a third party, including for example a competitor in the genetic testing market, might assert are infringed by our business. There may also be patent applications that, if issued as patents, could be asserted against us. Third parties making claims against us for infringement or misappropriation of their intellectual property rights may seek and obtain injunctive or other equitable relief, which could effectively block our ability to perform our tests. Further, if a patent infringement suit were brought against us, we could be forced to stop or delay our development or sales of any tests or other activities that are the subject of such suit. Defense of these claims, regardless of merit, could cause us to incur substantial expenses and be a substantial diversion of our employee resources. Any adverse ruling or perception of an adverse ruling in defending ourselves could have a material adverse impact on our business and stock price. In the event of a successful claim of infringement against us by a third party, we may have to (1) pay substantial damages, possibly including treble damages and attorneys' fees if we are found to have willfully infringed patents; (2) obtain one or more licenses, which may not be available on commercially reasonable terms (if at all); (3) pay royalties; and/or (4) redesign any infringing tests or other activities, which may be impossible or require substantial time and monetary expenditure, all of which could have a material adverse impact on our cash position and business and financial condition.

If licenses to third-party intellectual property rights are or become required for us to engage in our business, we may be unable to obtain them at a reasonable cost, if at all. Even if such licenses are available, we could incur substantial costs related to royalty payments for licenses obtained from third parties, which could negatively affect our gross margins. Moreover, we could encounter delays in the introduction of tests while we attempt to develop alternatives. Defense of any lawsuit or failure to obtain any of these licenses on favorable terms could prevent us from commercializing tests, which could materially affect our ability to grow and thus adversely affect our business and financial condition.

Developments in patent law could have a negative impact on our business.

Although we view current U.S. Supreme Court precedent to be aligned with our belief that naturally occurring DNA sequences and detection of natural correlations between observed facts (such as patient genetic data) and an understanding of that fact's implications (such as a patient's risk of disease associated with certain genetic variations) should not be patentable, it is possible that subsequent determinations by the U.S. Supreme Court or other federal courts could limit, alter or potentially overrule current law. Moreover, from time to time the U.S. Supreme Court, other federal courts, the United States Congress or the U.S. Patent and Trademark Office, or USPTO, may change the standards of patentability, and any such changes could run contrary to, or otherwise be inconsistent with, our belief that naturally occurring DNA sequences and detection of natural correlations between observed facts and an understanding of that fact's implications should not be patentable, which could result in third parties newly claiming that our business practices infringe patents drawn from categories of patents which we currently view to be invalid as directed to unpatentable subject matter.

Our inability to effectively protect our proprietary technologies, including the confidentiality of our trade secrets, could harm our competitive position.

We currently rely upon trade secret protection and copyright, as well as non-disclosure agreements and invention assignment agreements with our employees, consultants and third-parties, and to a limited extent patent protection, to protect our confidential and proprietary information. Although our competitors have utilized and are expected to continue utilizing similar methods and have aggregated and are expected to continue to aggregate similar databases of genetic testing information, our success will depend upon our ability to develop proprietary methods and databases and to defend any advantages afforded to us by such methods and databases relative to our competitors. If we do not protect our intellectual property adequately, competitors may be able to use our methods and databases and thereby

erode any competitive advantages we may have.

We will be able to protect our proprietary rights from unauthorized use by third parties only to the extent that our proprietary technologies are covered by valid and enforceable patents or are effectively maintained as trade secrets. In this regard, we have applied, and we intend to continue applying, for patents covering such aspects of our technologies as we deem appropriate. However, we expect that potential patent coverage we may obtain will not be sufficient to prevent substantial competition. In this regard, we believe it is probable that others will independently

develop similar or alternative technologies or design around those technologies for which we may obtain patent protection. In addition, any patent applications we file may be challenged and may not result in issued patents or may be invalidated or narrowed in scope after they are issued. Questions as to inventorship or ownership may also arise. Any finding that our patents or applications are unenforceable could harm our ability to prevent others from practicing the related technology, and a finding that others have inventorship or ownership rights to our patents and applications could require us to obtain certain rights to practice related technologies, which may not be available on favorable terms, if at all. If we initiate lawsuits to protect or enforce our patents, or litigate against third party claims, which would be expensive, and, if we lose, we may lose some of our intellectual property rights. Furthermore, these lawsuits may divert the attention of our management and technical personnel.

We expect to rely primarily upon trade secrets and proprietary know-how protection for our confidential and proprietary information, and we have taken security measures to protect this information. These measures, however, may not provide adequate protection for our trade secrets, know-how, or other confidential information. Among other things, we seek to protect our trade secrets and confidential information by entering into confidentiality agreements with employees and consultants. There can be no assurance that any confidentiality agreements that we have with our employees and consultants will provide meaningful protection for our trade secrets and confidential information or will provide adequate remedies in the event of unauthorized use or disclosure of such information. Accordingly, there also can be no assurance that our trade secrets will not otherwise become known or be independently developed by competitors. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret can be difficult, expensive, and time-consuming, and the outcome is unpredictable. In addition, trade secrets may be independently developed by others in a manner that could prevent legal recourse by us. If any of our confidential or proprietary information, such as our trade secrets, were to be disclosed or misappropriated, or if any such information was independently developed by a competitor, our competitive position could be harmed.

We may not be able to enforce our intellectual property rights throughout the world.

The laws of some foreign countries do not protect proprietary rights to the same extent as the laws of the United States, and many companies have encountered significant challenges in establishing and enforcing their proprietary rights outside of the United States. These challenges can be caused by the absence of rules and methods for the establishment and enforcement of intellectual property rights outside of the United States. In addition, the legal systems of some countries, particularly developing countries, do not favor the enforcement of patents and other intellectual property protection, especially those relating to healthcare. This could make it difficult for us to stop the infringement of our patents, if obtained, or the misappropriation of our other intellectual property rights. For example, many foreign countries have compulsory licensing laws under which a patent owner must grant licenses to third parties. In addition, many countries limit the enforceability of patents against third parties, including government agencies or government contractors. In these countries, patents may provide limited or no benefit. Patent protection must ultimately be sought on a country-by-country basis, which is an expensive and time-consuming process with uncertain outcomes. Accordingly, we may choose not to seek patent protection in certain countries, and we will not have the benefit of patent protection in such countries. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business. Accordingly, our efforts to protect our intellectual property rights in such countries may be inadequate. In addition, changes in the law and legal decisions by courts in the United States and foreign countries may affect our ability to obtain adequate protection for our technology and the enforcement of intellectual property.

Third parties may assert that our employees or consultants have wrongfully used or disclosed confidential information or misappropriated trade secrets.

We employ individuals who were previously employed at universities or genetic testing, diagnostic or other healthcare companies, including our competitors or potential competitors. Although we try to ensure that our employees and consultants do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that we or our employees or consultants have inadvertently or otherwise used or disclosed intellectual property,

including trade secrets or other proprietary information, of a former employer or other third parties. Further, we may be subject to ownership disputes in the future arising, for example, from conflicting obligations of consultants or others who are involved in developing our intellectual property. Litigation may be necessary to defend against these claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees.

Risks related to being a public company

We incur increased costs and demands on management as a result of compliance with laws and regulations applicable to public companies, which could harm our operating results.

As a public company, we incur significant legal, accounting and other expenses that we did not incur as a private company, including costs associated with public company reporting requirements. In addition, the Sarbanes-Oxley Act of 2002, or the Sarbanes-Oxley Act, as well as rules implemented by the SEC and the New York Stock Exchange, or NYSE, impose a number of requirements on public companies, including with respect to corporate governance practices. The SEC and other regulators have continued to adopt new rules and regulations and make additional changes to existing regulations that require our compliance. In July 2010, the Dodd-Frank Wall Street Reform and Consumer Protection Act, or the Dodd-Frank Act, was enacted. There are significant corporate governance and executive-compensation-related provisions in the Dodd-Frank Act that require the SEC to adopt additional rules and regulations in these areas. Our management and other personnel need to devote a substantial amount of time to these compliance and disclosure obligations. If these requirements divert the attention of our management and personnel from other aspects of our business concerns, they could have a material adverse effect on our business, financial condition and results of operations. Moreover, these rules and regulations applicable to public companies substantially increase our legal, accounting and financial compliance costs, require that we hire additional personnel and make some activities more time-consuming and costly. It may also be more expensive for us to obtain director and officer liability insurance.

If we are unable to maintain effective internal control over financial reporting, investors may lose confidence in the accuracy and completeness of our reported financial information and the market price of our common stock may be negatively affected.

We are required to maintain internal control over financial reporting and to report any material weaknesses in such internal controls. Section 404 of the Sarbanes-Oxley Act requires that we evaluate and determine the effectiveness of our internal control over financial reporting and provide a management report on our internal control over financial reporting. If we have a material weakness in our internal control over financial reporting, we may not detect errors on a timely basis and our financial statements may be materially misstated. We have only recently compiled the system and process documentation necessary to perform the evaluation needed to comply with Section 404 of the Sarbanes-Oxley Act. We will need to maintain and enhance these processes and controls as we grow and we may require additional personnel and resources to do so.

During the evaluation and testing process, if we identify one or more material weaknesses in our internal controls, our management will be unable to conclude that our internal control over financial reporting is effective. Moreover, when we are no longer an emerging growth company, our independent registered public accounting firm will be required to issue an attestation report on the effectiveness of our internal control over financial reporting. Even if our management concludes that our internal control over financial reporting is effective, our independent registered public accounting firm may conclude that there are material weaknesses with respect to our internal controls or the level at which our internal controls are documented, designed, implemented or reviewed.

If we are unable to conclude that our internal control over financial reporting is effective, or when we are no longer an emerging growth company, if our auditors were to express an adverse opinion on the effectiveness of our internal control over financial reporting because we had one or more material weaknesses, investors could lose confidence in the accuracy and completeness of our financial disclosures, which could cause the price of our common stock to decline. Internal control deficiencies could also result in the restatement of our financial results in the future.

We are an emerging growth company and may elect to comply with reduced public company reporting requirements applicable to emerging growth companies, which could make our common stock less attractive to investors.

We are an emerging growth company, as defined under the Securities Act. We will remain an emerging growth company until December 31, 2020, although if our revenue exceeds $1.07 billion in any fiscal year before that time, we would cease to be an emerging growth company as of the end of that fiscal year. In addition, if the market value of our common stock that is held by non-affiliates exceeds $700 million as of the last business day of our second fiscal quarter of any fiscal year before the end of that five-year period, we would cease to be an emerging growth company as of December 31 of that year. As an emerging growth company, we may choose to take

advantage of exemptions from various reporting requirements applicable to certain other public companies, including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, reduced financial statement and financial-related disclosures, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements, and exemptions from the requirement of holding a nonbinding advisory vote on executive compensation and obtaining stockholder approval of any golden parachute payments not previously approved by our stockholders. We cannot predict whether investors will find our common stock less attractive if we choose to rely on any of these exemptions. If investors find our common stock less attractive as a result of any choices to reduce future disclosure we may make, there may be a less active trading market for our common stock and our stock price may be more volatile.

Risks related to our common stock

Our stock price may be volatile, and you may not be able to sell shares of our common stock at or above the price you paid.

Prior to our initial public offering in February 2015, there was no public market for our common stock, and an active and liquid public market for our stock may not develop or be sustained. In addition, the trading price of our common stock is likely to be highly volatile and could be subject to wide fluctuations in response to various factors, some of which are beyond our control. These factors include:

- actual or anticipated fluctuations in our operating results;
- competition from existing tests or new tests that may emerge;
- announcements by us or our competitors of significant acquisitions, strategic partnerships, joint ventures, collaborations, or capital commitments;
- failure to meet or exceed financial estimates and projections of the investment community or that we provide to the public;
- issuance of new or updated research or reports by securities analysts or changed recommendations for our stock;
- our focus on long-term goals over short-term results;
- the timing of our investments in the growth of our business;
- actual or anticipated changes in regulatory oversight of our business;
- additions or departures of key management or other personnel;
- disputes or other developments related to our intellectual property or other proprietary rights, including litigation;
- changes in reimbursement by current or potential payers;
- general economic and market conditions; and
- issuances of significant amounts of our common stock.

In addition, the stock market in general, and the market for stock of life sciences companies in particular, has experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of those companies. Broad market and industry factors may seriously affect the market price of our common stock, regardless of our actual operating performance. In addition, in the past, following periods of volatility in the overall market and the market price of a particular company’s securities, securities class action litigation has often been instituted against these companies. This litigation, if instituted against us, could result in substantial costs and a diversion of our management’s attention and resources.

If securities or industry analysts issue an adverse opinion regarding our stock or do not publish research or reports about our company, our stock price and trading volume could decline.

The trading market for our common stock will depend in part on the research and reports that equity research analysts publish about us and our business. We do not control these analysts or the content and opinions included in

their reports. Securities analysts may elect not to provide research coverage of our company and such lack of research coverage may adversely affect the market price of our common stock. The price of our common stock could also decline if one or more equity research analysts downgrade our common stock, change their price targets, or issue other unfavorable commentary or cease publishing reports about us or our business. If one or more equity research analysts cease coverage of our company, we could lose visibility in the market, which in turn could cause our stock price to decline.

Insiders will exercise significant control over our company and will be able to influence corporate matters.

At December 31, 2017, directors, executive officers, 5% or greater stockholders and their affiliates beneficially owned, in the aggregate, 49% of our outstanding capital stock. As a result, these stockholders will be able to exercise significant influence over all matters submitted to our stockholders for approval, including the election of directors and approval of significant corporate transactions, such as a merger or sale of our company or its assets. This concentration of ownership may have the effect of delaying or preventing a third party from acquiring control of our company and could adversely affect the market price of our common stock.

Our ability to use our net operating loss carryforwards and certain other tax attributes may be limited.

At December 31, 2017, our total gross deferred tax assets were $106.2 million. Due to our lack of earnings history and uncertainties surrounding our ability to generate future taxable income, the net deferred tax assets have been fully offset by a valuation allowance. The deferred tax assets were primarily comprised of federal and state tax net operating losses and tax credit carryforwards. Furthermore, under Section 382 of the Internal Revenue Code of 1986, as amended, or the Internal Revenue Code, if a corporation undergoes an “ownership change,” the corporation’s ability to use its pre-change net operating loss carryforwards, or NOLs, and other pre-change tax attributes (such as research tax credits) to offset its future taxable income may be limited. In general, an “ownership change” occurs if there is a cumulative change in our ownership by “5% shareholders” that exceeds 50 percentage points over a rolling three-year period. Our existing NOLs and tax credit carryovers may be subject to limitations arising from previous ownership changes, and if we undergo one or more ownership changes in connection with completed acquisitions, or other future transactions in our stock, our ability to utilize NOLs and tax credit carryovers could be further limited by Section 382 of the Internal Revenue Code. As a result, if we earn net taxable income, our ability to use our pre-change net operating loss and tax credit carryforwards to offset U.S. federal taxable income may be subject to limitations, which could potentially result in increased future tax liability to us. The annual limitation may result in the expiration of certain net operating loss and tax credit carryforwards before their utilization. In addition, the recently enacted Tax Act limits the deduction for NOLs to 80% of current year taxable income and eliminates NOL carrybacks. Also, at the state level, there may be periods during which the use of NOLs is suspended or otherwise limited, which could accelerate or permanently increase state taxes owed.

We have never paid dividends on our capital stock and we do not anticipate paying dividends in the foreseeable future.

We have never paid dividends on any of our capital stock and currently intend to retain any future earnings to fund the growth of our business. In addition, our loan agreement prohibits us from paying dividends on our common stock. Any determination to pay dividends in the future will be at the discretion of our board of directors and will depend on our financial condition, operating results, capital requirements, general business conditions and other factors that our board of directors may deem relevant. As a result, capital appreciation, if any, of our common stock will be the sole source of gain for the foreseeable future.

Anti-takeover provisions in our charter documents and under Delaware law could discourage, delay or prevent a change in control and may affect the trading price of our common stock.

Provisions in our restated certificate of incorporation and our amended and restated bylaws may have the effect of delaying or preventing a change of control or changes in our management. Our restated certificate of incorporation and amended and restated bylaws include provisions that:

- authorize our board of directors to issue, without further action by the stockholders, up to 20,000,000 shares of undesignated preferred stock;

- require that any action to be taken by our stockholders be effected at a duly called annual or special meeting and not by written consent;
- specify that special meetings of our stockholders can be called only by our board of directors, our chairman of the board, or our chief executive officer;
- establish an advance notice procedure for stockholder approvals to be brought before an annual meeting of our stockholders, including proposed nominations of persons for election to our board of directors;
- establish that our board of directors is divided into three classes, Class I, Class II and Class III, with each class serving staggered terms;
- provide that our directors may be removed only for cause;
- provide that vacancies on our board of directors may, except as otherwise required by law, be filled only by a majority of directors then in office, even if less than a quorum; and
- require a super-majority of votes to amend certain of the above-mentioned provisions as well as to amend our bylaws generally.

In addition, we are subject to the provisions of Section 203 of the Delaware General Corporation Law regulating corporate takeovers. Section 203 generally prohibits us from engaging in a business combination with an interested stockholder subject to certain exceptions.

Our certificate of incorporation designates the Court of Chancery of the State of Delaware as the sole and exclusive forum for certain types of actions and proceedings that may be initiated by our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or other employees.

Our certificate of incorporation provides that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware shall be the sole and exclusive forum for:

- any derivative action or proceeding brought on our behalf;
- any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers, or other employees to us or our stockholders;
- any action asserting a claim arising pursuant to any provision of the Delaware General Corporation Law; or
- any action asserting a claim against us governed by the internal affairs doctrine.

Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock shall be deemed to have notice of and consented to the provisions of our certificate of incorporation described above. This choice of forum provision may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage such lawsuits against us and our directors, officers, and other employees. Alternatively, if a court were to find these provisions of our certificate of incorporation inapplicable to, or unenforceable in respect of, one or more of the specified types of actions or proceedings, we may incur additional costs associated with resolving such matters in other jurisdictions, which could adversely affect our business, financial condition or results of operations.

ITEM 1B. Unresolved Staff Comments.

None.

ITEM 2. Properties.

Our production facility and headquarters is located in San Francisco, California, where we currently lease and occupy 103,213 square feet of laboratory and office space. The lease for this facility expires in July 2026 and we may renew the lease for an additional ten years. We began to take occupancy of this facility in the fourth quarter of 2016 and we completed the move to the new facility in the first quarter of 2017.

Our subsidiary Good Start Genetics leases 42,517 square feet of laboratory and office space in Cambridge, Massachusetts and Framingham, Massachusetts, and our subsidiary CombiMatrix leases 12,164 square feet of laboratory and office space in Irvine, California. We also lease additional facilities in Palo Alto and Oakland, California.

We believe that our facilities are adequate for our current needs and that additional space will be available on commercially reasonable terms if required.

ITEM 3. Legal Proceedings.

We are not a party to any material legal proceedings on the date of this report. We may from time to time become involved in legal proceedings arising in the ordinary course of business, and the resolution of any such claims could be material.

ITEM 4. Mine Safety Disclosure.

Not applicable.

Executive Officers of the Registrant

The names of our executive officers and other corporate officers, and their ages as of March 5, 2018, are as follows:

Name	Age	Position
Executive officers		
Randal W. Scott, Ph.D.	60	Executive Chairman and Director
Sean E. George, Ph.D.	44	President, Chief Executive Officer, Director and Co-Founder
Lee Bendekgey	60	Chief Operating Officer and Secretary
Shelly D. Guyer	57	Chief Financial Officer
Robert L. Nussbaum, M.D.	68	Chief Medical Officer
Other corporate officers		
Thomas R. Brida	47	General Counsel
Patricia E. Dumond	53	Chief Accounting Officer
Katherine A. Stueland	42	Chief Commercial Officer

Randal W. Scott, Ph.D. has served as our Executive Chairman since January 9, 2017 and as a director since 2010. From August 2012 through January 2017, Dr. Scott served as our Chief Executive Officer. From 2000 through August 2012, Dr. Scott held a number of positions at Genomic Health, Inc., a publicly held genomic information company which he co-founded in 2000, most recently serving as the Chief Executive Officer of a wholly-owned subsidiary of Genomic Health, and as a director. Dr. Scott also served as Executive Chairman of the Board of Genomic Health from January 2009 until March 2012 and as Chairman of the Board and Chief Executive Officer from August 2000 until December 2008. Dr. Scott was a founder of Incyte Corporation, which at the time was a genomic information company, and served in various roles from 1991 through 2000, including Chairman of the Board, President and Chief Scientific Officer. Dr. Scott holds a B.S. in Chemistry from Emporia State University and a Ph.D. in Biochemistry from the University of Kansas.

Sean E. George, Ph.D. is one of our co-founders and has been our President and Chief Executive Officer since January 2017, a position he also held from January 2010 through August 2012. Dr. George also served as our President since August 2012 and he has served as our Chief Operating Officer from August 2012 until January 2017. He has also served as a director since January 2010. Prior to co-founding Invitae, Dr. George served as Chief Operating Officer from 2007 to November 2009 at Navigenics, Inc., a personalized medicine company. Previously, he served as Senior Vice President of Marketing and Senior Vice President, Life Science Business at Affymetrix, Inc., a provider of life science and molecular diagnostic products, as well as Vice President, Labeling and Detection Business at Invitrogen Corporation, a provider of tools to the life sciences industry, during his tenure

there from 2002 to 2007. Dr. George holds a B.S. in Microbiology and Molecular Genetics from the University of California Los Angeles, an M.S. in Molecular and Cellular Biology from the University of California Santa Barbara, and a Ph.D. in Molecular Genetics from the University of California Santa Cruz.

Lee Bendekgey has served as our Chief Operating Officer since June 2017. Mr. Bendekgey also served as our Chief Financial Officer from November 2013 to June 2017 and as our General Counsel from November 2013 through January 2017. Prior to joining our company, he was the General Counsel of DNAnexus, Inc., a cloud-based genome informatics and data management company, from September 2011 to October 2013. From March 2009 until September 2011, Mr. Bendekgey pursued personal interests. Prior to that, he was Chief Financial Officer and General Counsel for Nuvelo, Inc., a biopharmaceutical company, from July 2004 to March 2009. Mr. Bendekgey also served as General Counsel and Chief Financial Officer for Incyte Corporation from 1998 to July 2004. Mr. Bendekgey holds a B.A. in French and Political Science from Kalamazoo College and a J.D. from Stanford Law School.

Shelly D. Guyer has served as our Chief Financial Officer since June 2017. Ms. Guyer served as Chief Financial Officer of Veracyte, Inc., a genomic diagnostics company, from April 2013 to December 2016 and served as Veracyte's Secretary from April 2013 to March 2014. Previously, she served as Chief Financial Officer and Executive Vice President of Finance and Administration of iRhythm Technologies, Inc., a digital healthcare company, from April 2008 to December 2012. From March 2006 to August 2007, Ms. Guyer served as Vice President of Business Development and Investor Relations of Nuvelo Inc., a biopharmaceutical company. Prior to joining Nuvelo, Ms. Guyer worked at J.P. Morgan Securities and its predecessor companies for over 17 years, serving in a variety of roles including in healthcare investment banking. Ms. Guyer holds an A.B. in Politics from Princeton University and an M.B.A. from the Haas School of Business at the University of California Berkeley.

Robert L. Nussbaum, M.D. has served as our Chief Medical Officer since August 2015. From April 2006 to August 2015, he was chief of the Division of Genomic Medicine at UCSF Health where he also held leadership roles in the Cancer Genetics and Prevention Program beginning in January 2009 and the Program in Cardiovascular Genetics beginning in July 2007. From April 2006 to August 2015, he served as a member of the UCSF Institute for Human Genetics. Prior to joining UCSF Health, Dr. Nussbaum was chief of the Genetic Disease Research Branch of the National Human Genome Research Institute, one of the National Institutes of Health, from 1994 to 2006. He is a member of the Institute of Medicine and a fellow at the American Academy of Arts and Sciences. Dr. Nussbaum is a board-certified internist and medical geneticist who holds a Bachelor of Science in Applied Mathematics from Harvard College and an M.D. from Harvard Medical School in the Harvard-MIT joint program in Health Sciences and Technology. He completed his residency in internal medicine at Barnes-Jewish Hospital and a fellowship in medical genetics at the Baylor College of Medicine.

Thomas R. Brida has served as our General Counsel since January 2017. Mr. Brida also served as our Deputy General Counsel from January 2016 to January 2017. Prior to joining Invitae, he was Associate General Counsel at Bio-Rad Laboratories, a life science research and clinical diagnostics manufacturer, from January 2004 to January 2016. He holds a B.A. from Stanford University and a J.D. from U.C. Berkeley School of Law.

Patricia E. Dumond has served as our Chief Accounting Officer since September 2013. From 2003 to August 2013, she held various financial positions at Genomic Health, Inc., most recently as Senior Director, Finance. She holds a B.S. in finance with a minor in accounting from California State University Sacramento.

Katherine A. Stueland has served as our Chief Commercial Officer since October 2016. From January 2014 to October 2016, she served as our head of communications and investor relations. Prior to joining Invitae, Ms. Stueland was a Principal at Vivo Communications, a healthcare communications company, from January 2013 to December 2013. Previously, she served as Vice President, Communications and Investor Relations at Dendreon Corporation, a biotechnology company. Ms. Stueland holds a B.S in English Literature from Miami University in Ohio.

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PART II

ITEM 5. Market For Registrant's Common Equity, Related Stockholder Matters And Issuer Purchases Of Equity Securities.

Our common stock has been publicly traded on the New York Stock Exchange under the symbol "NVTA" since February 12, 2015. Prior to that time, there was no public market for our common stock. The following table sets forth for the periods indicated the high and low sales prices per share of our common stock on the New York Stock Exchange:

	High	Low
Year Ended December 31, 2016		
First quarter	$11.25	$5.66
Second quarter	$11.85	$7.14
Third quarter	$9.84	$7.22
Fourth quarter	$9.50	$5.76
Year Ended December 31, 2017		
First quarter	$11.30	$7.95
Second quarter	$11.88	$8.17
Third quarter	$10.44	$8.73
Fourth quarter	$10.10	$7.50

On March 2, 2018, the closing price of our common stock as reported on the New York Stock Exchange was $6.84 per share.

As of March 2, 2018, there were 72 stockholders of record of our common stock. The actual number of stockholders is greater than this number of record holders and includes stockholders who are beneficial owners but whose shares are held in street name by brokers and other nominees.

Dividend policy

We have never declared or paid any cash dividends on our capital stock. We currently intend to retain any future earnings and do not expect to pay any dividends in the foreseeable future. Any determination to pay dividends in the future will be at the discretion of our board of directors and will depend on our financial condition, operating results, capital requirements, general business conditions and other factors that our board of directors may deem relevant. In addition, the terms of our Loan Agreement prohibit the payment of dividends.

Stock performance graph

The following information shall not be deemed to be soliciting material or to be filed with the SEC, or subject to Regulations 14A or 14C under the Securities Exchange Act of 1934 ("Exchange Act") or to the liabilities of Section 18 of the Exchange Act nor shall such information be incorporated by reference into any future filing under the Securities Act or the Exchange Act, except to the extent that we specifically incorporate it by reference into such filing.

Comparison of Historical Cumulative Total Return Among Invitae Corporation, the S&P 500 Index and the S&P 500 Healthcare Index(*).

(*) The above graph shows the cumulative total stockholder return of an investment of $100 in cash from February 12, 2015 (the date our common stock commenced trading on the New York Stock Exchange) through December 31, 2017 for: (i) our common stock; (ii) the S&P 500 Index; and (iii) the S&P 500 Healthcare Index. All values assume reinvestment of the full amount of all dividends. The comparisons in the table are required by the SEC and are not intended to be forecasts or indicative of future stockholder returns.

	2/12/2015	12/31/2015	12/31/2016	12/31/2017
Invitae Corporation	$ 100.00	$ 48.15	$ 46.57	$ 53.26
S&P 500	$ 100.00	$ 97.87	$ 107.20	$ 128.02
S&P 500 Healthcare Index	$ 100.00	$ 102.41	$ 97.94	$ 117.53

Sales of Unregistered Securities

On August 3, 2017, we completed a private placement of 5,188,235 shares of common stock at a price of $8.50 per share and 3,458,823 shares of Series A Convertible Preferred Stock, $0.0001 par value per share, or the Series A Preferred Stock, at a price of $8.50 per share, to certain accredited investors. The Series A Preferred Stock, which is a common stock equivalent but non-voting and with a blocker on conversion if the holder would exceed a specified threshold of voting security ownership, is convertible into common stock on a one-for-one basis, subject to adjustment for events such as stock splits, combinations and the like. Gross proceeds to us from the private placement were approximately $73.5 million, before deducting fees and certain expenses payable by us. The sale of the shares of common stock and Series A Convertible Preferred Stock was made pursuant to the terms of a Securities Purchase Agreement dated as of July 31, 2017. The shares issued in the private placement were sold in reliance on the exemption from registration provided by Section 4(a)(2) of the Securities Act of 1933 and Regulation D promulgated thereunder. We relied on this exemption from registration based in part on representations made by the investors. Cowen and Company, LLC and Leerink Partners LLC acted as joint placement agents in connection with the private placement and received fees of approximately $4.4 million. The net proceeds to us from the private placement, after deducting the placement agent fees and other expenses payable by us, were approximately $68.9 million.

ITEM 6. Selected Financial Data.

The information set forth below should be read together with "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations" and our financial statements and related notes included elsewhere in this report. The selected consolidated balance sheet data at December 31, 2017 and 2016 and the selected consolidated statements of operations data for each of the years ended December 31, 2017, 2016, and 2015 have been derived from our audited consolidated financial statements that are included elsewhere in this report. The selected consolidated balance sheet data at December 31, 2015, 2014 and 2013 and the selected consolidated statement of operations data for the years ended December 31, 2014 and 2013 have been derived from our audited consolidated financial statements not included in this report. Historical results are not necessarily indicative of results to be expected in any future period.

	Year Ended December 31,				
	2017	2016	2015	2014	2013
	(In thousands except share and per share data)				
Consolidated Statements of Operations Data					
Test revenue	$65,169	$24,840	$8,378	$1,604	$148
Other revenue	3,052	208	—	—	—
Total revenue	68,221	25,048	8,378	1,604	148
Costs and operating expenses:					
Cost of test revenue (1)	50,142	27,878	16,523	5,624	667
Research and development (1)	46,469	44,630	42,806	22,063	16,039
Selling and marketing (1)	53,417	28,638	22,479	8,669	2,431
General and administrative (1)	39,472	24,085	16,047	12,600	5,764
Total costs and operating expenses	189,500	125,231	97,855	48,956	24,901
Loss from operations	(121,279)	(100,183)	(89,477)	(47,352)	(24,753)
Other income (expense), net	(303)	348	(94)	(79)	(26)
Interest expense	(3,654)	(421)	(211)	(61)	(59)
Net loss before taxes	(125,236)	(100,256)	(89,782)	(47,492)	(24,838)
Income tax benefit	(1,856)	—	—	—	—
Net loss	$(123,380)	$(100,256)	$(89,782)	$(47,492)	$(24,838)
Net loss attributable to common stockholders	$(123,380)	$(100,256)	$(89,782)	$(47,492)	$(24,989)
Net loss per share attributable to common stockholders, basic and diluted (2)	$(2.65)	$(3.02)	$(3.18)	$(56.14)	$(36.13)
Shares used in computing net loss per common share, basic and diluted	46,511,739	33,176,305	28,213,324	846,027	691,731

(1) Includes employee stock based compensation as follows:

	Year Ended December 31,				
	2017	2016	2015	2014	2013
	(In thousands)				
Cost of revenue	$2,093	$1,353	$368	$102	$11
Research and development	6,158	4,976	1,545	382	165
Selling and marketing	3,956	1,709	688	216	42

General and administrative	7,014	2,661	876	271	42
Total stock based compensation	$19,221	$10,699	$3,477	$971	$260

(2) See Notes 2 and 11 to our audited consolidated financial statements included elsewhere in this report for an explanation of the calculations of our basic and diluted net loss per share attributable to common stockholders.

	As of December 31,				
	2017	2016	2015	2014	2013
	(In thousands)				
Consolidated Balance Sheet Data:					
Cash and cash equivalents	$12,053	$66,825	$73,238	$107,027	$43,070
Working capital	53,294	87,047	120,433	102,020	41,577
Total assets	211,078	130,651	156,676	128,778	53,103
Capital lease obligations	5,412	1,575	3,164	3,535	2,001
Debt	39,084	12,102	7,040	—	—
Convertible preferred stock	—	—	—	202,305	86,574
Accumulated deficit	(398,598)	(275,218)	(174,962)	(85,180)	(37,688)
Total stockholders' equity (deficit)	121,794	99,074	138,376	(83,576)	(37,280)

ITEM 7. Management's Discussion and Analysis of Financial Condition and Results of Operations.

The following discussion of our financial condition and results of operations should be read in conjunction with our financial statements and the related notes included in Item 8 of this report. Historic results are not necessarily indicative of future results.

Business overview

Our mission is to bring comprehensive genetic information into mainstream medical practice to improve the quality of healthcare for billions of people. Our goal is to aggregate a majority of the world's genetic information into a comprehensive network that enables sharing of data among network participants to improve healthcare and clinical outcomes.

In 2017, we established a leading position in family health genetic information services through the strategic acquisition of reproductive health testing capabilities. In January 2017, we acquired AltaVoice, formerly PatientCrossroads, a patient-centered data company with a global platform for collecting, curating, coordinating, and delivering safeguarded data from patients and clinicians through Patient Insights Networks, also known as PINs, which enable organizations to more efficiently build engaged, research-ready patient communities, recruit for trials, educate, and track patient outcomes. This acquisition was subsequently complemented by the acquisition of what we believe to be one of the most efficient, end-to-end platforms available for collecting and managing genetic family histories, CancerGene Connect. In August 2017, we acquired Good Start Genetics Inc., or Good Start Genetics, a molecular diagnostics company focused on preimplantation and carrier screening for inherited disorders. In November 2017, we completed our acquisition of CombiMatrix Corporation, or CombiMatrix, a company which specialized in prenatal diagnosis, miscarriage analysis and pediatric developmental disorders.

We have experienced rapid growth. For the years ended December 31, 2017, 2016 and 2015, our revenue was $68.2 million, $25.0 million and $8.4 million, respectively and we incurred net losses of $123.4 million, $100.3 million and $89.8 million, respectively. At December 31, 2017, our accumulated deficit was $398.6 million. We increased our number of employees to 594 at December 31, 2017 from 332 on December 31, 2016. Our sales force grew to 103 at December 31, 2017 from 51 at December 31, 2016. We expect headcount will continue to increase in 2018, as we add staff to support anticipated growth.

Sales of our tests have grown significantly. In 2017, 2016 and 2015, we generated approximately 145,000, 57,000 and 19,000 billable tests, respectively. Through December 31, 2017, approximately 21% of the billable tests we performed have been billable to institutions and patients, and the remainder have been billable to third-party payers. Many of the gene tests on our assays are tests for which private insurers reimburse. However, when we do not have reimbursement policies or contracts with private insurers, our claims for reimbursement may be denied upon submission, and we must appeal the claims. The appeals process is time consuming and expensive, and may not result in payment. Even if we are successful in achieving reimbursement, we may be paid at lower rates than if we were under contract with the third-party payer. When there is not a contracted rate for reimbursement, there is typically a greater co-insurance or co-payment requirement from the patient which may result in further delay or decreased likelihood of collection.

We intend to continue to invest in our business. In 2015 we entered into a lease agreement for a new production facility and headquarters in San Francisco, California. This lease expires in July 2026 and at December 31, 2017, aggregate future minimum lease payments for the new facility are approximately $64.2 million. In 2017 we acquired four businesses as described above, and in doing so expanded our suite of genome management offerings and completed our entry into prenatal and perinatal genetic testing.

As a result of these and other factors, we expect to incur operating losses for the near-term future and may need to raise additional capital in order to fund our operations. If we are unable to achieve our revenue growth objectives and successfully manage our costs, we may not be able to achieve profitability.

We believe that the keys to our future growth will be to increase billable test volumes, achieve broad reimbursement coverage for our tests from third-party payers, consistently drive down the price for genetic analysis and interpretation, steadily increase the amount of genetic content we offer, consistently improve the client experience, drive physician and patient utilization of our website for ordering and delivery of results and increase the number of strategic partners working with us to add value for our clients.

Factors affecting our performance

Number of billable tests

The growth in our genetic testing business is tied to the number of tests for which we bill third-party payers, institutions, partners or patients, which we refer to as billable tests. We bill for our services following delivery of the billable test report derived from testing samples and interpreting the results. We incur the expenses associated with a test in the period in which the test is processed regardless of when payment is received with respect to that test. We believe the number of billable tests in any period is an important indicator of the growth in our business.

Success obtaining and maintaining reimbursement

Our ability to increase the number of billable tests and our revenue will depend in part on our success achieving broad reimbursement coverage and laboratory service contracts for our tests from third-party payers. Reimbursement may depend on a number of factors, including a payer's determination that a test is appropriate, medically necessary and cost-effective, as well as whether we are in contract, when we get paid more consistently and at higher rates. Because each payer makes its own decision as to whether to establish a policy or enter into a contract to reimburse for our testing services, seeking these approvals is a time-consuming and costly process. In addition, clinicians may decide not to order our tests if the cost of the test is not covered by insurance. Because we require an ordering physician to requisition a test, our revenue growth also depends on our ability to successfully promote the adoption of our testing services and expand our base of ordering clinicians. We believe that establishing coverage and obtaining contracts from third-party payers is an important factor in gaining adoption by ordering clinicians. As of March 1, 2018, we have entered in to contracts for laboratory services with providers covering over 240 million lives, including Medicare, most national provider plans, and Medicaid in 27 states, with the most recent addition of California (Medi-Cal), our home state.

In cases where we have established reimbursement rates with third-party payers, we face additional challenges in complying with their procedural requirements for reimbursement. These requirements may vary from payer to payer, and it may be time-consuming and require additional resources to meet these requirements. We may also experience delays in or denials of coverage if we do not adequately comply with these requirements. In addition, we have experienced, and may continue to experience, temporary delays in reimbursement when we transition to being an in-network provider with a payer.

We expect to continue to focus our resources on increasing adoption of, and expanding coverage and reimbursement for, our current tests, tests provided by companies we acquire and any future tests we may develop. However, if we are not able to continue to obtain and maintain adequate reimbursement from third-party payers for our testing services and expand the base of clinicians ordering our tests, we may not be able to effectively increase the number of billable tests or our revenue.

Ability to lower the costs associated with performing our tests

Reducing the costs associated with performing our genetic tests is both a near-term focus and a strategic objective of ours. Over the long term we will need to reduce the cost of raw materials by improving the output efficiency of our assays and laboratory processes, modifying our platform-agnostic assays and laboratory processes to use materials and technologies that provide equal or greater quality at lower cost, improving how we manage our materials, porting some tests onto a next generation sequencing platform and negotiating favorable terms for our materials purchases. We also intend to design and implement hardware and software tools that will reduce personnel cost for both laboratory and clinical operations/medical interpretation by increasing personnel efficiency and thus lowering labor costs per test.

Ability to expand our genetic content

As we reduce our costs, we intend to continue to expand our test menus by steadily releasing additional genetic content for the same or lower prices per test, ultimately leading to affordable whole genome services. The breadth and flexibility of our offering will be a critical factor in our ability to address new markets for genetic testing services. Both of these will be critical to our ability to continue to grow the volume of billable tests we deliver.

Investment in our business and timing of expenses

We plan to continue to invest in our genetic testing and information management business. We deploy state-of-the-art and costly technologies in our genetic testing services, and we intend to continue to scale our infrastructure, including our testing capacity and information systems. We also expect to incur software development costs as we seek to further automate our laboratory processes and our genetic interpretation and report sign-out procedures, scale our customer service capabilities and expand the functionality of our website. We plan to hire additional personnel as necessary to support anticipated growth, including software engineers, sales and marketing personnel, research and development personnel, medical specialists, biostatisticians and geneticists. We will also incur additional costs related to the expansion of our production facility in San Francisco to handle newly acquired tests and to accommodate growth. In addition, we expect to incur ongoing expenses as a result of operating as a public company. The expenses we incur may vary significantly by quarter, as we focus on building out different aspects of our business.

How we recognize revenue

Our historical revenue has principally been recognized when cash is received. Of our total revenue of $68.2 million for the year ended December 31, 2017, we recognized $46.4 million on a cash basis and $21.8 million on an accrual basis. In 2018 and future periods we will recognize revenue substantially on an accrual basis, reflecting our adoption of Accounting Standards Codification 606, Revenue from Contracts with Customers.

For the years ended December 31, 2017, 2016 and 2015, amounts billed for tests delivered totaled $157.1 million, $62.6 million and $24.3 million, respectively. In the year ended December 31, 2017, we recognized revenue of $60.6 million related to amounts billed for tests delivered and other revenues during 2017, $7.2 million related to amounts billed for tests delivered in 2016 and $0.4 million related to amounts billed for tests delivered in 2015. It is difficult to predict future revenue from previously delivered but unpaid tests. Accordingly, we cannot provide any assurance as to when, if ever, or to what extent any of these amounts will be collected. Because we are in the early stages of commercializing our tests, we have had limited payment and collection history. Notwithstanding our efforts to obtain payment for these tests, payers may deny our claims, in whole or in part, and we may never receive revenue from any previously delivered but unpaid tests. Revenue from these tests, if any, may not be equal to the billed amount due to a number of factors, including differences in reimbursement rates, the amounts of patient co-payments, the existence of secondary payers and claims denials. In addition, private payers often ask us to refrain from submitting claims for a period of up to 60 days after contract execution, which can cause the timing of payments to vary during the months after contract signing.

To date, we have incurred and recognized expenses for tests in the period in which the test was conducted and we have recognized revenue for tests in the period in which our revenue recognition criteria were met. Effective January 1, 2018, we implemented Financial Accounting Standards Board Accounting Standards Codification, or ASC Topic 2014-09, Revenue from Contracts with Customers or Topic 606, using the modified retrospective method. Under Topic 606 we will generally recognize revenue on an accrual basis, which is when a customer obtains control of the promised goods or services. The accrual amounts recognized will be based on estimates of the consideration that we expect to receive and such estimates will be updated and subsequently recorded until fully settled.

Financial overview

Revenue

We primarily generate revenue from the sale of our tests, which provide the analysis, and associated interpretation of the sequencing of parts of the genome. Clients are billed upon delivery of test results to the physician. Our ability to increase our revenue will depend on our ability to increase our market penetration, obtain contracted reimbursement coverage from third-party payers and increase the rate at which we are paid for tests performed.

Cost of test revenue

Cost of revenue reflects the aggregate costs incurred in delivering test results to clinicians and includes expenses for materials and supplies, personnel costs, equipment and infrastructure expenses associated with testing and allocated overhead including rent, equipment depreciation and utilities. Costs associated with performing our

test are recorded as the patient's sample is processed. We expect cost of revenue to generally increase in line with the increase in the number of tests we perform. However, we expect that the cost per test will decrease over time due to the efficiencies we may gain as test volume increases and from automation and other cost reductions.

Operating expenses

Our operating expenses are classified into three categories: research and development, selling and marketing, and general and administrative. For each category, the largest component is personnel costs, which include salaries, employee benefit costs, bonuses, commissions, as applicable, and stock-based compensation expense.

Research and development

Research and development expenses represent costs incurred to develop our technology and future tests. These costs are principally for process development associated with our efforts to expand the number of genes we can evaluate in our tests, with our efforts to lower the cost of performing our test. In addition, we incur process development costs to further develop the software we use to operate our laboratory, analyze the data it generates, process customer orders, deliver reports and automate our business processes. These costs consist of personnel costs, laboratory supplies and equipment expenses, consulting costs and allocated overhead including rent, information technology, equipment depreciation and utilities.

We expense all research and development costs in the periods in which they are incurred. We expect our research and development expenses will increase as we continue our efforts to develop additional tests, or port some of our acquired tests to our production facility, reduce testing costs and work on scaling the business.

Selling and marketing

Selling and marketing expenses consist of personnel costs, client service expenses, advertising and marketing expenses, educational and promotional expenses, market research and analysis, and allocated overhead including rent, information technology, equipment depreciation and utilities. We expect our selling expenses will be significantly higher in 2018 principally due to the expansion of our salesforce over the course of 2017.

General and administrative

General and administrative expenses include executive, finance and accounting, billing and collections, legal and human resources functions. These expenses include personnel-related costs, audit and legal expenses, consulting costs, and allocated overhead including rent, information technology, equipment depreciation and utilities. We expect our general and administrative expenses will increase slightly in 2018, compared to 2017, as we support continued growth of operations.

Other income (expense), net

Other income (expense), net, primarily consists of interest income, offset by: losses on extinguishment of debt; adjustments to fair value of acquisition liabilities; and losses on disposals of assets.

Interest expense

Interest expense is attributable to our financing obligations under capital lease agreements and our Loan and Security Agreement.

Critical accounting policies and estimates

Management's discussion and analysis of our financial condition and results of operations is based on our consolidated financial statements, which have been prepared in accordance with U.S. generally accepted accounting principles, or U.S. GAAP. The preparation of these financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, as well as the reported revenue generated and expenses incurred during the reporting periods. Our estimates are based on our historical experience and on various other factors that

we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions and any such differences may be material. We believe that the accounting policies discussed below are critical to understanding our historical and future performance, as these policies relate to the more significant areas involving management's judgments and estimates.

Revenue recognition

We generate revenue primarily from delivery of test reports generated from our assays. Through December 31, 2017, we have recognized revenue when persuasive evidence of an arrangement existed; delivery had occurred or services had been rendered; the fee was fixed or determinable; and collectability was reasonably assured. To date, for most payers, we have not been able to demonstrate a predictable pattern of collectability, and therefore have recognized revenue when payment was received. For payers who demonstrated a consistent pattern of payment of tests billed at appropriate amounts, we recognized revenue upon delivery of test results.

Other revenue consists primarily of revenue from genome network subscription services which we recognize on a straight-line basis over the subscription term, and revenue from collaboration agreements.

Effective January 1, 2018, we adopted ASC Topic 606. Under Topic 606 we will recognize the vast majority of test revenue on an accrual basis, that is when a customer obtains control of the promised goods or services. The accrual amounts to be recognized under Topic 606 will be based on an estimate of the consideration that we expect to receive and such estimates will be updated and subsequently adjusted as necessary until fully settled. The estimate of the consideration that we expect to receive will require significant judgement by management.

Business Combinations — Purchase Accounting

We apply ASC 805, Business Combinations, or ASC 805, which is the accounting guidance related to business combinations. The standard requires recognition of assets acquired, liabilities assumed, and contingent consideration at their fair value on the acquisition date with subsequent changes recognized in earnings; requires acquisition-related expenses and restructuring costs to be recognized separately from the business combination and expensed as incurred; requires in-process research and development to be capitalized at fair value as an indefinite-lived intangible asset until completion or abandonment; and requires that changes in accounting for deferred tax asset valuation allowances and acquired income tax uncertainties after the measurement period be recognized as a component of provision for taxes.

We account for acquisitions of entities that include inputs and processes and have the ability to create outputs as business combinations. The purchase prices of acquisitions are allocated to tangible assets, liabilities, and identifiable intangible assets acquired based on their estimated fair values. The excess of purchase prices over those fair values is recorded as goodwill. Acquisition-related expenses are expensed as incurred. While we use our best estimates and assumptions as a part of the process to accurately value assets acquired and liabilities assumed at the business combination date, these estimates and assumptions are inherently uncertain and subject to refinement. Our key assumptions used have included projected revenue, cost of goods sold, and operating expenses for our acquired entities, and discount rates. As a result, during the measurement period, which may be up to one year from the business combination date, we may record adjustments to the assets acquired and liabilities assumed, with the corresponding offset to goodwill. After the measurement period, we record adjustments to assets acquired or liabilities assumed subsequent to the measurement period in our operating results in the period in which the adjustments were determined.

Goodwill

In accordance with ASC 350, Intangibles – Goodwill and Other, or ASC 350, we do not amortize goodwill or other intangible assets with indefinite lives but rather test them for impairment. ASC 350 requires us to perform an

impairment review of our goodwill balance at least annually, which we do as of October 1 each year, and whenever events or changes in circumstances indicate that the carrying amount of these assets may not be recoverable. For our annual goodwill impairment test in the fourth quarter of fiscal 2017, we performed a quantitative test at the reporting unit level and determined the fair value substantially exceeded the carrying amount of our single reporting unit and, therefore, found no impairment of goodwill.

Stock-based compensation

Stock-based compensation expense is measured at the date of grant and is based on the estimated fair value of the award. Compensation cost is recognized as expense on a straight-line basis over the vesting period for options and restricted stock unit, or RSU, awards and on an accelerated basis for performance-based restricted stock unit, or PRSU, awards. We recognize stock-based compensation expense associated with PRSU grants when we determine the achievement of performance conditions is probable. In determining the fair value of stock options and Employee Stock Purchase Plan, or ESPP, purchases, we estimate the grant date fair value, and the resulting stock-based compensation expense, using the Black-Scholes option-pricing model. We estimate the grant date fair value of RSU and PRSU awards based on the grant date share price.

We account for stock-based compensation arrangements with non-employees using a fair value approach. The fair value of these options is measured using the Black-Scholes option-pricing model reflecting the same assumptions as applied to employee options in each of the reported periods, other than the expected life, which is assumed to be the remaining contractual life of the option. The compensation expenses of these arrangements are subject to remeasurement over the vesting terms as earned.

For the years ended December 31, 2017, 2016 and 2015, we recorded stock-based compensation expense of $19.2 million, $10.7 million and $3.5 million, respectively. At December 31, 2017, our unrecognized stock-based compensation expense related to unvested stock options, net of estimated forfeitures, was $9.0 million, which we expect to recognize over a weighted-average period of 2.2 years. Unrecognized compensation expense related to RSUs at December 31, 2017 was $14.6 million, which we expect to recognize on a straight-line basis over a weighted-average period of 2.1 years.

The Black-Scholes option-pricing model requires the use of highly subjective assumptions, which determine the fair value of stock-based awards. These assumptions include:

Expected term—The expected term represents the period that stock-based awards are expected to be outstanding. We used the simplified method to determine the expected term, which is based on the mid-point between the vesting date and the end of the contractual term.

Expected volatility—Since we were privately held until our initial public offering in February 2015 and did not have any trading history for our common stock, we have estimated expected volatility based on the average volatility for comparable publicly traded life sciences companies, including molecular diagnostics companies, over a period equal to the expected term of stock option grants and RSUs. When selecting comparable publicly traded life sciences companies, including molecular diagnostics companies, on which we based our expected stock price volatility, we have selected companies with comparable characteristics to us, including enterprise value, risk profiles, position within the industry, and with historical share price information sufficient to meet the expected life of the stock-based awards. We have computed historical volatility data using daily closing prices for the selected companies' shares during the equivalent period of the calculated expected term of the stock-based awards. We will continue to apply this process until a sufficient amount of historical information regarding the volatility of our own stock price becomes available. We estimate expected volatility for ESPP purchases, using our own stock price volatility over the expected six-month term of the ESPP purchase period.

Risk-free interest rate—The risk-free interest rate is based on the U.S. Treasury zero coupon issues in effect at the time of grant for periods corresponding with the expected term of an option.

Dividend yield—We have never paid dividends on our common stock and have no plans to pay dividends on our common stock. Therefore, we used an expected dividend yield of zero.

In addition to the Black-Scholes assumptions, we estimate our forfeiture rate based on an analysis of our actual forfeitures and will continue to evaluate the adequacy of the forfeiture rate based on actual forfeiture experience, analysis of employee turnover behavior, and other factors. The impact from any forfeiture rate adjustment would be recognized in full in the period of adjustment and if the actual number of future forfeitures differs from our estimates, we might be required to record adjustments to stock-based compensation in future periods.

Historically, for all periods prior to our initial public offering, the fair values of the shares of common stock underlying our share-based awards were estimated on each grant date by our board of directors. In order to determine the fair value of our common stock underlying option grants, our board of directors considered, among other things, contemporaneous valuations of our common stock prepared by an independent third-party valuation firm in accordance with the guidance provided by the American Institute of Certified Public Accountants Practice

Guide, Valuation of Privately-Held-Company Equity Securities Issued as Compensation. Given the absence of a public trading market for our common stock, our board of directors exercised reasonable judgment and considered a number of objective and subjective factors to determine the best estimate of the fair value of our common stock, including our stage of development; progress of our research and development efforts; our operating and financial performance, including our levels of available capital resources; the rights, preferences and privileges of our convertible preferred stock relative to those of our common stock; sales of our convertible preferred stock in arms'-length transactions; the valuation of publicly traded companies in our industry, as well as recently completed mergers and acquisitions of peer companies; equity market conditions affecting comparable public companies; and the lack of marketability of our common stock.

In determining a fair value for our common stock, we estimated the enterprise value of our business using the market approach or option pricing back-solve method. The estimated enterprise value was then allocated to the common stock using the Option Pricing Method, or OPM, and the Probability Weighted Expected Return Method, or PWERM, or the hybrid method. The hybrid method applied the PWERM utilizing the probability of two public offering exit scenarios with a low and high value, and the OPM was utilized in the remaining private scenario.

For valuations after the completion of our initial public offering, the fair value of each share of underlying common stock is the closing price of our common stock as reported on the date of grant.

Results of Operations

Comparison of the Years Ended December 31, 2017 and 2016

	Year Ended December 31,		Dollar Change	% Change
	2017	2016		
Revenue:				
Test revenue	$65,169	$24,840	$40,329	162 %
Other revenue	3,052	208	2,844	1,367 %
Total revenue	68,221	25,048	43,173	172 %
Operating expenses:				
Cost of test revenue	50,142	27,878	22,264	80 %
Research and development	46,469	44,630	1,839	4 %
Selling and marketing	53,417	28,638	24,779	87 %
General and administrative	39,472	24,085	15,387	64 %
Total operating expenses	189,500	125,231	64,269	51 %
Loss from operations	(121,279)	(100,183)	(21,096)	21 %
Other income (expense), net	(303)	348	(651)	(187)%
Interest expense	(3,654)	(421)	(3,233)	768 %
Net loss before taxes	(125,236)	(100,256)	(24,980)	25 %
Income tax benefit	(1,856)	—	(1,856)	(100)%
Net loss	$(123,380)	$(100,256)	$(23,124)	23 %

Revenue

The increase in total revenue of $43.2 million for the year ended December 31, 2017 compared to the same period in 2016 was due primarily to increased test volume from our historical business and test and other revenues from our acquisitions of AltaVoice, Good Start Genetics and CombiMatrix. Revenue recognized on a cash basis was $46.4 million in the year ended December 31, 2017 compared to $21.3 million in the same period in 2016, and this increase was principally attributable to increased test volumes from our historical business. Revenue recognized on an accrual basis was $21.8 million in the year ended December 31, 2017 compared to $3.6 million in the same period in 2016. Of this increase, $7.2 million was attributable to increased test volumes from our historical business, $6.2 million was attributable to revenues relating to our acquisition of Good Start Genetics, $2.8 million was attributable to genome network revenues relating to our acquisition of AltaVoice and $2.0 million was attributable to revenues relating to our acquisition of CombiMatrix.

Cost of test revenue

The increase in the cost of test revenue of $22.3 million for the year ended December 31, 2017 compared to the same period in 2016 was primarily due to costs associated with increased test volume partially offset by the effect of cost efficiencies. For the year ended December 31, 2017, the number of samples accessioned increased to approximately 150,000 from approximately 59,000 for the same period in 2016. This increase included approximately 13,000 Good Start Genetics samples and 2,000 CombiMatrix samples. Cost per sample accessioned was $335 in 2017 compared to $473 in 2016. The decrease in the cost per sample was primarily attributable to increased volume, which led to higher labor efficiencies, to production improvements which resulted in lower materials costs, and to automation and software improvements which have reduced the medical interpretation time per report.

Research and development

The increase in research and development expense of $1.8 million for the year ended December 31, 2017 compared to the same period in 2016 was due primarily to personnel costs which increased by $3.3 million principally reflecting the acquisitions of Good Start Genetics and CombiMatrix. Facilities and information technology costs increased by $2.8 million reflecting costs associated with our new production facility and headquarters, which became fully operational in February 2017. Stock-based compensation costs increased by $1.2 million and depreciation expense increased by $0.7 million. These cost increases were partially offset by an increase of $6.5 million in allocations of resources from research and development to cost of revenue, reflecting increased test volumes.

Selling and marketing

The increase in selling and marketing expenses of $24.8 million for the year ended December 31, 2017 compared to the same period in 2016 was due primarily to increased personnel costs of $16.1 million including increases of $12.4 million in salaries and benefits, $2.8 million in sales commissions and $0.9 million in other payroll related costs. Facilities and information technology costs increased by $4.7 million, reflecting costs associated with our new production facility and headquarters, which became fully operational in February 2017. Stock based compensation increased by $2.2 million and travel costs increased by $2.1 million reflecting our growing sales force. In addition, marketing costs increased by $1.0 million and professional services costs increased by $0.4 million.

These cost increases were partially offset by an increase of $1.9 million in allocations of resources from sales and marketing to cost of revenue, reflecting increased test volumes and sign-out activity. In addition, depreciation and amortization costs decreased by $0.2 million.

General and administrative

The increase in general and administrative expenses of $15.4 million for the year ended December 31, 2017 compared to the same period in 2016 was primarily due to increased personnel costs of $5.7 million. Headcount increased principally due to hiring an internal billings and collection team to replace third-party billings and collections contractors. Headcount also increased due to the acquisitions of Good Start Genetics and CombiMatrix. Stock-based compensation increased by $4.4 million due principally to acquisition-related stock compensation expense for Good Start Genetics and CombiMatrix. Depreciation and amortization expense increased by $2.3 million, due primarily to intangible asset amortization of $1.6 million in 2017 and increased depreciation expense of $0.7 million principally for leasehold improvements associated with our new production facility and headquarters. Occupancy costs increased by $2.1 million, principally reflecting costs associated with our new production facility and headquarters. Acquisition-related legal and accounting fees increased by $1.8 million, internal billing and collection costs increased by $1.5 million and legal costs increased by $1.2 million. Professional fees increased by $1.4 million, principally due to third-party billings and collection costs reflecting increased sales volumes and costs related to running dual billing systems for a portion of 2017 as we moved from a third-party billing agency to in-house billing. Information technology costs increased by $1.1 million due principally to computer equipment and software purchases to support

headcount growth.

These cost increases were offset by increased allocations of technology and facilities-related expenses to other functional areas of $7.5 million, reflecting the allocation of costs associated with our new production facility and

headquarters, which became fully operational in February 2017. From February 2016 to January 2017, we recorded rent expense for our new production facility and headquarters as general and administrative expense. Beginning in February 2017, we began allocating this cost across our organization.

Other income (expense), net

The decrease in other income (expense), net of $0.7 million for the year ended December 31, 2017 compared to the same period in 2016 was principally due to a loss on extinguishment of debt of $0.7 million recorded in March 2017. This charge related to our repayment in full, and prior to the scheduled maturity date, of the balance of our obligations under a loan and security agreement entered into in July 2015, or the 2015 Loan Agreement.

Interest expense

The increase in interest expense of $3.2 million for the year ended December 31, 2017 compared to the same period in 2016 was due principally to borrowings, under a loan and security agreement entered into in March 2017, or the 2017 Loan agreement. See Note 7, “Commitments and contingencies” in the Notes to Consolidated Financial Statements included elsewhere in this report. We began borrowed $40.0 million pursuant to the 2017 Loan Agreement in March 2017.

Income tax benefit

The income tax benefit of $1.9 million recorded in the year ended December 31, 2017 was due to changes in our deferred income tax asset valuation allowances resulting from our acquisitions of AltaVoice in January 2017 and Ommdom in June 2017.

Comparison of the Years Ended December 31, 2016 and 2015

	Year Ended December 31,		Dollar Change	% Change
	2016	2015		
Revenue:				
Test revenue	$24,840	$8,378	$16,462	196 %
Other revenue	208	—	208	n/a
Total revenue	25,048	8,378	16,670	199 %
Operating expenses:				
Cost of test revenue	27,878	16,523	11,355	69 %
Research and development	44,630	42,806	1,824	4 %
Selling and marketing	28,638	22,479	6,159	27 %
General and administrative	24,085	16,047	8,038	50 %
Total operating expenses	125,231	97,855	27,376	28 %
Loss from operations	(100,183)	(89,477)	(10,706)	12 %
Other income (expense), net	348	(94)	442	(470)%
Interest expense	(421)	(211)	(210)	100 %
Net loss before taxes	(100,256)	(89,782)	(10,474)	12 %
Income tax benefit	—	—	—	n/a
Net loss	$(100,256)	$(89,782)	$(10,474)	12 %

Revenue

The increase in revenue of $16.7 million for the year ended December 31, 2016 compared to the same period in 2015 was due to increased test volume, which resulted in increased cash collections, as well as the commencement of payments from CMS for tests provided to Medicare patients. Approximately $21.7 million of revenue in the year ended December 31, 2016 was from tests delivered in 2016. We recorded $3.6 million of revenue in the year ended December 31, 2016 on an accrual basis.

Cost of revenue

The increase in the cost of test revenue of $11.4 million for the year ended December 31, 2016 compared to the same period in 2015 was primarily due to costs associated with increased test volume. For the year ended December 31, 2016 the number of billed test results delivered increased to approximately 57,000 from approximately 19,000 for the same period in 2015. However, the effect of increased test volumes on cost of revenue was partially offset by efficiencies that resulted in lower costs per test. Reagent and laboratory materials costs increased by $3.3 million and costs of other materials associated with fulfilling orders increased by $2.6 million. Personnel costs increased by $2.8 million reflecting stock-based compensation costs that increased by $1.0 million as well as increased headcount and increased time spent processing revenue-generating tests. Allocated technology and facilities-related expenses increased by $2.0 million and costs associated with equipment and equipment maintenance increased by $0.8 million.

Research and development

The increase in research and development expenses of $1.8 million for the year ended December 31, 2016 compared to the same period in 2015 was primarily driven by costs related to the continued development of our assay platforms. Personnel costs increased by $7.0 million reflecting additional headcount and increased stock-based compensation costs of $3.4 million. Reference materials costs increased by $0.3 million, also reflecting increased headcount, and data storage costs increased by $0.2 million. These cost increases were partially offset by the effects of reduced validation sequencing activities and increased test volumes in 2016. Costs of reagents and laboratory materials decreased by $2.5 million, as validation sequencing activity was greater in 2015 than in 2016, due principally to the expansion of our test menu introduced in October 2015. Increased test volumes resulted in a greater allocation of resources, by $1.8 million, to cost of revenue in 2016. In addition, equipment costs decreased by $0.5 million, costs associated with software and software licenses decreased by $0.3 million, and consulting costs decreased by $0.3 million.

Selling and marketing

The increase in selling and marketing expenses of $6.2 million for the year ended December 31, 2016 compared to the same period in 2015 was due primarily to increased personnel costs of $6.1 million, primarily reflecting increased headcount, increased sales commissions of $1.5 million, increased stock-based compensation costs of $1.0 million and increased severance costs of $0.5 million primarily associated with the program to streamline our organization. In addition, costs associated with software and software licenses increased by $0.9 million, allocations of technology and facilities-related expenses increased by $0.7 million and travel costs increased by $0.5 million. These increases were partially offset by a reduction of $1.2 million in market collaboration costs due to the termination of certain collaboration projects and reductions in other consulting costs of $0.8 million.

General and administrative

The increase in general and administrative expenses of $8.0 million for the year ended December 31, 2016 compared to the same period in 2015 was primarily due to increased facilities costs of $5.0 million reflecting facilities leases executed in the first quarter of 2015 and in subsequent periods. In February 2016, we began recognizing rent expense for our new production facility and headquarters in San Francisco. Rent expense relating to this facility was $5.8 million for the year ended December 31, 2016 and we recorded this cost as general and administrative expense. Personnel costs increased by $2.9 million principally reflecting increased headcount but also including increased stock-based compensation costs of $1.8 million. Losses realized on the impairment and disposal of facility assets in 2016 were $1.0 million and were for write-offs of leasehold improvements relating to facility lease terminations and for equipment disposals related to the shutdown of our Chilean operations. Billings and collection costs increased by $1.0 million, reflecting increased billing-related cash collections, and consulting costs increased by $0.5 million, principally due to internal systems development efforts.

These increases were partially offset by increased allocations of technology and facilities-related expenses to other functional groups of $1.1 million. In addition, legal costs were lower by $0.8 million in 2016, principally due to facility lease-related activities in 2015 that were not repeated in 2016. Consulting costs were lower by $0.4 million reflecting reduced headcount growth and related recruiting costs as well as increased utilization of internal resources for recruiting functions.

Other income (expense), net

The net increase in other income (expense) of $0.4 million for the year ended December 31, 2016 compared to the same period in 2015 was principally due to increases in interest income, foreign currency exchange gains and other income items.

Interest expense

The increase in interest expense of $0.2 million for the year ended December 31, 2016, compared to the same period in 2015, was principally due to interest expense relating to term loans under the Loan and Security Agreement (the Loan Agreement) executed in July 2015. See Note 7, “Commitments and contingencies” in the Notes to Consolidated Financial Statements included elsewhere in this report. We began borrowing activity pursuant to the Loan Agreement in July 2015 and in 2016 the amount borrowed under the Loan Agreement rose from $7.5 million to $15.0 million.

Liquidity and capital resources

Liquidity and capital expenditures

We have incurred net losses since our inception. For the years ended December 31, 2017 and 2016, we had net losses of $123.4 million and $100.3 million, respectively, and we expect to incur additional losses in the near-term. At December 31, 2017, we had an accumulated deficit of $398.6 million. To date, we have generated only limited revenue, and we may never achieve revenue sufficient to offset our expenses.

Since inception, our operations have been financed primarily by net proceeds of $202.3 million from sales of our convertible preferred stock, net proceeds of approximately $105.7 million from our initial public offering and net proceeds of $47.1 million from an underwritten public offering of our common stock which closed in November 2016. In addition, in August 2017, we sold common stock and Series A convertible preferred stock in a private placement for net proceeds of approximately $68.9 million.

From inception through December 31, 2017, we have entered into various capital lease agreements for an aggregate financing amount of $14.9 million to obtain laboratory equipment. The terms of our capital leases are typically three years. Interest rates for currently outstanding capital leases range from 4.3% to 6.4% and the leases are secured by the underlying equipment.

In addition, in July 2015, we entered into the 2015 Loan Agreement with a bank under which term loans for purchases of equipment up to an aggregate of $15.0 million were available in tranches not to exceed $2.5 million. At December 31, 2016, we had borrowed a total of $15.0 million under the 2015 Loan Agreement and our outstanding balance payable to the lender was $12.1 million. In March 2017, in connection with the execution of a new loan agreement, we repaid in full the balance of our obligations under the 2015 Loan Agreement, approximately $12.1 million, and terminated the 2015 Loan Agreement.

On March 15, 2017, we entered into the 2017 Loan Agreement with a lender pursuant to which we borrowed an initial term loan of $40.0 million, and received net proceeds of approximately $39.7 million. Subject to certain conditions, we will also be eligible to borrow a second term loan of $20.0 million in the first quarter of 2018. On February 26, 2018, we entered into the Amended 2017 Loan Agreement with the same lender, under which we will be eligible to

borrow a third term loan of $20.0 million in the second quarter of 2018.

Term loans under the Amended 2017 Loan Agreement bear interest at a floating rate equal to an index rate plus 7.73%, where the index rate is the greater of 0.77% or the 30-day U.S. Dollar London Interbank Offered Rate, or LIBOR, as reported in The Wall Street Journal, with the floating rate resetting monthly subject to a floor of 8.5%. We can make monthly interest-only payments until May 1, 2019 (or, subject to certain conditions, May 1, 2020), and thereafter monthly payments of principal and interest are required to fully amortize the borrowed amount by a final maturity date of March 1, 2022. A fee of 5% of each funded draw is due at the earlier of prepayment or loan maturity, a facility fee of 0.5% is due upon funding for each draw, and a prepayment fee of between 1% and 3% of the outstanding balance will apply in the event of a prepayment. Concurrent with each term loan, we will grant to the lender a warrant to acquire shares of our common stock equal to the quotient of 3% of the funded amount divided by a per share exercise price equal to the lower of the average closing price for the previous ten days of trading (calculated on the day prior to funding) or the closing price on the day prior to funding. In connection with the initial term loan, we granted the lender a warrant to purchase 116,845 shares of common stock at an exercise price of $10.27 per share. The warrants have a term of ten years from the date of issuance and include a cashless exercise provision.

Our obligations under the Amended 2017 Loan Agreement are subject to quarterly covenants to achieve certain volume and revenue levels as well as additional covenants, including limits on our ability to dispose of assets, undergo a change in control, merge with or acquire other entities, incur debt, incur liens, pay dividends or other distributions to holders of our capital stock, repurchase stock and make investments, in each case subject to certain exceptions. Our obligations under the Amended 2017 Loan Agreement are secured by a security interest on substantially all of our assets, excluding our intellectual property.

We estimate our capital expenditures for the full year 2018 will be $6.0 million.

At December 31, 2017 and 2016, we had $76.0 million and $97.3 million, respectively, of cash, cash equivalents, restricted cash and marketable securities.

Our primary uses of cash are to fund our operations as we continue to grow our business and potentially to acquire businesses and technologies. Cash used to fund operating expenses is affected by the timing of when we pay expenses, as reflected in the change in our outstanding accounts payable and accrued expenses.

We have incurred substantial losses since our inception, and we expect to continue to incur losses in the near term. We believe our existing cash, cash equivalents and marketable securities as of December 31, 2017, revenue from the sale of our tests, and term loans available to us pursuant to the Amended 2017 Loan Agreement, will be sufficient to meet our anticipated cash requirements for our currently-planned operations for the 12-month period following the filing date of this report.

We may need additional funding to finance operations prior to achieving profitability or should we make additional acquisitions. We regularly consider fundraising opportunities and will determine the timing, nature and size of future financings based upon various factors, including market conditions and our operating plans. We may in the future elect to finance operations by selling equity or debt securities or borrowing money. We also may elect to finance future acquisitions by selling equity or debt securities or borrowing money. If we raise funds by issuing equity securities, dilution to stockholders may result. Any equity securities issued may also provide for rights, preferences or privileges senior to those of holders of our common stock. If we raise funds by issuing debt securities, these debt securities would have rights, preferences and privileges senior to those of holders of our common stock. In addition, the terms of debt securities or borrowings could impose significant restrictions on our operations. If additional funding is required, there can be no assurance that additional funds will be available to us on acceptable terms on a timely basis, if at all. If we are unable to obtain additional funding when needed, we will need to curtail planned activities to reduce costs. Doing so will likely have an unfavorable effect on our ability to execute on our business plan, and have an adverse effect on our business, results of operations and future prospects.

We have implemented the guidance in Financial Accounting Standards Board ASU No. 2014-15, Presentation of Financial Statements — Going Concern (Subtopic 205-40), and concluded that there are not conditions or events, considered in the aggregate, that raise substantial doubt about our ability to continue as a going concern for a period of one year following the date that the December 31, 2017 financial statements are issued.

The following table summarizes our cash flows:

	Year Ended December 31,		
	2017	2016	2015
	(in thousands)		
Cash used in operating activities	$(97,739)	$(76,317)	$(80,655)

Cash provided by (used in) investing activities	(37,195)	16,061	(60,891)
Cash provided by financing activities	80,871	53,709	112,438

Cash flows from operating activities

For the year ended December 31, 2017, cash used in operating activities of $97.7 million principally resulted from our net loss of $123.4 million and non-cash income tax benefits offset by non-cash charges of $19.2 million for stock-based compensation, $9.2 million for depreciation and amortization and $1.8 million for remeasurements of liabilities associated with business combinations. The net effect on cash of changes in net operating assets was a use of cash of $3.1 million due principally to the effect of increase in accounts receivable.

For the year ended December 31, 2016, cash used in operating activities of $76.3 million principally resulted from our net loss of $100.3 million offset by non-cash charges of $10.7 million for stock-based compensation, $6.6 million for depreciation and amortization and $1.0 million for asset impairment charges. The net effect on cash of changes in net operating assets was $5.3 million and was due principally to the effect of increases in accrued expenses and other assets.

For the year ended December 31, 2015, cash used in operating activities of $80.7 million principally resulted from our net loss of $89.8 million offset by non cash charges of $5.3 million for depreciation and amortization, $3.5 million for stock based compensation and $0.6 million for amortization of premiums on marketable securities. The net effect on cash of changes in net operating assets was $0.3 million.

Cash flows from investing activities

For the year ended December 31, 2017, cash used in investing activities of $37.2 million resulted from purchases of marketable securities exceeding proceeds from maturities of marketable securities by $33.1 million and purchases of property and equipment of $6.9 million, partially offset by $2.8 million cash acquired from acquisition of businesses.

For the year ended December 31, 2016, cash provided by investing activities of $16.2 million resulted from proceeds from maturities of marketable securities exceeding purchases of marketable securities by $27.7 million, partially offset by purchases of property and equipment of $11.6 million.

For the year ended December 31, 2015, cash used in investing activities of $65.6 million resulted primarily from purchases of marketable securities exceeding proceeds from sales and maturities of marketable securities by $54.4 million and purchases of property and equipment of $6.5 million. In addition, restricted cash increased by $4.7 million due to deposits for our new facility lease executed in September 2015 and compensating balances for our Loan Agreement executed in July 2015.

Cash flows from financing activities

For the year ended December 31, 2017, cash provided by financing activities of $80.9 million consisted of net proceeds of $68.9 million from the August 2017 private placement, net proceeds of $39.7 million from an initial term loan under the 2017 Loan Agreement and cash received from employee stock plan purchases, exercises of stock options and exercises of warrants totaling $5.7 million. These cash inflows were partially offset by a cash payment of $18.4 million to settle loan obligations assumed in the Good Start acquisition, other loan payments of $12.1 million and capital lease obligations payments of $3.0 million.

For the year ended December 31, 2016, cash provided by financing activities of $53.7 million resulted from net proceeds from the underwritten public offering of common stock of $47.1 million, borrowings of $7.5 million under the Loan Agreement and cash received from exercises of stock options of $3.1 million, partially offset by loan payments of $2.4 million and capital lease obligations payments of $1.6 million.

For the year ended December 31, 2015, cash provided by financing activities of $112.4 million resulted primarily from $107.1 million of net proceeds from our initial public offering completed in February 2015 and borrowings of $7.5 million under the Loan Agreement executed in July 2015, partially offset by payments of $2.0 million on our capital lease obligations and loan payments of $0.4 million.

Contractual obligations

The following table summarizes our contractual obligations, including interest, as of December 31, 2017 (in thousands):

Contractual obligations:	2018	2019 and 2020	2021 and 2022	2023 and beyond	Total
Operating leases	$9,707	$ 19,145	$ 19,403	$29,846	$78,101
Capital leases	2,369	3,481	21	—	5,871
Term loan	3,691	28,575	20,198	—	52,464
Total	$15,767	$ 51,201	$ 39,622	$29,846	$136,436

In September 2015, we entered into a lease agreement for our new production facility and headquarters in San Francisco, California, in which we commenced occupancy and operations in January 2017. This lease expires in July 2026. Leases for other facilities in California and in Cambridge, Massachusetts expire at various dates from January 2018 through October 2026.

Aggregate future minimum lease payments for these facilities are included in the table above. See Note 7, “Commitments and contingencies” in the Notes to Condensed Consolidated Financial Statements.

In March 2017, we entered into the 2017 Loan Agreement pursuant to which we borrowed an initial term loan of $40.0 million and received net proceeds of $39.7 million. Subject to certain conditions, and pursuant to the Amended 2017 Loan Agreement, we will also be eligible to borrow a second term loan of $20.0 million in the first quarter of 2018 and a third term loan of $20.0 million in the second quarter of 2018. The amounts in the line item “Term loan” in the table above include principal and interest payments pertaining to the initial term loan of $40.0 million. See Note 7, “Commitments and contingencies” and Note 13, “Subsequent event” in the Notes to Consolidated Financial Statements.

Off-balance sheet arrangements

We have not entered into any off-balance sheet arrangements and do not have any holdings in variable interest entities.

Recent accounting pronouncements

See “Recent accounting pronouncements” in Note 2, “Summary of significant accounting policies” in the Notes to Consolidated Financial Statements for a discussion of recently adopted accounting pronouncements and accounting pronouncements not yet adopted, and their expected effect on our financial position and results of operations.

ITEM 7A. Quantitative and Qualitative Disclosures about Market Risk.

We are exposed to market risks in the ordinary course of our business. These risks primarily relate to interest rates. We had loan obligations of $39.1 million at December 31, 2017, which resulted from a term loan pursuant to the 2017 Loan Agreement. This loan is subject to a floating interest rate. We had capital lease obligations of $5.4 million as of December 31, 2017, which result from various capital lease agreements to obtain laboratory equipment. Our capital lease obligations carry fixed rates of interest. Our cash, cash equivalents, restricted cash and marketable securities totaled $76.0 million at December 31, 2017, and consisted of bank deposits, money market funds, U.S. treasury notes, and U.S. government agency securities. Such interest-bearing instruments carry a degree of risk; however, because our investments are primarily short-term in duration, we have not been exposed to, nor do we anticipate being exposed to, material risks due to changes in interest rates. At December 31, 2017, a hypothetical 1% (100 basis points) increase in interest rates would have resulted in a decline in the fair value of our cash equivalents and portfolio of marketable securities of approximately $389,000. Fluctuations in the value of our cash equivalents and portfolio of marketable securities caused by a change in interest rates (gains or losses on the carrying value) are recorded in other comprehensive gain (loss), and are realized only if we sell the underlying securities prior to maturity or declines in fair value are determined to be other-than-temporary.

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ITEM 8. Financial Statements and Supplementary Data.

Invitae Corporation

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Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors of Invitae Corporation

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Invitae Corporation (the Company) as of December 31, 2017 and 2016, the related consolidated statements of operations, comprehensive loss, convertible preferred stock and stockholders' equity (deficit), and cash flows for each of the three years in the period ended December 31, 2017, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2017 and 2016, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2017, in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (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 financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the 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 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 financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2013.

Redwood City, California

March 5, 2018

INVITAE CORPORATION

Consolidated Balance Sheets

	December 31, 2017	December 31, 2016
Assets		
Current assets:		
Cash and cash equivalents	$12,053	$66,825
Marketable securities	52,607	25,798
Accounts receivable	10,422	1,153
Prepaid expenses and other current assets	11,599	8,024
Total current assets	86,681	101,800
Property and equipment, net	30,341	23,793
Restricted cash	5,406	4,697
Marketable securities, non-current	5,983	—
Intangible assets, net	35,516	—
Goodwill	46,575	—
Other assets	576	361
Total assets	$211,078	$130,651
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$8,606	$3,352
Accrued liabilities	22,742	6,711
Capital lease obligation, current portion	2,039	1,309
Debt, current portion	—	3,381
Total current liabilities	33,387	14,753
Capital lease obligation, net of current portion	3,373	266
Debt, net of current portion	39,084	8,721
Other long-term liabilities	13,440	7,837
Total liabilities	89,284	31,577
Commitments and contingencies (Note 7)		
Stockholders' equity:		
Preferred stock, $0.0001 par value: Authorized: 20,000,000 shares; Issued and outstanding: 3,458,823 and 0 shares as of December 31, 2017 and December 31, 2016, respectively	—	—
Common stock, $0.0001 par value: Authorized: 400,000,000 shares; Issued and outstanding: 53,595,914 and 41,143,513 shares as of December 31, 2017 and December 31, 2016, respectively	5	4
Accumulated other comprehensive loss	(171)	—
Additional paid-in capital	520,558	374,288
Accumulated deficit	(398,598)	(275,218)
Total stockholders' equity	121,794	99,074

Total liabilities and stockholders' equity	$211,078	$130,651

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

INVITAE CORPORATION

Consolidated Statements of Operations

	Year Ended December 31,		
	2017	2016	2015
Revenue:			
Test revenue	$65,169	$24,840	$8,378
Other revenue	3,052	208	-
Total revenue	68,221	25,048	8,378
Costs and operating expenses:			
Cost of test revenue	50,142	27,878	16,523
Research and development	46,469	44,630	42,806
Selling and marketing	53,417	28,638	22,479
General and administrative	39,472	24,085	16,047
Total costs and operating expenses	189,500	125,231	97,855
Loss from operations	(121,279)	(100,183)	(89,477)
Other income (expense), net	(303)	348	(94)
Interest expense	(3,654)	(421)	(211)
Net loss before taxes	(125,236)	(100,256)	(89,782)
Income tax benefit	(1,856)	—	—
Net loss	$(123,380)	$(100,256)	$(89,782)
Net loss per share, basic and diluted	$(2.65)	$(3.02)	$(3.18)
Shares used in computing net loss per share, basic and diluted	46,511,739	33,176,305	28,213,324

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

INVITAE CORPORATION

Consolidated Statements of Comprehensive Loss

	Year Ended December 31,		
	2017	2016	2015
	(In thousands)		
Net loss	$(123,380)	$(100,256)	$(89,782)
Other comprehensive income (loss):			
Unrealized income (loss) on available-for-sale marketable securities, net of tax	(171)	15	(15)
Comprehensive loss	$(123,551)	$(100,241)	$(89,797)

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

INVITAE CORPORATION

Consolidated Statements of Convertible Preferred Stock and Stockholders' Equity (Deficit)

	Convertible Preferred stock		Common Stock		Additional Paid-In	Accumulated Other Comprehensive Income	Accumulated	Total Stockholders Equity
	Shares	Amount	Shares	Amount	Capital	(Loss)	Deficit	(Deficit)
	(In thousands, except share amounts)							
Balance as of December 31, 2014	141,131,524	$202,305	944,581	$ —	$1,604	$ —	$(85,180)	$(83,576)
Conversion of preferred stock into common stock upon initial public offering	(141,131,524)	(202,305)	23,521,889	3	202,302	—	—	202,305
Issuance of common stock in connection with initial public offering, net of offering costs of $2,961	—	—	7,302,500	1	105,667	—	—	105,668
Common stock issued on exercise of stock options	—	—	148,870	—	288	—	—	288
Vesting of common stock related to early exercise of options	—	—	17,281	—	11	—	—	11
Stock-based compensation expense	—	—	—	—	3,477	—	—	3,477
Unrealized loss on investments	—	—	—	—	—	(15)	—	(15)
Net loss	—	—	—	—	—	—	(89,782)	(89,782)
Balance as of December 31, 2015	—	—	31,935,121	4	313,349	(15)	(174,962)	138,376
Common stock issued on exercise	—	—	243,916	—	744	—	—	744

of stock options								
Common stock issued pursuant to vesting of restricted stock units			156,810	(1)	—	—	—	(1)
Common stock issued pursuant to employee stock purchase plan	—	—	369,674	—	2,391	—	—	2,391
Common stock issued in connection with underwritten public offering, net of offering costs of $3,498	—	—	8,433,332	1	47,101	—	—	47,102
Vesting of common stock related to early exercise of options			4,660	—	4			4
Stock-based compensation expense	—	—	—	—	10,699	—	—	10,699
Unrealized income (loss) on available-for-sale marketable securities, net of tax	—	—	—	—	—	15	—	15
Net loss	—	—	—	—	—	—	(100,256)	(100,256)
Balance as of December 31, 2016	—	—	41,143,513	4	374,288	—	(275,218)	99,074
Common stock and convertible preferred stock issued in connection with private placement, net of offering costs of $4,599	3,458,823	—	5,188,235	1	68,896	—	—	68,897

Common stock issued on exercise of stock options, net	—	—	386,868	—	1,706	—	—	1,706
Common stock issued pursuant to vesting of restricted stock units, net	—	—	924,591	—	—	—	—	—
Common stock issued pursuant to acquisition-related transaction bonus	—	—	4,284	—	—	—	—	—
Common stock issued pursuant to exercises of warrants	—	—	232,038	—	1,381	—	—	1,381
Common stock issued pursuant to employee stock purchase plan	—	—	378,583	—	2,635	—	—	2,635
Common stock issued pursuant to business combinations	—	—	5,175,931	—	50,808	—	—	50,808
Common stock issued to settle assumed liabilities	—	—	161,871	—	1,272	—	—	1,272
Warrants issued pursuant to Loan and Security Agreement	—	—	—	—	740	—	—	740
Stock-based compensation expense	—	—	—	—	18,832	—	—	18,832
Unrealized income (loss) on	—	—	—	—	—	(171)	—	(171)

available-for-sale marketable securities, net of tax								
Net loss	—	—	—	—	—	—	(123,380)	(123,380)
Balance as of December 31, 2017	3,458,823	$—	53,595,914	$ 5	$520,558	$ (171)	$(398,598)	$121,794

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

INVITAE CORPORATION

Consolidated Statements of Cash Flows

	Year Ended December 31,		
	2017	2016	2015
	(In thousands)		
Cash flows from operating activities:			
Net loss	$(123,380)	$(100,256)	$(89,782)
Adjustments to reconcile net loss to net cash used in operating activities:			
Depreciation and amortization	9,181	6,553	5,321
Stock-based compensation	19,221	10,699	3,477
Amortization of premium on marketable securities	136	311	632
Loss on disposal of assets	268	1,030	23
Remeasurements of liabilities associated with business combinations	1,810	—	—
Benefit from income taxes	(1,856)	—	—
Changes in operating assets and liabilities net of effects of business combination:			
Accounts receivable	(1,963)	(843)	(309)
Prepaid expenses and other current assets	(641)	(1,149)	(1,367)
Other assets	(185)	1,465	36
Accounts payable	(535)	(111)	508
Accrued expenses and other liabilities	(37)	5,984	806
Net cash used in operating activities	(97,981)	(76,317)	(80,655)
Cash flows from investing activities:			
Purchases of marketable securities	(101,867)	(90,236)	(216,994)
Proceeds from sales of marketable securities	—	—	15,891
Proceeds from maturities of marketable securities	68,768	117,922	146,676
Acquisition of businesses, acquired cash	2,821	—	—
Purchases of property and equipment	(6,675)	(11,625)	(6,464)
Net cash provided by (used in) investing activities	(36,953)	16,061	(60,891)
Cash flows from financing activities:			
Proceeds from issuance of common stock upon initial public offering, net of issuance costs	—	—	107,120
Proceeds from underwritten public offering of common stock, net of issuance costs	—	47,102	—
Proceeds from issuance of common stock	74,619	3,134	288
Proceeds from loan agreement	—	7,500	7,500
Proceeds from loan and security agreement	39,661	—	—
Loan payments	(30,457)	(2,438)	(413)
Capital lease principal payments	(2,952)	(1,589)	(2,010)
Loan agreement financing costs	—	—	(47)
Net cash provided by financing activities	80,871	53,709	112,438
Net decrease in cash, cash equivalents and restricted cash	(54,063)	(6,547)	(29,108)
Cash, cash equivalents and restricted cash at beginning of period	71,522	78,069	107,177

Cash, cash equivalents and restricted cash at end of period	$17,459	$71,522	$78,069
Supplemental cash flow information:			
Interest paid	$2,852	$421	$211
Supplemental cash flow information of non-cash investing and financing activities:			
Equipment acquired through capital leases	$6,789	$—	$1,639
Conversion of convertible preferred stock to common stock	$—	$—	$202,305
Purchases of property and equipment in accounts payable and accrued liabilities	$200	$1,644	$603
Warrants issued pursuant to loan and security agreement	$740	$—	$—
Common stock issued for acquisition of businesses	$50,808	$—	$—
Consideration payable for acquisition of businesses	$13,276	$—	$—
Common stock issued to settle assumed liabilities	$1,272	$—	$—

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

INVITAE CORPORATION

Notes to Consolidated Financial Statements

December 31, 2017

1. Organization and description of business

Invitae Corporation (the "Company") was incorporated in the State of Delaware on January 13, 2010, as Locus Development, Inc. and changed its name to Invitae Corporation in 2012. The Company utilizes an integrated portfolio of laboratory processes, software tools and informatics capabilities to process DNA-containing samples, analyze information about patient-specific genetic variation and generate test reports for clinicians and their patients. The Company's production facility and headquarters is located in San Francisco, California. The Company currently has more than 20,000 genes in production and provides a variety of diagnostic tests that can be used in multiple indications. The Company's tests include multiple genes associated with hereditary cancer, neurological disorders, cardiovascular disorders, pediatric disorders, metabolic disorders and other hereditary conditions. In addition, and as a result of the acquisitions of Good Start Genetics in August 2017 and CombiMatrix Corporation in November 2017, the Company's tests also include preimplantation and carrier screening for inherited disorders, prenatal diagnosis, miscarriage analysis and pediatric developmental disorders. The Company operates in one segment.

The Company has incurred substantial losses since its inception and expects to continue to incur operating losses in the near-term. For the year ended December 31, 2017, the Company's net loss was $123.4 million. At December 31, 2017, the Company's accumulated deficit was $398.6 million. To date, the Company has generated only limited revenue, and it may never achieve revenue sufficient to offset its expenses. The Company believes its existing cash, cash equivalents and marketable securities as of December 31, 2017, revenue from the sale of its tests, and amounts available under a loan agreement will be sufficient to meet its anticipated cash requirements for its currently-planned operations for the 12-month period following the filing date of this report.

The Company may need to obtain additional funding to finance operations prior to achieving profitability. Company management regularly considers fundraising opportunities and will determine the timing, nature and size of future financings based upon various factors, including market conditions and management's operating plans. The Company may in the future elect to finance operations by selling equity or debt securities or borrowing money. If additional funding is required, there can be no assurance that additional funds will be available to the Company on acceptable terms on a timely basis, if at all. If the Company is unable to obtain additional funding when needed, it will need to curtail planned activities to reduce costs. Doing so will likely have an unfavorable effect on the Company's ability to execute on its business plan, and have an adverse effect on its business, results of operations and future prospects.

The Company has implemented the guidance in Financial Accounting Standards Board ("FASB") Accounting Standards Update ("ASU") No. 2014-15, Presentation of Financial Statements – Going Concern (Subtopic 205-40), and concluded that there are not conditions or events, considered in the aggregate, that raise substantial doubt about the Company's ability to continue as a going concern for a period of one year following the date that the December 31, 2017 financial statements are issued.

2. Summary of significant accounting policies

Principles of consolidation

The consolidated financial statements include the accounts of the Company and its wholly owned subsidiaries. All intercompany balances and transactions have been eliminated in consolidation.

Use of estimates

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent liabilities as of the date of the financial statements and the reported amounts of revenue and expenses during the reporting period. The Company believes judgment is involved in determining revenue recognition; the acquisition-date fair value of intangible assets; the fair value of contingent consideration associated with acquisitions; the recoverability of long-lived assets; impairment of goodwill and intangible assets; stock-based compensation expense; and income tax uncertainties. The Company bases these estimates on historical and anticipated results, trends, and various other assumptions that the Company believes are reasonable under the circumstances, including assumptions as to future events. Actual results could differ materially from those estimates and assumptions.

Concentrations of credit risk and other risks and uncertainties

Financial instruments that potentially subject the Company to a concentration of credit risk consist of cash, cash equivalents, marketable securities and accounts receivable. The Company's cash and cash equivalents are held by financial institutions in the United States. Such deposits may exceed federally insured limits. The Company does not perform evaluations of customers' financial condition and does not require collateral.

Significant customers are those that represent 10% or more of the Company's total revenue for each year presented on the statements of operations. For each significant customer, revenue as a percentage of total revenue is as follows:

	December 31,		
Customers	2017	2016	2015
Customer A	13%	11%	*
Customer B	*	*	13%

* Less than 10% of total revenue

Customer A represented 13% of accounts receivable in the consolidated financial statements as of December 31, 2017. No single customer represented 10% or more of accounts receivable in the consolidated financial statements as of December 31, 2016.

Cash equivalents

The Company considers all highly liquid investments with original maturities of three months or less from the date of purchase to be cash equivalents. Cash equivalents consist primarily of amounts invested in money market funds and U.S. government agency securities.

Marketable securities

All marketable securities have been classified as "available-for-sale" and are carried at estimated fair value as determined based upon quoted market prices or pricing models for similar securities. Management determines the appropriate classification of its marketable debt securities at the time of purchase and reevaluates such designation at each balance sheet date. Short-term marketable securities have maturities less than 365 days at the balance sheet date. Unrealized gains and losses are excluded from earnings and are reported as a component of other comprehensive loss. Realized gains and losses and declines in fair value judged to be other than temporary, if any, on available-for-sale securities are included in interest and other income (expense), net. The cost of securities sold is based on the specific-identification method. Interest on marketable securities is included in interest and other income (expense), net.

Accounts receivable

The Company receives payment for its tests from partners, patients, institutional customers and third-party payers. For most payers, the Company has not been able to demonstrate a predictable pattern of collectability, and therefore recognizes revenue when payment is received. For payers who have demonstrated a consistent pattern of payment of tests billed, the Company recognizes revenue, at estimated realizable amounts, upon delivery of test results. Accounts receivable balances primarily represent partner, patient, institutional customer and Medicare billings.

Restricted cash

Restricted cash consists of money market funds that serve as: collateral for a security deposit for the Company's lease agreement for its production facility and headquarters; collateral for security deposits for facilities of the Company's

subsidiary Good Start; collateral for a credit card agreement at one of the Company’s financial institutions; and for securing a letter of credit as collateral for a facility sublease agreement.

Cash, cash equivalents and restricted cash

The following table provides a reconciliation of cash, cash equivalents and restricted cash reported within the consolidated balance sheets that sum to the total of the same amounts shown in the statements of cash flows (in thousands):

	December 31, 2017	December 31, 2016
Cash and cash equivalents	$ 12,053	$ 66,825
Restricted cash	5,406	4,697
Total cash, cash equivalents and restricted cash	$ 17,459	$ 71,522

Business combinations

The tangible and identifiable intangible assets acquired and liabilities assumed in a business combination are recorded based on their estimated fair values as of the business combination date, including identifiable intangible assets which either arise from a contractual or legal right or are separable from goodwill. The Company bases the estimated fair value of identifiable intangible assets acquired in a business combination on independent valuations that use information and assumptions provided by management, which consider management's estimates of inputs and assumptions that a market participant would use. Any excess purchase price over the estimated fair value assigned to the net tangible and identifiable intangible assets acquired and liabilities assumed is recorded to goodwill. The use of alternative valuation assumptions, including estimated revenue projections, growth rates, cash flows, discount rates, estimated useful lives and probabilities surrounding the achievement of contingent milestones could result in different purchase price allocations and amortization expense in current and future periods.

In circumstances where an acquisition involves a contingent consideration arrangement that meets the definition of a liability under FASB Accounting Standards Codification ("ASC") Topic 480, Distinguishing Liabilities from Equity, the Company recognizes a liability equal to the fair value of the contingent payments the Company expects to make as of the acquisition date. The Company remeasures this liability each reporting period and records changes in the fair value as a component of operating expenses.

Transaction costs associated with acquisitions are expensed as incurred in general and administrative expenses. Results of operations and cash flows of acquired companies are included in the Company's operating results from the date of acquisition.

Intangible assets

Amortizable intangible assets include trade names, non-compete agreements, developed technology and customer relationships acquired as part of business combinations. Customer relationships are amortized on an accelerated basis, utilizing free cash flows, over periods ranging from five years to eleven years. All other intangible assets subject to amortization are amortized using the straight-line method over their estimated useful lives ranging from two to 15 years. All intangible assets subject to amortization are reviewed for impairment in accordance with ASC 360, Property, Plant and Equipment.

Goodwill

In accordance with ASC 350, Intangibles-Goodwill and Other ("ASC 350"), the Company's goodwill is not amortized but is tested for impairment on an annual basis or whenever events or changes in circumstances indicate that the

carrying amount of these assets may not be recoverable. Under ASC 350, the Company performs annual impairment reviews of its goodwill balance during the fourth fiscal quarter. In testing for impairment, the Company compares the fair value of its reporting unit to its carrying value including the goodwill of that unit. If the carrying value, including goodwill, exceeds the reporting unit's fair value, the Company will recognize an impairment loss for the amount by which the carrying amount exceeds the reporting unit's fair value. The loss recognized cannot exceed the total amount of goodwill allocated to that reporting unit.

The Company performed its first annual impairment review of its goodwill balance as of October 1, 2017. The Company determined, after performing a quantitative review, that it is more likely than not that the fair value of its reporting unit is substantially in excess of its carrying amount. Accordingly, there was no impairment. The Company did not incur any goodwill impairment losses in any of the periods presented.

Leases

The Company rents its facilities under operating lease agreements and recognizes related rent expense on a straight-line basis over the term of the applicable lease agreement. Some of the lease agreements contain rent holidays, scheduled rent increases, lease incentives, and renewal options. Rent holidays and scheduled rent increases are included in the determination of rent expense to be recorded over the lease term. Lease incentives are recognized as a reduction of rent expense on a straight-line basis over the term of the lease. Renewals are not assumed in the determination of the lease term unless they are deemed to be reasonably assured at the inception of the lease. The Company recognizes rent expense beginning on the date it obtains the legal right to use and control the leased space.

Property and equipment

Property and equipment are stated at cost less accumulated depreciation and amortization. Depreciation is computed using the straight line method over the estimated useful lives of the assets, generally between three and seven years. Leasehold improvements are amortized using the straight line method over the shorter of the estimated useful life of the asset or the term of the lease. Amortization expense of assets acquired through capital leases is included in depreciation and amortization expense in the consolidated statements of operations. Maintenance and repairs are charged to expense as incurred, and improvements and betterments are capitalized. When assets are retired or otherwise disposed of, the cost and accumulated depreciation are removed from the balance sheet and any resulting gain or loss is reflected in the statements of operations in the period realized.

The useful lives of the property and equipment are as follows:

Furniture and fixtures	7 years
Automobiles	7 years
Laboratory equipment	5 years
Computer equipment	3 years
Software	3 years
Leasehold improvements	Shorter of lease term or estimated useful life

Long lived assets

The Company reviews long lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of the assets may not be recoverable. An impairment loss is recognized when the total estimated future undiscounted cash flows expected to result from the use of the asset and its eventual disposition are less than its carrying amount. Impairment, if any, is assessed using discounted cash flows or other appropriate measures of fair value. The Company recorded asset impairment losses of $1.0 million in 2016 relating to leasehold improvements and to the shutdown of the Company’s Chilean operations. All impairment losses were charged to general and administrative expense. There were no impairment losses recorded for any other period presented.

Fair value of financial instruments

The Company’s financial instruments consist principally of cash and cash equivalents, marketable securities, accounts payable, accrued liabilities, capital leases and debt. The carrying amounts of certain of these financial instruments, including cash and cash equivalents, accounts receivable, accounts payable and accrued and other current liabilities approximate their current fair value due to the relatively short-term nature of these accounts. Based on borrowing rates available to the Company, the carrying value of capital leases approximates fair value.

See Note 6, “Fair value measurements” for disclosure of the fair value of debt and further information on the fair value of the Company’s financial instruments.

Revenue recognition

Test revenue is generated primarily from the sale of tests that provide analysis and associated interpretation of the sequencing of parts of the genome. Revenue associated with subsequent re-requisition services and family variant tests was de minimis for all periods presented.

Test revenue is recognized when persuasive evidence of an arrangement exists; delivery has occurred or services have been rendered; the fee is fixed or determinable; and collectability is reasonably assured. The criterion for whether the fee is fixed or determinable and whether collectability is reasonably assured are based on management's judgments. When evaluating collectability, in situations where contracted reimbursement coverage does not exist, the Company considers whether the Company has sufficient history to reliably estimate a payer's individual payment patterns. The Company reviews the number of tests paid against the number of tests billed over at least six months of payment history and the payer's outstanding balance for unpaid tests to determine whether payments are being made at a consistently high percentage of tests billed and at appropriate amounts given the amount billed. For most payers, the Company has not been able to demonstrate a predictable pattern of collectability, and therefore recognizes revenue when payment is received. For payers who have demonstrated a consistent pattern of payment of tests billed at appropriate amounts, the Company recognizes revenue, at estimated realizable amounts, upon delivery of test results.

Other revenue consists primarily of revenue from genome network subscription services which is recognized on a straight-line basis over the subscription term, and revenue from collaboration agreements.

Cost of test revenue

Cost of test revenue reflects the aggregate costs incurred in delivering the genetic testing results to clinicians and includes expenses for personnel costs including stock-based compensation, materials and supplies, equipment and infrastructure expenses associated with testing and allocated overhead including rent, equipment depreciation and utilities. Costs associated with performing the Company's test are recorded as the test is processed regardless of whether and when revenue is recognized with respect to that test.

Income taxes

The Company uses the asset and liability method of accounting for income taxes. Under this method, deferred tax assets and liabilities are determined based on the differences between the financial reporting and the tax bases of assets and liabilities and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse. A valuation allowance is provided when it is more likely than not that some portion or all of a deferred tax asset will not be realized.

Stock-based compensation

The Company measures its stock-based payment awards made to employees and directors based on the estimated fair values of the awards and recognizes the compensation expense over the requisite service period. The Company uses the Black-Scholes option-pricing model to estimate the fair value of its stock option awards and employee stock purchase plan ("ESPP") purchases. The fair value of restricted stock unit ("RSU") awards with time-based vesting terms is based on the grant date share price. The Company grants performance-based restricted stock unit ("PRSU") awards to certain employees which vest upon the achievement of certain performance conditions, subject to the employees' continued service relationship with the Company. The probability of vesting is assessed at each reporting period and compensation cost is adjusted based on this probability assessment. The Company recognizes such compensation expense on an accelerated vesting method.

Stock-based compensation expense for awards without a performance condition is recognized using the straight-line method. Stock-based compensation expense is based on the value of the portion of stock-based payment awards that is ultimately expected to vest. As such, the Company's stock-based compensation is reduced for the estimated forfeitures at the date of grant and revised, if necessary, in subsequent periods if actual forfeitures differ from those estimates.

The Company accounts for compensation expense related to stock options granted to non-employees based on fair values estimated using the Black-Scholes option-pricing model. Stock options granted to non-employees are re-measured at each reporting date until the award is vested.

The Company accounts for stock issued as compensation in connection with business combinations based on the fair value of the Company's common stock on the date of issuance.

Advertising

Advertising expenses are expensed as incurred. The Company recorded advertising expenses of $0.6 million, $0.5 million and $0.4 million in 2017, 2016 and 2015, respectively.

Comprehensive loss

Comprehensive loss is composed of two components: net loss and other comprehensive loss. Other comprehensive loss refers to gains and losses that under U.S. GAAP are recorded as an element of stockholders' equity (deficit), but are excluded from net loss. The Company's other comprehensive loss consists of unrealized losses on investments in available-for-sale securities.

Net loss per common share

Basic net loss per common share is calculated by dividing net loss by the weighted-average number of common shares outstanding during the period, without consideration of common stock equivalents. Diluted net loss per share is computed by dividing net loss by the weighted-average number of common share equivalents outstanding for the period determined using the treasury stock method. Potentially dilutive securities, consisting of preferred stock, options to purchase common stock, common stock warrants, RSUs and PRSUs, are considered to be common stock equivalents and were excluded from the calculation of diluted net loss per share because their effect would be antidilutive for all periods presented.

Recent accounting pronouncements

Recently issued accounting pronouncements not yet adopted

In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842). Under the new guidance, lessees will be required to recognize a lease liability and a right-of-use asset for all leases (with the exception of short-term leases) at the commencement date. Lessor accounting under ASU 2016-02 is largely unchanged. ASU 2016-02 is effective for annual and interim periods beginning on or after December 15, 2018 and early adoption is permitted. Under ASU 2016-02, lessees (for capital and operating leases) and lessors (for sales-type, direct financing, and operating leases) must apply a modified retrospective transition approach for leases existing at, or entered into after, the beginning of the earliest comparative period presented in the financial statements. Lessees and lessors may not apply a full retrospective transition approach. The Company is evaluating the effect that ASU 2016-02 will have on its consolidated financial statements, related disclosures and ongoing financial reporting. The Company has not yet selected an implementation date for ASU 2016-02.

In May 2014, the FASB issued ASU 2014-09, Revenue from Contracts with Customers ("Topic 606"), which requires an entity to recognize the amount of revenue to which it expects to be entitled upon the transfer of control of the promised goods or services to customers. ASU 2014-09 will replace most existing revenue recognition guidance in U.S. GAAP when it becomes effective.

Topic 606 provides for the use of either of two methods of adoption: retrospectively to each prior reporting period presented (the full retrospective method), or retrospectively with the cumulative effect of initially applying the guidance recognized at the date of initial application (the modified retrospective method). The Company implemented Topic 606 effective January 1, 2018 using the modified retrospective method.

Based upon its work performed to date, the Company expects the implementation of Topic 606 will have a significant impact on its accounts receivable at January 1, 2018, and the timing of revenue recognition for its diagnostic test

revenue thereafter. Under current GAAP, the Company recognizes test revenue generated from the majority of third-party payers on a cash basis, while under Topic 606, the Company will recognize the vast majority of test revenue on an accrual basis at the time of delivery of genetic test results to its customers. The accrual amounts to be recognized under Topic 606 in periods subsequent to the date of transition will be based on an estimate of the consideration that the Company expects to receive, and such estimates will be updated and subsequently adjusted as necessary until fully settled. This policy change will result in earlier revenue recognition under ASC 606 relative to the cash-basis revenue recognition policy utilized by the Company through December 31, 2017 for many of its payers.

The Company has not completed the work required to implement Topic 606 as of January 1, 2018. The work required to complete the implementation primarily relates to the determination of estimated variable consideration, including such consideration arising from recently acquired businesses, as of the date of transition.

Recently adopted accounting pronouncements

In January 2017, the FASB issued ASU 2017-04, Intangibles – Goodwill and Other (Topic 350). The amendments in this ASU simplify the subsequent measurement of goodwill by eliminating Step 2 from the goodwill impairment test. The amendments also eliminate the requirements for any reporting unit with a zero or negative carrying amount to perform a quantitative assessment. An entity still has the option to perform the qualitative assessment for a reporting unit to determine if the quantitative impairment test is necessary. The amendments in this ASU should be applied on a prospective basis. The Company early adopted ASU 2017-04 effective January 1, 2017 and the adoption of this standard did not have a material effect on the Company's consolidated financial statements, related disclosures and ongoing financial reporting.

In January 2017, the FASB issued ASU 2017-01, Business Combinations (Topic 805): Clarifying the Definition of a Business. The amendments in this ASU clarify the definition of a business with the objective of adding guidance to assist entities with evaluating whether transactions should be accounted for as acquisitions (or disposals) of businesses. ASU 2017-01 is effective for annual and interim periods beginning after December 15, 2017 and early adoption is permitted. The Company early adopted ASU 2017-01 effective January 1, 2017, and the adoption of this standard did not have a material effect on the Company's consolidated financial statements, related disclosures and ongoing financial reporting.

In December 2016, the FASB issued ASU 2016-18, Statement of Cash Flows (Topic 230): Restricted Cash. The amendments in this ASU require that a statement of cash flows explain the change during the period in the total of cash, cash equivalents, and amounts generally described as restricted cash or restricted cash equivalents. Therefore, amounts generally described as restricted cash and restricted cash equivalents should be included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. The amendments in this ASU apply to all entities that have restricted cash or restricted cash equivalents and are required to present a statement of cash flows under Topic 230. ASU 2016-18 is effective for annual and interim periods beginning on or after December 15, 2018 and early adoption is permitted. The Company early adopted ASU 2016-18 effective January 1, 2017, and the adoption of this standard did not have a material effect on the Company's consolidated financial statements, related disclosures and ongoing financial reporting.

In August 2016, the FASB issued ASU 2016-15, Statement of Cash Flows (Topic 230) – Classification of Certain Cash Receipts and Cash Payments. The ASU is intended to improve financial reporting by reducing diversity in practice of how certain cash receipts and cash payments are presented and classified in the statement of cash flows. ASU 2016-15 is effective for annual and interim periods beginning on or after December 15, 2016. The Company adopted ASU 2016-15 effective January 1, 2017, and the adoption of this standard did not have a material effect on the Company's consolidated financial statements, related disclosures and ongoing financial reporting.

In March 2016, the FASB issued ASU 2016-09, Compensation - Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting, which simplifies accounting for share-based payment award transactions. ASU 2016-09 is effective for annual and interim periods beginning on or after December 15, 2016. The Company adopted ASU 2016-09 effective January 1, 2017, and, upon adoption of this standard, recorded a deferred tax asset for unrecorded excess tax benefits of approximately $0.4 million related to share-based payments through a cumulative effect adjustment to retained earnings, and a corresponding offset of the deferred tax asset with a 100% valuation allowance. In addition, under ASU 2016-09 the Company can elect a policy to account for forfeitures as they occur rather than on an estimated basis. The Company elected to continue its current policy of estimating forfeitures. The adoption of ASU 2016-09 did not have a material effect on the Company's consolidated financial statements, related disclosures and ongoing financial reporting.

The Company has determined there are no other recently adopted or issued accounting standards that had, or will have, a material impact on its consolidated financial statements.

Prior period reclassifications

Revenue amounts in prior periods have been reclassified to conform with current period presentation, which separates test revenue from other revenue, which consists principally of revenue from genome network subscription services and collaboration arrangements.

3. Business combinations

AltaVoice

On January 6, 2017, the Company acquired AltaVoice (formerly Patient Crossroads, Inc.), a privately-owned patient-centered data company with a global platform for collecting, curating, coordinating, and delivering safeguarded data from patients and clinicians. The acquisition, complemented by several other strategic partnerships, will expand the Company's genome network, designed to connect patients, clinicians, advocacy organizations, researchers and therapeutic developers to accelerate the understanding, diagnosis, and treatment of hereditary disease. Pursuant to the terms of the Stock Purchase Agreement entered into on January 6, 2017, the Company acquired all of the outstanding shares of AltaVoice for total purchase consideration of $12.4 million, payable in the Company’s common stock, as follows:

(a) payment of $5.5 million through the issuance of 641,126 shares of the Company’s common stock;
(b) payment of $5.0 million in the Company’s common stock, payable on March 31, 2018, with the common shares deliverable equal to $5.0 million divided by the trailing average share price of the Company’s common stock for the 30 days preceding March 31, 2018;
(c) payment of $5.0 million in the Company’s common stock, contingently payable on March 31, 2018 if a milestone based on a certain threshold of revenue is achieved during 2017, with the shares deliverable equal to $5.0 million divided by the trailing average share price of the Company’s common stock for the 30 days preceding March 31, 2018; or should the foregoing milestone not be achieved, then there is a new contingent milestone based on achieving a revenue target during 2017 and 2018. Should the new milestone revenue target be achieved, then on March 31, 2019, a payment of up to $5.0 million in the Company’s common stock would be payable. The actual payout is dependent upon the 2017 and 2018 revenue target (capped at $14.0 million) times 75% less $5.5 million. This formula in effect caps the possible payout amount at $5.0 million in the Company’s common shares. The number of shares to be issued will be equal to the payout amount divided by the trailing average share price of the Company’s common stock for the 30 days preceding March 31, 2019.

The first payment of $5.5 million was classified as equity. The second payment was discounted to $4.7 million and recorded as a liability, and will be accreted to fair value at each reporting date until the extinguishment of the liability on March 31, 2018. The third payment, representing contingent consideration, was determined to have a fair value of $2.2 million and was recorded as a liability. The Company’s calculation of this fair value was based on a Monte Carlo simulation, as well as estimates of the 30-day trailing price of the Company’s stock at certain dates, its volatility assumptions and its revenue forecast. In accordance with ASC Topic 805, Business Combinations, the contingent consideration of $2.2 million will be remeasured to fair value at each reporting date until the contingency is resolved, with changes in fair value recognized in earnings.

For the second payment, whose acquisition-date fair value was $4.7 million, the Company recorded an accretion loss of $0.2 million in other income (expense), net, for the year ended December 31, 2017. This accretion loss resulted from adjustments to the discounted value of the second payment, reflecting the passage of time. For the third payment, whose contingent acquisition-date fair value was $2.2 million, the Company recorded remeasurement losses of $1.6 million in operating expense for the year ended December 31, 2017. This remeasurement loss reflects an updated estimation of fair value of the third payment, based upon achieving a revenue target during 2017 and 2018, as the milestone based on a certain threshold of revenue to be achieved during 2017 was not met. The principal inputs affecting that estimation were updates to the Company’s revenue forecasts and the passage of time.

Assets acquired and liabilities assumed are recorded based on valuations derived from estimated fair value assessments and assumptions used by the Company. While the Company believes that its estimates and assumptions underlying the valuations are reasonable, different estimates and assumptions could result in different valuations assigned to the individual assets acquired and liabilities assumed, and the resulting amount of goodwill. The following table summarizes the fair values of assets acquired and liabilities assumed at the date of acquisition (in thousands):

Cash	$54
Accounts receivable	274
Prepaid expense and other assets	52
Non-compete agreement	286
Developed technology	570
Customer relationships	3,389
Total identifiable assets acquired	4,625
Accounts payable	(28)
Deferred revenue	(202)
Accrued expenses	(21)
Deferred tax liability	(1,422)
Total liabilities assumed	(1,673)
Net identifiable assets acquired	2,952
Goodwill	9,432
Net assets acquired	$12,384

Acquisition-related intangibles included in the above table are finite-lived. Customer relationships are being amortized on an accelerated basis, utilizing free cash flows, over a period of ten years. All other acquisition-related intangibles are being amortized on a straight-line basis over their estimated lives, which approximates the pattern in which the economic benefits of the intangible assets are expected to be realized, as follows (in thousands):

	Gross Purchased Intangible Assets	Estimated Useful Life (in Years)
Non-compete agreement	$ 286	5
Developed technology	570	6
Customer relationships	3,389	10
	$ 4,245	

Goodwill represents the excess of the purchase price over the fair value of the net tangible and intangible assets acquired. The acquisition of AltaVoice resulted in $9.4 million of goodwill. The Company believes this goodwill consists principally of expected synergies to be realized by combining capabilities, technology and data to accelerate the use of genetic information for the diagnosis and treatment of hereditary diseases. In accordance with ASC 350, goodwill will not be amortized but will be tested for impairment at least annually. Goodwill created as a result of the acquisition is not deductible for tax purposes. Concurrent with the acquisition, the Company recorded additional goodwill of $1.4 million relating to the tax consequence of recognizing the fair value of the acquisition-related intangibles, with an equal offset to deferred tax liability.

The results of operations of AltaVoice for the period from the acquisition date through December 31, 2017 are included in the accompanying consolidated statements of operations. Pursuant to ASC 805, the Company incurred and expensed approximately $159,000 in acquisition and transitional costs associated with the acquisition of AltaVoice during the year ended December 31, 2016 and the three months ended March 31, 2017, which were primarily general and administrative related.

Ommdom

On June 11, 2017, the Company acquired Ommdom, Inc. (“Ommdom”), a privately-held company that develops, commercializes and sells hereditary risk assessment and management software, including CancerGene

Connect, a cancer genetic counseling platform. The acquisition expands Invitae's suite of genome management offerings designed to help patients and clinicians use genetic information as part of mainstream medical care. CancerGene Connect is a platform for collecting and managing genetic family histories. The platform uses a cloud-based, mobile friendly patient interface to gather family history information from patients prior to a clinician appointment. Then, analysis tools analyze patients' predisposition to disease and provide actionable analysis to inform therapeutic decisions, such as genetic testing or treatment approaches. In addition, the platform provides clinicians with the ability to look beyond the individual to understand trends across all of their patients.

Pursuant to the terms of the Stock Exchange Agreement entered into on June 11, 2017, the Company acquired all of the outstanding shares of Ommdom for consideration of $6.1 million, payable entirely in the Company's common stock. There was no cash consideration nor any contingent payments associated with the acquisition, other than a hold-back amount of $613,000. Per the terms of the agreement, the Company will issue shares of its common stock as follows:

(a) payment of $5.5 million through the issuance of 600,108 shares of the Company's common stock; and
(b) payment of $0.6 million through the issuance of 66,582 shares of the Company's common stock, representing a hold-back amount, and payable on the twelve-month anniversary of the acquisition date.

The first payment of $5.5 million was classified as equity. The second payment of $0.6 million was recorded as a stock payable liability and will be reclassified to equity upon the issuance of the Company's common stock on the twelve-month anniversary of the acquisition date.

Assets acquired and liabilities assumed are recorded based on valuations derived from estimated fair value assessments and assumptions used by the Company. While the Company believes that its estimates and assumptions underlying the valuations are reasonable, different estimates and assumptions could result in different valuations assigned to the individual assets acquired and liabilities assumed, and the resulting amount of goodwill. The following table summarizes the fair values of assets acquired and liabilities assumed at the date of acquisition (in thousands):

Cash	$53
Accounts receivable	10
Prepaid expense and other assets	4
Trade name	13
Developed technology	2,335
Customer relationships	147
Total identifiable assets acquired	2,562
Accounts payable	(16)
Accrued expenses	(17)
Deferred tax liability	(434)
Total liabilities assumed	(467)
Net identifiable assets acquired	2,095
Goodwill	4,045
Net assets acquired	$6,140

Finite-lived intangibles included in the above table are being amortized on a straight-line basis over their estimated lives, which approximates the pattern in which the economic benefits of the intangible assets are expected to be realized, as follows (in thousands):

	Gross Purchased Intangible Assets	Estimated Useful Life (in Years)
Trade name	$ 13	5
Developed technology	2,335	5
Customer relationships	147	5
	$ 2,495	

Goodwill represents the excess of the purchase price over the fair value of the net tangible and intangible assets acquired. The acquisition of Ommdom resulted in the recognition of $4.0 million of goodwill. The Company believes this goodwill consists principally of expected synergies to be realized by expanding the Company's suites of genome management offerings designed to help patients and clinicians use genetic information as part of mainstream medical care. In accordance with ASC 350, goodwill will not be amortized but rather will be tested for impairment at least annually. Goodwill created as a result of the acquisition is not deductible for tax purposes. Concurrent with the acquisition, the Company recorded additional goodwill of $434,000 relating to the tax consequence of recognizing the fair value of the acquisition-related intangibles, with an equal offset to deferred tax liability.

The results of operations of Ommdom for the period from the acquisition date through December 31, 2017 are included in the accompanying consolidated statements of operations. Pursuant to ASC 805, during the year ended December 31, 2017, the Company incurred and expensed approximately $164,000 in acquisition and transitional costs associated with the acquisition of Ommdom, which were primarily general and administrative related.

Good Start Genetics

On August 4, 2017, the Company acquired 100% of the fully diluted equity of Good Start, a privately-held molecular diagnostics company focused on preimplantation and carrier screening for inherited disorders. The acquisition of Good Start is intended to further Invitae's intention to create a comprehensive genetic information platform providing high-quality, affordable genetic information coupled with world-class clinical expertise to inform healthcare decisions throughout every stage of an individual's life. The purchase consideration for the Good Start acquisition consisted of the assumption of the net liabilities of Good Start of $24.4 million at the acquisition date, August 4, 2017.

Immediately subsequent to the acquisition of Good Start, the Company paid $18.4 million in cash to settle the outstanding notes payable, accrued interest and related costs. In addition, and immediately subsequent to the acquisition, the Company settled the outstanding convertible promissory notes payable through:

(a) payment of $11.9 million through the issuance of 1,148,283 shares of the Company's common stock; and
(b) payment of $3.6 million through the issuance of 343,986 shares of the Company's common stock, representing a hold-back amount payable on the one-year anniversary of the acquisition date.

Also in connection with the acquisition of Good Start and immediately subsequent to the acquisition, the Company paid bonuses to certain members of Good Start's management team through:

(a) payment of $0.9 million through the issuance of 83,025 shares of the Company's common stock; and
(b) payment of $0.4 million through the issuance of 37,406 shares of the Company's common stock, representing a hold-back amount payable on the one-year anniversary of the acquisition date.

These bonus payments were recorded as general and administrative expense.

Assets acquired and liabilities assumed are recorded based on valuations derived from estimated fair value assessments and assumptions used by the Company. The amount recorded as accounts receivable is provisional as the Company expects to receive future cash collections pertaining to Good Start revenue activities completed but not recognized at the acquisition date. The amount recorded as deferred tax liability, zero as of December 31, 2017, is provisional because certain information and analysis related to Good Start's historical net operating losses that may affect the Company's valuation is still being obtained or reviewed. Thus, the provisional measurement of fair value discussed above is subject to change. The Company expects to finalize the valuation as soon as practicable, but not later than one year from the acquisition date. While the Company believes that its estimates and assumptions underlying the valuations are reasonable, different estimates and assumptions could result in different valuations assigned to the individual assets acquired and liabilities assumed, and the resulting amount of goodwill.

At acquisition date, the Company also recorded $4.8 million as a provisional amount for a deferred tax liability because certain information and analysis related to Good Start's historical net operating losses that may affect the

Company’s initial valuation was still being obtained or reviewed at that time. This provisional amount for the deferred tax liability was subsequently reversed during the fourth quarter of 2017 based on the results of further analysis of Good Start’s historical net operating losses.

The following table summarizes the fair values of assets acquired and liabilities assumed at the date of acquisition (in thousands):

Cash and restricted cash	$1,381
Accounts receivable	2,904
Prepaid expense and other assets	1,579
Property and equipment	1,320
Trade name	460
Developed technology	5,896
Customer relationships	7,830
Total identifiable assets acquired	21,370
Accounts payable	(5,418)
Accrued expenses	(6,802)
Notes payable	(17,904)
Convertible promissory notes payable	(15,430)
Other liabilities	(222)
Total liabilities assumed	(45,776)
Net identifiable assets acquired	(24,406)
Goodwill	24,406
Net assets acquired	$—

Customer relationships are being amortized on an accelerated basis, utilizing free cash flows, over a period of eight years. All other finite-lived intangibles included in the above table are being amortized on a straight-line basis over their estimated lives, which approximates the pattern in which the economic benefits of the intangible assets are expected to be realized, as follows (in thousands):

	Gross Purchased Intangible Assets	Estimated Useful Life (in Years)
Trade name	$ 460	3
Developed technology	5,896	5
Customer relationships	7,830	8
	$ 14,186	

Goodwill represents the excess of the purchase price over the fair value of the net tangible and intangible assets acquired. The acquisition of Good Start resulted in the recognition of $24.4 million of goodwill. The Company believes this goodwill consists principally of expected synergies to be realized by expanding the Company’s suite of genome management offerings designed to help patients and clinicians use genetic information as part of mainstream medical care. In accordance with ASC 350, goodwill will not be amortized but rather will be tested for impairment at least annually. Goodwill created as a result of the acquisition is not deductible for tax purposes.

The results of operations of Good Start for the period from the acquisition date through December 31, 2017 are included in the accompanying consolidated statements of operations. Pursuant to ASC 805, the Company incurred and expensed approximately $1.7 million in acquisition and transitional costs associated with the acquisition of Good Start during the year ended December 31, 2017, which were recorded as general and administrative expense.

CombiMatrix

On November 14, 2017, the Company completed its acquisition of CombiMatrix in accordance with the terms of the Agreement and Plan of Merger and Reorganization, dated as of July 31, 2017 (the “Merger Agreement”), by and among the Company, Coronado Merger Sub, Inc., a wholly owned subsidiary of the Company (“Merger Sub”), and CombiMatrix, pursuant to which Merger Sub merged with and into CombiMatrix, with CombiMatrix surviving as a wholly owned subsidiary of the Company (the “Merger”).

At the closing of the Merger, the Company issued shares of its common stock to (i) CombiMatrix's common stockholders, at an exchange ratio of 0.8692 of a share of the Company's common stock (the "Merger Exchange Ratio") for each share of CombiMatrix common stock outstanding immediately prior to the Merger, (ii) CombiMatrix's Series F preferred stockholders, at the Merger Exchange Ratio for each share of CombiMatrix common stock underlying Series F preferred stock outstanding immediately prior to the Merger, (iii) holders of outstanding and unexercised in-the-money CombiMatrix stock options, which were fully accelerated to the extent of any applicable vesting period and converted into the right to receive the number of shares of the Company's common stock equal to the Merger Exchange Ratio multiplied by the number of shares of CombiMatrix common stock issuable upon exercise of such option, minus the number of shares of the Company's common stock determined by dividing the aggregate exercise price for such option by $9.491 (the "Invitae Trailing Average Share Value"), and (iv) holders of outstanding and unsettled CombiMatrix restricted stock units, which were fully accelerated to the extent of any applicable vesting period and converted into the right to receive a number of shares of the Company's common stock determined by multiplying the number of shares of CombiMatrix common stock that were subject to such restricted stock unit by the Merger Exchange Ratio.

In addition, at the closing of the Merger, (a) all outstanding and unexercised out-of-the money CombiMatrix stock options were cancelled and terminated without the right to receive any consideration, (b) all CombiMatrix Series D Warrants and Series F Warrants outstanding and unexercised immediately prior to the closing of the Merger were assumed by the Company and converted into warrants to purchase the number of shares of the Company's common stock determined by multiplying the number of shares of CombiMatrix common stock subject to such warrants by the Merger Exchange Ratio, and with the exercise price adjusted by dividing the per share exercise price of the CombiMatrix common stock subject to such warrants by the Merger Exchange Ratio, and (c) certain entitlements under CombiMatrix's executive compensation transaction bonus plan (the "Transaction Bonus Plan") were paid in shares of the Company's common stock or RSUs to be settled in shares of the Company's common stock. All outstanding and unexercised CombiMatrix Series A, Series B, Series C, Series E, and PIPE warrants were repurchased by CombiMatrix prior to closing pursuant to that certain CombiMatrix Common Stock Purchase Warrants Repurchase Agreement dated July 11, 2016.

Pursuant to the Merger Agreement, the Company issued an aggregate of 2,703,389 shares of its common stock as follows:

(a) payment of $20.5 million through the issuance of 2,611,703 shares of the Company's common stock to holders of CombiMatrix common stock outstanding;
(b) payment of $0.7 million through the issuance of 85,219 shares of the Company's RSUs to holders of outstanding and unsettled CombiMatrix restricted stock units.
(c) payment of $26,000 through the issuance of 3,323 shares of the Company's common stock to holders of outstanding and unexercised in-the-money CombiMatrix stock options; and
(d) payment of $25,000 through the issuance of 3,144 shares of the Company's common stock to holders of CombiMatrix Series F preferred stock.

In addition, and pursuant to the Merger Agreement, the Company issued warrants to purchase an aggregate of 2,077,273 shares of its common stock as follows:

(a) payment of $7.4 million through the issuance of warrants to purchase a total of 1,739,689 shares of the Company's common stock in exchange for all outstanding CombiMatrix Series F warrants; and
(b) payment of $1,000 through the issuance of warrants to purchase a total of 337,584 shares of the Company's common stock in exchange for all outstanding CombiMatrix Series D warrants.

In connection with the acquisition of CombiMatrix, the Company paid bonuses to certain members of CombiMatrix's management team through:

(a) payment of $1.7 million through the issuance of common stock and RSUs totaling 214,976 shares of the Company's common stock to settle payments pursuant to CombiMatrix's executive compensation transaction bonus plan (the "Transaction Bonus Plan"), recorded as post-combination compensation expense and included in general and administrative expense; and

(b) payment of $0.2 million through the issuance of 22,966 shares of the Company's common stock to settle payments pursuant to the Transaction Bonus Plan, recorded as an assumed liability at the acquisition date.

Assets acquired and liabilities assumed are recorded based on valuations derived from estimated fair value assessments and assumptions used by the Company. The amount recorded as deferred tax liability, zero at December 31, 2017, is provisional because certain information and analysis related to CombiMatrix's tax attributes and ownership change history that may affect the Company's valuation is still being obtained or reviewed. Thus, the provisional measurement of fair value discussed above is subject to change. The Company expects to finalize the valuation as soon as practicable, but not later than one year from the acquisition date. While the Company believes that its estimates and assumptions underlying the valuations are reasonable, different estimates and assumptions could result in different valuations assigned to the individual assets acquired and liabilities assumed, and the resulting amount of goodwill. The following table summarizes the fair values of assets acquired and liabilities assumed at the date of acquisition (in thousands):

Cash and restricted cash	$1,333
Accounts receivable	4,118
Prepaid expense and other assets	1,299
Property and equipment	437
Other assets - non current	30
Favorable leases	247
Trade name	103
Patent licensing agreement	496
Developed technology	3,162
Customer relationships	12,397
Total identifiable assets acquired	23,622
Accounts payable	(276)
Accrued expenses	(3,925)
Other liabilities	(180)
Total liabilities assumed	(4,381)
Net identifiable assets acquired	19,241
Goodwill	8,692
Net assets acquired	$27,933

Customer relationships are being amortized on an accelerated basis, utilizing free cash flows, over a period of eleven years. All other finite-lived intangibles included in the above table are being amortized on a straight-line basis over their estimated lives, which approximates the pattern in which the economic benefits of the intangible assets are expected to be realized, as follows (in thousands):

	Gross	Estimated

	Purchased Intangible Assets	Useful Life (in Years)
Favorable leases	$ 247	2
Trade name	103	1
Patent licensing agreement	496	15
Developed technology	3,162	4
Customer relationships	12,397	11
	$ 16,405	

Goodwill represents the excess of the purchase price over the fair value of the net tangible and intangible assets acquired. The acquisition of CombiMatrix resulted in the recognition of $8.7 million of goodwill. The Company believes this goodwill consists principally of expected synergies to be realized by expanding the Company's suite of genome management offerings designed to help patients and clinicians use genetic information as part of mainstream medical care. In accordance with ASC 350, goodwill will not be amortized but rather will be tested for impairment at least annually. Goodwill created as a result of the acquisition is not deductible for tax purposes.

The results of operations of CombiMatrix for the period from the acquisition date through December 31, 2017 are included in the accompanying consolidated statements of operations. Pursuant to ASC 805, the Company incurred and expensed approximately $1.8 million in acquisition and transitional costs associated with the acquisition of CombiMatrix during the year ended December 31, 2017, which were recorded as general and administrative expense.

Pro Forma Financial Information

The financial information in the table below summarizes the combined results of operations of the Company, AltaVoice, Ommdom, Good Start and CombiMatrix on an unaudited pro forma basis, as though the companies had been combined as of the beginning of each of the periods presented. The unaudited pro forma financial information has been calculated after adjusting the results of the Company, AltaVoice, Ommdom, Good Start and CombiMatrix to reflect the business combination accounting effects resulting from the acquisitions. These accounting effects consist of income tax benefits relating to the tax consequences of recognizing fair value of acquired intangible assets, amortization expense from acquired intangible assets and stock-based compensation expense relating to acquisitions.

The pro forma financial information is presented for informational purposes only and is not indicative of the results of operations that would have been achieved if the acquisitions had taken place at the beginning of each of the periods presented. The pro forma financial information for the year ended December 31, 2017 combines the adjusted results of the Company for the year ended December 31, 2017, which include the adjusted results of AltaVoice subsequent to January 6, 2017, the adjusted results of Ommdom subsequent to June 11, 2017, the adjusted results of Good Start subsequent to August 4, 2017 and the adjusted results of CombiMatrix for the period subsequent to November 14, 2017 (the acquisition dates for AltaVoice, Ommdom, Good Start and CombiMatrix, respectively), with the adjusted historical results for AltaVoice for the period from January 1, 2017 to January 6, 2017, the adjusted historical results for Ommdom for the period from January 1, 2017 to June 11, 2017, the adjusted historical results of Good Start for the period from January 1, 2017 to August 4, 2017, and the adjusted historical results of CombiMatrix for the period from January 1, 2017 to November 14, 2017. The pro forma financial information for the year ended December 31, 2016 combines the adjusted historical results for the Company for those periods, with the adjusted historical results for AltaVoice, Ommdom, Good Start and CombiMatrix for the same periods.

The following table summarizes the pro forma financial information for the years ended December 31, 2017 and 2016 (in thousands):

	Year Ended December 31,	
	2017	2016
Total revenue	$94,001	$62,991
Net loss	$(149,596)	$(123,148)

Revenue attributable to AltaVoice, Good Start and CombiMatrix since their acquisition dates and recognized in the year ended December 31, 2017 was $2.7 million, $6.2 million and $2.0 million, respectively. As the Company combined operations with AltaVoice, Ommdom, Good Start and CombiMatrix at the acquisition dates, net loss attributable to AltaVoice, Ommdom, Good Start and CombiMatrix since their acquisition dates cannot be practically calculated.

4. Goodwill and intangible assets

Goodwill

Details of the Company's goodwill for the year ended December 31, 2017 are as follows (in thousands):

	AltaVoice	Ommdom	Good Start	CombiMatrix	Total
Balance as of December 31, 2016	$ —	$ —	$—	$ —	$—
Goodwill acquired	9,432	4,045	29,366	8,692	51,535
Goodwill adjustment	—	—	(4,960)	—	(4,960)
Balance as of December 31, 2017	$ 9,432	$ 4,045	$24,406	$ 8,692	$46,575

The goodwill adjustment was principally due to the reversal, in the fourth quarter of 2017, of a provisional deferred tax liability of $4.8 million recorded in August 2017. The reversal of this deferred tax liability resulted from the completion of the Company's analysis of Good Start's historical net operating losses.

Intangible assets

The following table presents details of the Company's finite-lived intangible assets as of December 31, 2017 (in thousands):

	Cost	Accumulated Amortization	Net	Weighted Average Useful Life (in Years)	Weighted Average Estimated Remaining Useful Life (in Years)
Customer relationships	$23,763	$ (717)	$23,046	10.0	9.6
Developed technology	11,963	(949)	11,014	4.8	4.4
Non-compete agreement	286	(57)	229	5.0	4.0
Trade name	576	(78)	498	2.7	2.3
Patent licensing agreement	496	(4)	492	15.0	14.9
Favorable leases	247	(10)	237	2.2	2.1
	$37,331	$ (1,815)	$35,516	8.2	7.8

Acquisition-related intangibles included in the above table are finite-lived. Customer relationships are being amortized on an accelerated basis, in proportion to estimated cash flows, over periods ranging from five to eleven years. All other acquisition-related intangibles are being amortized on a straight-line basis over their estimated lives, which approximates the pattern in which the economic benefits of the intangible assets are realized. Amortization expense was $1.8 million for the year ended December 31, 2017. As all acquisition-related intangible assets were acquired in 2017, no amortization was recorded for year ended December 31, 2016. Intangible assets are carried at cost less accumulated amortization. Amortization expense is recorded to research and development, sales and marketing and general and administrative expense.

The following table summarizes the Company's estimated future amortization expense of intangible assets with finite lives as of December 31, 2017 (in thousands):

	Amount
2018	$5,059
2019	5,250
2020	5,525
2021	5,829
2022	4,123
Thereafter	9,730
	$35,516

5. Balance sheet components

Cash equivalents and marketable securities

The following is a summary of cash equivalents and marketable securities (in thousands):

	December 31, 2017			
	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Value
Money market funds	$5,998	$ —	$ —	$ 5,998
Certificates of deposit	300	—	—	300
U.S. treasury notes	12,010	—	(19)	11,991
U.S. government agency securities	46,451	—	(152)	46,299
	$64,759	$ —	$ (171)	$ 64,588
Reported as:				
Cash equivalents				$ 592
Restricted cash				5,406
Marketable securities				58,590
Total cash equivalents, restricted cash and marketable securities				$ 64,588

	December 31, 2016			
	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Value
Money market funds	$19,457	$ —	$ —	$ 19,457
U.S. treasury notes	11,515	2	—	11,517
U.S. government agency securities	14,283	—	(2)	14,281
	$45,255	$ 2	$ (2)	$ 45,255
Reported as:				
Cash equivalents				$ 14,760
Restricted cash				4,697
Marketable securities				25,798
Total cash equivalents, restricted cash and marketable securities				$ 45,255

The total amount of unrealized losses at December 31, 2017 was $171,000. The total fair value of investments with unrealized losses at December 31, 2017 was $58.3 million. None of the available-for-sale securities held as of December 31, 2017 has been in a continuous unrealized loss position for more than one year. At December 31, 2017, unrealized losses on available-for-sale investments are not attributed to credit risk and are considered to be temporary.

The Company believes it is more likely than not that investments in an unrealized loss position will be held until maturity or the recovery of the cost basis of the investment. To date, the Company has not recorded any impairment charges on marketable securities related to other-than-temporary declines in market value.

At December 31, 2017, the remaining contractual maturities of available-for-sale securities ranged from less than one to 13 months. For the years ended December 31, 2017, 2016 and 2015, there were no realized gains or losses on available-for-sale securities.

Property and equipment, net

Property and equipment consisted of the following (in thousands):

	December 31, 2017	December 31, 2016
Leasehold improvements	$ 12,623	$ 1,256
Laboratory equipment	17,705	13,644
Equipment under capital lease	11,446	5,871
Computer equipment	4,023	2,514
Software	2,520	2,489
Furniture and fixtures	569	238
Automobiles	20	20
Construction-in-progress	965	12,229
Total property and equipment, gross	49,871	38,261
Accumulated depreciation and amortization	(19,530)	(14,468)
Total property and equipment, net	$ 30,341	$ 23,793

Depreciation expense was $7.2 million, $6.6 million and $5.3 million for the years ended December 31, 2017, 2016 and 2015, respectively.

Accrued liabilities

Accrued liabilities consisted of the following (in thousands):

	December 31, 2017	December 31, 2016
Accrued compensation and related expenses	$ 7,406	$ 3,072
Accrued laboratory materials purchases	1,242	338
Accrued outsourced services	142	—
Accrued professional services	1,077	446
Accrued construction in progress	—	1,215
Lease incentive obligation, current	489	468
Liabilities associated with business combinations	9,497	—
Other	2,889	1,172
Total accrued liabilities	$ 22,742	$ 6,711

Other long-term liabilities

Other long-term liabilities consisted of the following (in thousands):

	December 31, 2017	December 31, 2016
Lease incentive obligation, non-current	$ 3,831	$ 4,243
Deferred rent, non-current	5,153	3,419
Liabilities associated with business combination	3,779	—
Other non-current liabilities	677	175
Total other long-term liabilities	$ 13,440	$ 7,837

6. Fair value measurements

Financial assets and liabilities are recorded at fair value. Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability (an exit price) in an orderly transaction between market participants at the reporting date. The authoritative guidance establishes a three-level valuation hierarchy that

prioritizes the inputs to valuation techniques used to measure fair value based upon whether such inputs are observable or unobservable. Observable inputs reflect market data obtained from independent sources, while unobservable inputs reflect market assumptions made by the reporting entity.

The three-level hierarchy for the inputs to valuation techniques is summarized as follows:

Level 1—Observable inputs such as quoted prices (unadjusted) for identical instruments in active markets.

Level 2—Observable inputs such as quoted prices for similar instruments in active markets, quoted prices for identical or similar instruments in markets that are not active, or model-derived valuations whose significant inputs are observable.

Level 3—Unobservable inputs that reflect the reporting entity's own assumptions.

The following tables set forth the fair value of the Company's consolidated financial instruments that were measured at fair value on a recurring basis as of December 31, 2017 and December 31, 2016 (in thousands):

	December 31, 2017			
	Level 1	Level 2	Level 3	Total
Financial assets:				
Money market funds	$5,998	$—	$—	$5,998
Certificates of deposit	300	—	—	300
U.S. treasury notes	11,991	—	—	11,991
U.S. government agency securities	—	46,299	—	46,299
Total financial assets	$18,289	$46,299	$—	$64,588
Financial liabilities:				
Contingent consideration	$—	$—	$3,779	$3,779
Total financial liabilities	$—	$—	$3,779	$3,779

	December 31, 2016			
	Level 1	Level 2	Level 3	Total
Financial assets:				
Money market funds	$19,457	$—	$ —	$19,457
U.S. treasury notes	11,517	—	—	11,517
U.S. government agency securities	—	14,281	—	14,281
Total financial assets	$30,974	$14,281	$ —	$45,255

There were no transfers between Level 1, Level 2 and Level 3 during the periods presented.

The following table presents the Company's Level 3 financial instruments that are measured at fair value on a recurring basis (in thousands):

	Level 3 Contingent Consideration Liability
Balance as of December 31, 2016	$ —
Contingent consideration	2,200
Change in estimate of fair value	1,579
Balance as of December 31, 2017	$ 3,779

The Company's debt securities of U.S. government agency entities are classified as Level 2 as they are valued based upon quoted market prices for similar instruments in active markets, quoted prices for identical or similar instruments in markets that are not active and model-based valuation techniques for which all significant inputs are observable in the market or can be corroborated by observable market data for substantially the full term of the assets. Where applicable, these models project future cash flows and discount the future amounts to a present value using market-based observable inputs obtained from various third party data providers, including but not limited to benchmark yields, interest rate curves, reported trades, broker/dealer quotes and reference data.

As of December 31, 2017, the Company had a contingent obligation of up to $5.0 million payable in the Company's common stock to the former owners of AltaVoice in conjunction with the Company's acquisition of AltaVoice in January 2017. The contingency is dependent upon future revenues attributable to AltaVoice. If the revenue attributable to AltaVoice for the combined period of 2017 and 2018 is at least $10 million, the Company will make a payment of up to $5.0 million in the Company's common stock on March 31, 2019. The Company estimated the fair value of the contingent consideration at $2.2 million at the acquisition date of January 6, 2017, based on a Monte Carlo simulation, as well as estimates of the 30-day trailing price of its stock at certain dates, its volatility assumptions and its revenue forecasts, all of which were significant inputs in the Level 3 measurement not supported by market activity. The value of the liability will be subsequently remeasured to fair value at each reporting date. Changes to revenue forecasts can significantly affect the estimated fair value of the contingent consideration. Changes in estimated fair value will be recorded as a component of operating expenses until the contingency is paid or expires. The change in the fair value of the contingent consideration between the acquisition date and December 31, 2017 was an increase of $1.6 million.

The fair value of the Company's outstanding debt is estimated using the net present value of future debt payments, discounted at an interest rate that is consistent with market interest rates, which is a Level 2 input. The carrying amount and the estimated fair value of the Company's outstanding debt at December 31, 2017 and December 31, 2016, are as follows (in thousands):

	December 31, 2017		December 31, 2016	
	Carrying Amount	Fair Value	Carrying Amount	Fair Value
Debt	$39,084	$40,526	$12,102	$11,905

7. Commitments and contingencies

Operating leases

In September 2015, the Company entered into a lease agreement for a production facility and headquarters in San Francisco, California. This lease expires in July 2026 and the Company may renew the lease for an additional ten years. The Company has determined the lease term to be a ten-year period expiring in 2026. The lease term commenced when the Company took occupancy of the facility in February 2016. In connection with the execution of the lease, the Company provided a security deposit of approximately $4.6 million which is included in restricted cash in the Company's consolidated balance sheets. Minimum annual rent under the lease is subject to increases based on

stated rental adjustment terms. In addition, per the terms of the lease, the Company received a $5.2 million lease incentive in the form of reimbursement from the landlord for a portion of the costs of leasehold improvements the Company has made to the facility. The assets purchased with the lease incentive are included in property and equipment, net, in the Company's consolidated balance sheets and the lease incentive is recognized as a reduction of rental expense on a straight-line basis over the term of the lease. At December 31, 2017, all of the lease incentive had been utilized by the Company and all related reimbursements had been received from the landlord. Aggregate future minimum lease payments for this facility at December 31, 2017 were approximately $64.2 million.

In addition to the security deposit of $4.6 million for its production facility and headquarters, the Company has provided, as collateral for other leases, security deposits of $0.4 million and $0.8 million at December 31, 2017 and December 31, 2016, respectively, which are included in other assets in the Company's consolidated balance sheets. Security deposits relating to Good Start facilities were $0.4 million at December 31, 2017 and are included in restricted cash in the Company's consolidated balance sheet as of that date.

Future minimum payments under non-cancelable operating leases as of December 31, 2017 are as follows (in thousands):

	Amounts
2018	$ 9,707
2019	9,633
2020	9,512
2021	9,727
2022	9,676
Thereafter	29,846
Total minimum lease payments	$ 78,101

Rent expense was $8.6 million, $8.6 million and $3.7 million for the years ended December 31, 2017, 2016 and 2015, respectively.

Debt financing

In July 2015, the Company entered into a Loan and Security Agreement (the “Loan Agreement”) with a bank under which term loans were available for purchases of equipment up to an aggregate of $15.0 million. As of December 31, 2016, obligations under the Loan Agreement were $12.1 million.

On March 15, 2017, the Company entered into a Loan and Security Agreement (the “Loan and Security Agreement”) with a lender pursuant to which the Company borrowed an initial term loan of $40.0 million, and received net proceeds of approximately $39.7 million. Subject to certain conditions, the Company will also be eligible to borrow a second term loan of $20.0 million in the first quarter of 2018. In connection with entering into the Loan and Security Agreement, the Company terminated the Loan Agreement and repaid in full the balance of its obligations under such agreement, approximately $12.1 million. The payment to the lender under the Loan Agreement included a prepayment premium of $670,000, which was classified as extinguishment of debt and included in other income (expense), net.

Term loans under the Loan and Security Agreement bear interest at a floating rate equal to an index rate plus 7.73%, where the index rate is the greater of 0.77% or the 30-day U.S. Dollar London Interbank Offered Rate “LIBOR” as reported in The Wall Street Journal, with the floating rate resetting monthly subject to a floor of 8.5%. The Company is required to make monthly interest-only payments until May 1, 2019 (or, subject to certain conditions, May 1, 2020), and thereafter monthly payments of principal and interest are required to fully amortize the borrowed amount by a final maturity date of March 1, 2022. A fee of 5% of each funded draw is due at the earlier of prepayment or loan maturity, a facility fee of 0.5% is due upon funding for each draw, and a prepayment fee of between 1% and 3% of the outstanding balance will apply in the event of a prepayment. Concurrent with each term loan, the Company will grant to the lender a warrant to acquire shares of the Company’s common stock equal to the quotient of 3% of the funded amount divided by a per share exercise price equal to the lower of the average closing price for the previous ten days of trading (calculated on the day prior to funding) or the closing price on the day prior to funding. In connection with the initial term loan, the Company granted the lender a warrant to purchase 116,845 shares of common stock at an exercise price of $10.27 per share. The Company classified the warrant as equity and determined the fair value of the warrant to be $740,000. The warrant has a term of ten years from the date of issuance and includes a cashless exercise provision.

The Company’s obligations under the Loan and Security Agreement are subject to quarterly covenants to achieve certain revenue levels as well as additional covenants, including limits on the Company’s ability to dispose of assets, undergo a change in control, merge with or acquire other entities, incur debt, incur liens, pay dividends or other

distributions to holders of its capital stock, repurchase stock and make investments, in each case subject to certain exceptions. The Company's obligations under the Loan and Security Agreement are secured by a security interest on substantially all the Company's assets, excluding its intellectual property.

At December 31, 2017, obligations under the Loan and Security Agreement were $40.0 million. Debt issuance costs related to the Loan and Security Agreement of $339,000 and the warrant fair value of $740,000 were recorded as a direct deduction from the debt liability and are being amortized to interest expense over the term of the Loan and Security Agreement. Future payments under the Loan and Security Agreement as of December 31, 2017 are as follows (in thousands):

	Amounts
2018	$3,691
2019	12,587
2020	15,988
2021	14,716
2022	5,482
Thereafter	—
Total remaining debt payments	52,464
Less: amount representing debt discount	(916)
Less: amount representing interest	(12,464)
Present value of remaining debt payments	39,084
Less: current portion	—
Total non-current debt obligation	$39,084

Interest expense related to the Loan and Security Agreement and the Loan Agreement was $3.5 million, $315,000 and $58,000 for the years ended December 31, 2017, 2016 and 2015, respectively.

On February 26, 2018, the Company and the lender amended the Loan and Security Agreement (see note 14).

Capital leases

The Company has entered into various capital lease agreements to obtain laboratory equipment. The terms of the capital leases are typically three years with interest rates ranging from 4.3% to 6.4%. The leases are secured by the underlying equipment. The portion of the future payments designated as principal repayment was classified as a capital lease obligation on the consolidated balance sheets.

Future payments under capital leases at December 31, 2017 are as follows (in thousands):

	Amounts
2018	$ 2,369
2019	2,087
2020	1,394
2021	21
Total capital lease obligations	5,871
Less: amount representing interest	(459)
Present value of net minimum capital lease payments	5,412

Less: current portion	(2,039)
Total non-current capital lease obligations	$ 3,373

Interest expense related to capital leases was $163,000, $103,000 and $141,000 for the years ended December 31, 2017, 2016 and 2015, respectively.

Property and equipment under capital leases was $11.4 million and $5.9 million as of December 31, 2017 and December 31, 2016, respectively. Accumulated depreciation and amortization, collectively, on these assets was $3.0 million and $2.4 million at December 31, 2017 and December 31, 2016, respectively.

Guarantees and indemnifications

As permitted under Delaware law and in accordance with the Company’s bylaws, the Company indemnifies its directors and officers for certain events or occurrences while the officer or director is or was serving in such

capacity. The maximum amount of potential future indemnification is unlimited; however, the Company maintains director and officer liability insurance. This insurance allows the transfer of the risk associated with the Company's exposure and may enable it to recover a portion of any future amounts paid. The Company believes the fair value of these indemnification agreements is minimal. Accordingly, the Company did not record any liabilities associated with these indemnification agreements at December 31, 2017 or December 31, 2016.

Contingencies

The Company was not a party to any material legal proceedings at December 31, 2017, or at the date of this report. The Company may from time to time become involved in various legal proceedings arising in the ordinary course of business, and the resolution of any such claims could be material.

8. Stockholders' Equity

Common stock

As of December 31, 2017 and 2016, the Company had reserved shares of common stock, on an as if converted basis, for issuance as follows:

	As of December 31,	
	2017	2016
Options issued and outstanding	4,114,874	4,490,662
RSU awards issued and outstanding	2,387,120	1,421,757
Shares available for grant under stock option plan	2,397,234	1,375,766
Shares reserved for issuance under the 2015 Employee Stock Purchase Plan	307,538	274,686
Common stock underlying warrants	1,962,074	—
Common stock issuable upon conversion of preferred stock	3,458,823	—
Common stock underlying stock payable liabilities	689,347	—
Common stock payable as contingent consideration	550,660	—
Total	15,867,670	7,562,871

Private placement

On August 3, 2017, in a private placement to certain accredited investors, the Company sold 5,188,235 shares of its common stock at a price of $8.50 per share, and 3,458,823 shares of its Series A convertible preferred stock at a price of $8.50 per share, for gross proceeds of approximately $73.5 million and net proceeds of $68.9 million. The Series A preferred stock is a non-voting common stock equivalent and conversion of the Series A preferred stock is prohibited if the holder exceeds a specified threshold of voting security ownership. The Series A preferred stock is convertible into common stock on a one-for-one basis, subject to adjustment for events such as stock splits, combinations and the like. The Series A Preferred Stock has the right to receive dividends first or simultaneously with payment of dividends on common stock, in an amount equal to the product of (i) the dividend payable on each share of common stock and (ii) the number of shares of common stock issuable upon conversion of a share of Series A Preferred Stock. The Series

A Preferred Stock has no voting rights except as required by law, as modified by the Company's Amended and Restated Certificate of Incorporation. In the event of any liquidation or dissolution of the Company, the Series A Preferred Stock is entitled to receive $0.001 per share prior to the payment of any amount to any holders of capital stock of the Company ranking junior to the Series A Preferred Stock and thereafter shall participate pari passu with the holders of the Company's common stock (on an as-if-converted-to-common-stock basis).

Common stock warrants

As of December 31, 2017, the Company had outstanding warrants to purchase common stock as follows:

Warrant	Issuance Date	Expiration Date	Exercise Price Per Share	Number of Warrants Outstanding
Warrants issued in exchange for CombiMatrix Series D warrants	November 14, 2017	December 19, 2018	$ 53.84	337,584
Warrants issued in exchange for CombiMatrix Series F warrants	November 14, 2017	March 24, 2021	$ 5.95	1,507,645
Warrants issued to lender under Loan and Security Agreement	March 15, 2017	March 15, 2027	$ 10.27	116,845
				1,962,074

The exercise price of warrants issued in exchange for CombiMatix Series D and Series F warrants was determined pursuant to the terms of the Merger Agreement (See Note 3). The exercise price of the warrants issued to the lender under the Loan and Security Agreement was the closing price of the Company's common stock on the date of the agreement.

9. Stock incentive plans

Stock incentive plans

In 2010, the Company adopted the 2010 Incentive Plan (the "2010 Plan"). The 2010 Plan provides for the granting of stock-based awards to employees, directors, and consultants under terms and provisions established by the Board of Directors. Under the terms of the 2010 Plan, options may be granted at an exercise price not less than fair market value. For employees holding more than 10% of the voting rights of all classes of stock, the exercise prices for incentive and nonstatutory stock options must be at least 110% of fair market of the common stock on the grant date, as determined by the Board of Directors. The terms of options granted under the 2010 Plan may not exceed ten years.

In January 2015, the Company adopted the 2015 Stock Incentive Plan (the "2015 Plan"), which became effective upon the closing of the Company's initial public offering ("IPO"). The 2015 Plan had 4,370,452 shares of common stock reserved for future issuance at the time of its effectiveness, which included 120,452 shares under the 2010 Plan which were transferred to the 2015 Plan upon effectiveness of the 2015 Plan. The 2015 Plan provides for automatic annual increases in shares available for grant, beginning on January 1, 2016 through January 1, 2025. In addition, shares subject to awards under the 2010 Plan that are forfeited or terminated will be added to the 2015 Plan. The 2015 Plan provides for the grant of incentive stock options, nonstatutory stock options, restricted stock awards, stock units, stock appreciation rights and other forms of equity compensation, all of which may be granted to employees, including officers, non-employee directors and consultants. Additionally, the 2015 Plan provides for the grant of cash-based awards.

Options granted generally vest over a period of four years. Typically, the vesting schedule for options granted to newly hired employees provides that 1/4 of the award vests upon the first anniversary of the employee's date of hire, with the remainder of the award vesting monthly thereafter at a rate of 1/48 of the total shares subject to the option. All other options typically vest in equal monthly installments over the four-year vesting schedule.

RSUs generally vest over a period of three years. Typically, the vesting schedule for RSUs provides that one third of the award vests upon each anniversary of the grant date.

In February 2016, the Company granted PRSUs under the 2015 Plan, which PRSUs could be earned based on the achievement of specified performance conditions measured over a period of approximately 12 months. In February 2017, upon the Audit Committee's determination of the level of achievement, 352,045 fully vested stock units were awarded to holders of PRSUs.

Based on its evaluations of the probability of achieving performance conditions, the Company recorded stock-based compensation expense of $0.4 million and $1.9 million for the years ended December 31, 2017 and 2016, respectively, related to the PRSUs.

Activity under the 2010 Plan and the 2015 Plan is set forth below (in thousands, except share and per share amounts and years):

	Shares Available For Grant	Stock Options Outstanding	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Life (years)	Aggregate Intrinsic Value (000's)
Balances at December 31, 2016	1,375,766	4,490,662	$ 8.21	8.11	$ 5,312
Additional shares reserved	2,923,183	—			
Options granted	(607,398)	607,398	$ 9.20		
Options cancelled	595,763	(595,763)	$ 9.67		
Options exercised		(387,423)	$ 4.38		
RSUs granted	(2,360,511)				
RSUs cancelled	292,471				
PRSUs cancelled	177,960				
Balances at December 31, 2017	2,397,234	4,114,874	$ 8.51	7.63	$ 5,128
Options exercisable at December 31, 2017		2,213,417	$ 7.75	7.09	$ 4,411
Options vested and expected to vest at December 31, 2017		3,861,828	$ 8.45	7.59	$ 5,043

The aggregate intrinsic value is calculated as the difference between the exercise price of the underlying stock options and the fair value of the Company’s common stock for stock options that were in-the-money.

The weighted-average fair value of options to purchase common stock granted was $5.82, $6.18 and $6.26 in the years ended December 31, 2017, 2016 and 2015, respectively. The weighted-average fair value of RSUs granted was $10.03, $9.80 and $10.72 in the years ended December 31, 2017, 2016 and 2015, respectively. No PRSUs were granted in the year ended December 31, 2017 and the weighted average fair value of PRSUs granted in the year ended December 31, 2016 was $6.50.

The total grant-date fair value of options to purchase common stock vested was $6.9 million, $5.6 million and $2.1 million in the year ended December 31, 2017 and 2016, respectively.

The intrinsic value of options to purchase common stock exercised was $2.1 million, $1.4 million and $1.2 million in the years ended December 31, 2017, 2016 and 2015, respectively.

The following table summarizes RSU and PRSU activity for the year ended December 31, 2017:

	Number of Shares	Weighted-Average

		Grant Date Fair Value
Balance at December 31, 2016	1,421,757	$ 8.77
RSUs granted	2,360,511	$ 10.03
RSUs vested	(572,672)	$ 10.51
PRSUs vested	(352,045)	$ 6.54
RSUs cancelled	(292,471)	$ 10.17
PRSUs cancelled	(177,960)	$ 6.53
Balance at December 31, 2017	2,387,120	$ 9.91

2015 employee stock purchase plan

In January 2015, the Company adopted the 2015 Employee Stock Purchase Plan (the “ESPP”), which became effective upon the closing of the IPO. Employees participating in the ESPP may purchase common stock at 85% of the lesser of the fair market value of common stock on the purchase date or last trading day preceding the offering date. At December 31, 2017, cash received from payroll deductions pursuant to the ESPP was $0.4 million.

The ESPP provides for automatic annual increases in shares available for grant, beginning on January 1, 2016 and continuing through January 1, 2025. At December 31, 2017, a total of 307,538 shares of common stock are reserved for issuance under the ESPP.

Stock-based compensation

The Company uses the grant date fair value of its common stock to value both employee and non-employee options when granted. The Company revalues non-employee options each reporting period using the fair market value of the Company's common stock as of the last day of each reporting period.

In determining the fair value of stock options and ESPP purchases, the Company uses the Black-Scholes option-pricing model and, for stock options, the assumptions discussed below. Each of these inputs is subjective and its determination generally requires significant judgment. The fair value of RSU and PRSU awards is based on the grant date share price. Compensation cost is recognized as expense on a straight-line basis over the vesting period for options and RSUs and on an accelerated basis for PRSUs.

In 2016, the Company modified certain stock options and RSU awards. The terms of the stock option modifications included acceleration of vesting and extensions of post-termination exercise periods. The terms of the RSU award modifications included acceleration of vesting. A total of 14 employees were affected by the stock option and RSU modifications and the total incremental compensation cost relating to these modifications was $323,000.

Expected term—The expected term represents the period that the Company's stock-based awards are expected to be outstanding and is determined using the simplified method (based on the midpoint between the vesting date and the end of the contractual term).

Expected volatility—Because the Company was privately held until February 2015 and did not have any trading history for its common stock prior to its IPO, the expected volatility was estimated based on the average volatility for comparable publicly traded biopharmaceutical companies over a period equal to the expected term of stock option grants and restricted stock units. When selecting comparable companies on which it has based its expected stock price volatility, the Company selected companies with comparable characteristics to it, including enterprise value, risk profiles, position within the industry, and with historical share price information sufficient to meet the expected life of the stock-based awards. Historical volatility data has been computed using the daily closing prices for the selected companies' common stock during the equivalent period of the calculated expected term of the stock-based awards. The Company will continue to apply this process until a sufficient amount of historical information regarding the volatility of its own stock price becomes available. The Company estimates expected volatility for ESPP purchases using its own stock price volatility over the expected, six-month term ESPP purchase periods.

Risk-free interest rate—The risk-free interest rate is based on the U.S. Treasury zero coupon issues in effect at the time of grant for periods corresponding with the expected term of the option.

Dividend yield—The Company has never paid dividends on its common stock and has no plans to pay dividends on its common stock. Therefore, the Company used an expected dividend yield of zero.

The fair value of share-based payments for stock options granted to employees and directors was estimated on the date of grant using the Black-Scholes option-pricing model based on the following assumptions:

	Year Ended December 31,		
	2017	2016	2015
Expected term (in years)	6.03	6.03	6.03
Expected volatility	72.7%	64.2% – 74.4%	68.2 – 79.7%
Risk-free interest rate	2.01%	1.57%	1.28 – 1.86%
Dividend yield	—	—	—

Stock-based compensation related to stock options granted to non-employees is recognized as the stock options vest. The fair value of the stock options granted is calculated at each reporting date using the Black-Scholes option-pricing model based on the following assumptions:

	Year Ended December 31,		
	2017	2016	2015
Expected term (in years)	8.41 – 8.83	6.25 – 10.00	7.25 – 9.82
Expected volatility	69.9 – 78.70%	76.92%	69.9 – 78.70%
Risk-free interest rate	1.83 – 2.04%	1.55 – 2.37%	1.86 – 2.25%
Dividend yield	—	—	—

The fair value of shares purchased pursuant to the ESPP is estimated using the Black Scholes option pricing model. For the years ended December 31, 2017, 2016 and 2015, the weighted average grant date fair value per share for the ESPP was $2.51, $2.66 and $2.17, respectively and stock based compensation expense for the ESPP was $1.1 million, $0.9 million and $102,000, respectively.

The fair value of the shares purchased pursuant to the ESPP was estimated using the following assumptions:

	Year Ended December 31,		
	2017	2016	2015
Expected term (in years)	0.50	0.50	0.50
Expected volatility	52.50%	66.31%	74.13%
Risk-free interest rate	1.23 %	0.50 %	0.33 %
Dividend yield	—	—	—

The following table summarizes stock-based compensation expense for the years ended December 31, 2017, 2016 and 2015, included in the consolidated statements of operations (in thousands):

	Year Ended December 31,		
	2017	2016	2015
Cost of test revenue	$2,093	$1,353	$368
Research and development	6,158	4,976	1,545
Selling and marketing	3,956	1,709	688
General and administrative	7,014	2,661	876
Total stock-based compensation expense	$19,221	$10,699	$3,477

At December 31, 2017, unrecognized compensation expense related to unvested stock options, net of estimated forfeitures, was $9.0 million, which the Company expects to recognize on a straight-line basis over a weighted-average period of 2.2 years. Unrecognized compensation expense related to RSUs at December 31, 2017,

net of estimated forfeitures, was $14.6 million, which the Company expects to recognize on a straight-line basis over a weighted-average period of 2.1 years. At December 31, 2017, there was no unrecognized compensation expense related to PRSUs and no capitalized stock-based employee compensation.

10. Income taxes

The Company recorded a benefit for income taxes in the year ended December 31, 2017. The Company did not record a provision or benefit for income taxes during the years ended December 31, 2016 and 2015. The components of loss before income taxes by U.S. and foreign jurisdictions are as follows (in thousands):

	Year Ended December 31,		
	2017	2016	2015
United States	$124,108	$99,793	$88,112
Foreign	1,128	463	1,670
Total	$125,236	$100,256	$89,782

The components of the provision for income taxes are as follows (in thousands):

	Year Ended December 31,		
	2017	2016	2015
Current	$—	$ —	$ —
Federal	—	—	—
State	—	—	—
Foreign	—	—	—
Total Current	—	—	—
Deferred			
Federal	(1,704)	—	—
State	(152)	—	—
Foreign	—	—	—
Total Deferred	(1,856)	—	—
Tax Provision	$(1,856)	$ —	$ —

The following table presents a reconciliation of the tax expense computed at the statutory federal rate and the Company's tax expense for the periods presented:

	Year Ended December 31,		
	2017	2016	2015
U.S. federal taxes at statutory rate	34.0 %	34.0 %	34.0 %
State taxes (net of federal benefit)	3.3 %	1.4 %	0.8 %
Stock-based compensation	(1.1)%	(1.7)%	(—)%
Non-deductible expenses	(—)%	0.2 %	(0.8)%
Foreign tax differential	(0.3)%	(0.2)%	(0.2)%
Other	(—)%	1.1 %	(—)%
Change in valuation allowance	(34.4)%	(34.8)%	(33.8)%
Change in deferred—Tax Reform	(39.0)%	(—)%	(—)%
Change in valuation allowance—Tax Reform	39.0 %	(—)%	(—)%
Total	1.5 %	(—)%	(—)%

The tax effects of temporary differences and carryforwards that give rise to significant portions of the deferred tax assets are as follows (in thousands):

	As of December 31,	
	2017	2016
Deferred tax assets:		
Net operating loss carryforwards	$70,825	$76,353
Tax credits	15	13
Revenue recognition reserves	29,819	14,291
Accruals and other	5,544	3,405

Gross deferred tax assets	106,203	94,062
Valuation allowance	(95,687)	(93,666)
Net deferred tax assets	10,516	396
Deferred tax liabilities:		
Property and equipment	(10,516)	(396)
Total deferred tax liabilities	(10,516)	(396)
Net deferred tax assets	$—	$—

On December 22, 2017, the Tax Cuts and Jobs Act of 2017 (the “Tax Act”) was signed into law making significant changes to the Internal Revenue Code. Changes including among other items, a reduction of the corporate tax rate from a top marginal rate of 35% to a flat rate of 21%. Although the Tax Act is generally effective January 1, 2018, GAAP requires recognition of the tax effects of new legislation during the reporting period that includes the enactment date, which was December 22, 2017. As a result of the lower corporate tax rate enacted as

part of the Tax Act, the Company recorded a provisional estimate to reduce deferred tax assets by $48.8. The reduction in deferred tax assets was offset by a corresponding reduction in the valuation allowance resulting in no net impact to tax expense.

On December 22, 2017, the Securities and Exchange Commission issued Staff Accounting Bulletin No. 118 ("SAB 118") to address the application of U.S. GAAP in situations when a registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting for certain income tax effects of the Act. In accordance with SAB 118, the Company has been able to make a reasonable estimate of the impact to deferred taxes as a result of Tax Reform. The Company has recorded a provisional estimate which resulted in a $48.8 million reduction in deferred tax assets as of December 31, 2017. The provisional amount will be updated as IRS, Treasury and state tax guidance is issued and as the Company finalizes its deferred tax accounting for the GSG and CombiMatrix acquisitions.

The Company has established a full valuation allowance against its deferred tax assets due to the uncertainty surrounding realization of such assets. During 2017, the change in the valuation allowance of $2.0 million consisted of a $50.8 million increase as result of operations with an offsetting $48.8 million reduction due to the Tax Act. The valuation allowance increased by $33.4 million during the year ended December 31, 2016 as a result of operations.

As of December 31, 2017, the Company had net operating loss carryforwards of approximately $292.2 million and $145.6 million available to reduce future taxable income, if any, for Federal and state income tax purposes, respectively. The U.S. Federal and California state net operating loss carryforwards will begin to expire in 2018.

As of December 31, 2017, the Company had research and development credit carryforwards of approximately $5.5 million and $5.1 million available to reduce its future tax liability, if any, for Federal and California state income tax purposes, respectively. The Federal credit carryforwards begin to expire in 2030. California credit carryforwards have no expiration date.

Internal Revenue Code section 382 places a limitation (the “Section 382 limitation” or “annual limitation”) on the amount of taxable income that can be offset by net operating loss (“NOL”) carryforwards after a change in control (generally greater than 50% change in ownership) of a loss corporation. Similar provisions exist for states. In addition, and as a result of the acquisitions of Good Start Genetics in August 2017 and CombiMatrix in November 2017, tax loss carryforwards from acquired entities are also subject to the Section 382 limitation due to the change in control in the acquired entities in the current year.

The Company performed an IRC Section 382 analysis for Good Start Genetics and CombiMatrix and concluded that a substantial portion of the acquired operating loss and credit carryovers would expire unused as a result of annual limitations under IRC sections 382 and 383. As a result, the federal and state operating loss and credit carryforwards acquired in connection with the Good Start Genetics and CombiMatrix acquisitions were reduced by the amount of tax attributes estimated to expire during their respective carryforward periods. In addition, as a result of equity issued in connection with its 2017 acquisitions, the Company also performed an IRC section 382 analysis through December 31, 2017 with respect to its legacy operating loss and credit carryforwards. The Company concluded while an ownership change occurred in 2017 as defined under IRC section 382, none of the Company’s legacy carryforwards would expire unused solely as a result of annual limitations imposed on the use of the carryforwards under IRC sections 382 and 383.

As of December 31, 2017, the Company had unrecognized tax benefits of $10.6 million, none of which would currently affect the Company’s effective tax rate if recognized due to the Company’s deferred tax assets being fully

offset by a valuation allowance. Unrecognized tax benefits are not expected to change in the next 12 months.

A reconciliation of the beginning and ending amount of unrecognized tax benefits is as follows (in thousands):

	Year ended December 31,		
	2017	2016	2015
Unrecognized tax benefits, beginning of period	$7,791	$11,429	$5,661
Gross increases—current period tax positions	2,552	782	2,993
Gross increases—prior period tax positions	218	(4,420)	2,775
Unrecognized tax benefits, end of period	$10,561	$7,791	$11,429

The Company’s policy is to include penalties and interest expense related to income taxes as a component of tax expense. The Company has not accrued interest and penalties related to the unrecognized tax benefits reflected in the financial statements for the years ended December 31, 2017, 2016 and 2015.

The Company's major tax jurisdictions are the United States and California. All of the Company's tax years will remain open for examination by the Federal and state tax authorities for three and four years, respectively, from the date of utilization of the net operating loss or research and development credit. The Company does not have any tax audits pending.

11. Net loss per common share

The following table presents the calculation of basic and diluted net loss per common share for the years ended December 31, 2017, 2016 and 2015 (in thousands, except share and per share amounts):

	Year ended December 31,		
	2017	2016	2015
Net loss	$(123,380)	$(100,256)	$(89,782)
Shares used in computing net loss per share, basic and diluted	46,511,739	33,176,305	28,213,324
Net loss per share, basic and diluted	$(2.65)	$(3.02)	$(3.18)

The following common stock equivalents have been excluded from diluted net loss per share for the years ended December 31, 2017, 2016 and 2015 because their inclusion would be anti-dilutive:

	Year Ended December 31,		
	2017	2016	2015
Shares of common stock subject to outstanding options	4,114,874	4,490,662	3,659,713
Shares of common stock subject to outstanding warrants	1,962,074	—	—
Shares of common stock subject to outstanding RSUs	2,387,120	891,752	482,818
Shares of common stock subject to outstanding PRSUs	—	530,005	—
Shares of common stock pursuant to ESPP	59,259	55,078	45,963
Shares of common stock underlying Series A convertible preferred stock	3,458,823	—	—
Shares of common stock subject to unvested	—	—	4,659

early exercise of outstanding options subject to repurchase			
Total shares of common stock equivalents	11,982,150	5,967,497	4,193,153

12. Geographic information

Revenue by country is determined based on the billing address of the customer and is summarized as follows (in thousands):

	Year Ended December 31,		
	2017	2016	2015
United States	$62,446	$20,758	$5,432
Canada	3,226	2,526	2,112
Rest of world	2,549	1,764	834
Total revenue	$68,221	$25,048	$8,378

Long-lived assets (net) by location are summarized as follows (in thousands):

	December 31,		
	2017	2016	2015
United States	$30,341	$23,793	$17,180
Chile	—	—	1,529
Total long-lived assets, net	$30,341	$23,793	$18,709

13. Selected quarterly data (unaudited)

The following table contains quarterly financial information for 2017 and 2016. The Company believes that the following information reflects all normal recurring adjustments necessary for a fair statement of the information for the periods presented. The operating results for any quarter are not necessarily indicative of results for any future period.

	Three Months Ended							
(In thousands, except per share amounts)	Dec 31, 2017	Sept 30, 2017	June 30, 2017	Mar 31, 2017	Dec 31, 2016	Sept 30, 2016	June 30, 2016	Mar 31, 2016
Revenue	$25,399	$18,148	$14,336	$10,338	$9,236	$6,276	$5,581	$3,955
Loss from operations	$(34,891)	$(30,976)	$(28,075)	$(27,337)	$(24,952)	$(24,906)	$(24,835)	$(25,490)
Net loss	$(40,493)	$(27,402)	$(28,557)	$(26,928)	$(24,848)	$(24,971)	$(24,847)	$(25,590)
Net loss per share, basic and diluted	$(0.78)	$(0.57)	$(0.66)	$(0.64)	$(0.69)	$(0.77)	$(0.77)	$(0.80)

14. Subsequent event

On February 26, 2018, the Company entered into an agreement (the “Amended 2017 Loan Agreement”) to modify the Loan and Security Agreement pursuant to which the Company is eligible to borrow a third term loan of $20.0 million in the second quarter of 2018.

If the third term loan becomes available and is not fully drawn, a line fee of 1% will be applied to the difference between $20.0 million and the amount drawn. The Amended 2017 Loan Agreement adds a quarterly covenant to achieve certain accession volumes. Substantially all other terms of the Amended 2017 Loan Agreement are consistent with the terms of the Loan and Security Agreement.

ITEM 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure.

Not applicable.

ITEM 9A. Controls and Procedures.

Evaluation of disclosure controls and procedures

We maintain “disclosure controls and procedures,” as such term is defined in Rule 13a 15(e) under the Securities Exchange Act of 1934, or Exchange Act, that are designed to ensure that information required to be disclosed by us in reports that we file or submit under the Exchange Act is recorded, processed, summarized, and reported within the time periods specified in Securities and Exchange Commission rules and forms, and that such information is accumulated and communicated to our management, including our principal executive officer and principal financial officer, as appropriate, to allow timely decisions regarding required disclosure. In designing and evaluating our disclosure controls and procedures, management recognized that disclosure controls and procedures, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the disclosure controls and procedures are met. Our disclosure controls and procedures have been designed to meet reasonable assurance standards. Additionally, in designing disclosure controls and procedures, our management necessarily was required to apply its judgment in evaluating the cost benefit relationship of possible disclosure controls and procedures. The design of any disclosure controls and procedures also is based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions.

Based on their evaluation as of the end of the period covered by this Annual Report on Form 10 K, our Chief Executive Officer (our principal executive officer) and Chief Financial Officer (our principal financial officer) have concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

Changes in internal controls

There was no change in our internal control over financial reporting (as defined in Rule 13a 15(f) under the Exchange Act) identified in connection with the evaluation described in Item 9A(a) above that occurred during our last fiscal quarter that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Management's annual report on internal control over financial reporting

Our management is responsible for establishing and maintaining internal control over our financial reporting. Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Projections of any evaluation of the effectiveness of internal control 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 policies or procedures may deteriorate. Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, assessed the effectiveness of our internal control over financial reporting as of December 31, 2017. In making this assessment, our management used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission, or COSO, in Internal Control—Integrated Framework (2013 Framework). Based on the assessment using those criteria, our management concluded that, as of December 31, 2017, our internal control over financial reporting was effective.

ITEM 9B. Other Information.

None.

PART III

ITEM 10. Directors, Executive Officers and Corporate Governance.

The information required by this item with respect to directors is incorporated by reference from the information under the caption “Election of Directors,” contained in our proxy statement to be filed with the Securities and Exchange Commission no later than 120 days from the end of our fiscal year ended December 31, 2017 in connection with the solicitation of proxies for our 2018 Annual Meeting of Stockholders, or the Proxy Statement. Certain information required by this item concerning executive officers is set forth in Part I of this Report under the caption “Executive Officers of the Registrant” and is incorporated herein by reference.

There have been no material changes to the procedures by which stockholders may recommend nominees to our Board of Directors.

Item 405 of Regulation S-K calls for disclosure of any known late filing or failure by an insider to file a report required by Section 16(a) of the Exchange Act. This disclosure is contained in the section entitled “Section 16(a) Beneficial Ownership Reporting Compliance” in the Proxy Statement and is incorporated herein by reference.

Our board of directors has adopted a code of ethics for senior financial officers applicable to our Chief Executive Officer and Chief Financial Officer as well as other key management employees addressing ethical issues. The code of business conduct and the code of ethics are each posted on our website www.invitae.com. The code of business conduct and the code of ethics can only be amended by the approval of a majority of our board of directors. Any waiver to the code of business conduct for an executive officer or director or any waiver of the code of ethics may only be granted by our board of directors or our nominating and corporate governance committee and must be timely disclosed as required by applicable law. We have implemented whistleblower procedures that establish formal protocols for receiving and handling complaints from employees. Any concerns regarding accounting or auditing matters reported under these procedures will be communicated promptly to our audit committee. Stockholders may request a free copy of our code of business conduct and code of ethics by contacting Invitae Corporation, Attention: Chief Financial Officer, 1400 16th Street, San Francisco, California 94103.

To date, there have been no waivers under our code of business conduct or code of ethics. We intend to disclose future amendments to certain provisions of our code of business conduct or code of ethics or waivers of such codes granted to executive officers and directors on our website at http://www.invitae.com within four business days following the date of such amendment or waiver.

Our Board of Directors has appointed an Audit Committee, comprised of Eric Aguiar, Geoffrey S. Crouse and Christine M. Gorjanc. The Board of Directors has determined that each of the members of our Audit Committee qualifies as an Audit Committee Financial Expert under the definition outlined by the Securities and Exchange Commission. In addition, each of the members of the Audit Committee qualifies as an "independent director" under the current rules of the New York Stock Exchange and Securities and Exchange Commission rules and regulations.

ITEM 11. Executive Compensation.

The information required by this item is incorporated by reference from the information under the captions “Election of Directors-Director Compensation” and “Executive Compensation” contained in the Proxy Statement.

ITEM 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

The information required by this item is incorporated by reference to the disclosure appearing under the headings “Security Ownership of Certain Beneficial Owners and Management” and “Executive Compensation-Equity Compensation Plan Information” contained in the Proxy Statement.

ITEM 13. Certain Relationships and Related Transactions, and Director Independence.

The information required by this item is incorporated by reference from the information under the caption “Election of Directors-Certain Relationships and Related Transactions” and “-Director Independence” contained in the Proxy Statement.

ITEM 14. Principal Accountant Fees and Services.

The information required by this item is incorporated by reference from the information under the caption “Ratification of the Appointment of Independent Registered Public Accounting Firm” contained in the Proxy Statement.

PART IV

ITEM 15. Exhibits and Financial Statement Schedules.

(a) Documents filed as part of this report

1. Financial Statements: Reference is made to the Index to Financial Statements of Invitae Corporation included in Item 8 of Part II hereof.
2. Financial Statement Schedules: All schedules have been omitted because they are not required, not applicable, or the required information is included in the financial statements or notes thereto.
3. Exhibits: See Item 15(b) below. Each management contract or compensating plan or arrangement required to be filed has been identified.

(b) Exhibits

Exhibit Number	Description
2.1&@	Stock Purchase Agreement dated as of January 6, 2017 by and among Invitae Corporation, each of the selling shareholders listed on Schedule 1 thereto, and the sellers' agent (incorporated by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8_K filed January 6, 2017).
2.2@	Form of Stock Exchange Agreement dated as of June 11, 2017 by and among Invitae Corporation, each of the selling stockholders listed on Schedule 1 thereto, and the sellers' agent (incorporated by referenced to Exhibit 2.1 to the Registrant's Current Report on Form 8-K filed June 13, 2017).
2.3@	Agreement and Plan of Merger and Reorganization, dated as of July 31, 2017, by and among Invitae Corporation, Coronado Merger Sub, Inc. and CombiMatrix Corporation (incorporated by referenced to Exhibit 2.1 to the Registrant's Current Report on Form 8-K filed August 1, 2017).
2.4@	Agreement and Plan of Merger, dated as of July 31, 2017, by and among Invitae Corporation, Bueno Merger Sub, Inc., Good Start Genetics, Inc., the Noteholders, the Management Carveout Plan Participants, and OrbiMed Private Investments III, LP as the Holders' Representative (incorporated by referenced to Exhibit 2.2 to the Registrant's Current Report on Form 8-K filed August 1, 2017).
3.1	Restated Certificate of Incorporation of the Registrant (incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8_K filed February 23, 2015).
3.1.1	Certificate of Designation of Preferences, Rights and Limitations of Series A Convertible Preferred Stock of Invitae Corporation (incorporated by referenced to Exhibit 3.1 to the Registrant's Current Report on Form 8-K filed August 1, 2017).
3.2	Amended and Restated Bylaws of the Registrant (incorporated by reference to Exhibit 3.2 to the Registrant's Current Report on Form 8_K filed February 23, 2015).
4.1	Form of Common Stock Certificate (incorporated by reference to Exhibit 4.1 to the Registrant's Registration Statement on Form S_1 (File No. 333_201433), as amended, declared effective on February 11, 2015).
4.2	Fifth Amended and Restated Investors' Rights Agreement, dated August 26, 2014, among Invitae Corporation and certain investors (incorporated by reference to Exhibit 4.2 to the Registrant's Registration Statement on Form S_1 (File No. 333_201433), as amended, declared effective on February 11, 2015).
4.3	

	Omnibus Approval and Amendment with Respect to: Series F Preferred Stock Purchase Agreement; Fifth Amended and Restated Investors' Rights Agreement; and Fifth Amended and Restated Voting Agreement, dated October 9, 2014, among Invitae Corporation and certain investors (incorporated by reference to Exhibit 4.3 to the Registrant's Registration Statement on Form S-1 (File No. 333-201433), as amended, declared effective on February 11, 2015).
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Exhibit Number	Description
4.4	Form of Invitae Corporation Series D Warrant (incorporated by reference to Exhibit 4.2 to the Registrant's Registration Statement on Form S-4 (File No. 333-220447), as amended, filed September 13, 2017).
4.5	Form of Invitae Corporation Series D Warrant Agent Agreement (incorporated by reference to Exhibit 4.3 to the Registrant's Registration Statement on Form S-4 (File No. 333-220447), as amended, filed September 13, 2017).
4.6	Form of Invitae Corporation Series F Warrant (incorporated by reference to Exhibit 4.4 to the Registrant's Registration Statement on Form S-4 (File No. 333-220447), as amended, filed September 13, 2017).
4.7	Form of Invitae Corporation Series F Warrant Agent Agreement (incorporated by reference to Exhibit 4.5 to the Registrant's Registration Statement on Form S-4 (File No. 333-220447), as amended, filed September 13, 2017).
10.1	Form of Indemnification Agreement between the Registrant and its officers and directors (incorporated by reference to Exhibit 10.1 to the Registrant's Registration Statement on Form S-1 (File No. 333-201433), as amended, declared effective on February 11, 2015).
10.2#	2010 Stock Plan (incorporated by reference to Exhibit 10.2 to the Registrant's Registration Statement on Form S-1 (File No. 333-201433), as amended, declared effective on February 11, 2015).
10.3#	Form of Notice of Stock Option Grant and Stock Option Agreement—Standard Exercise for awards granted under 2010 Stock Incentive Plan (incorporated by reference to Exhibit 10.3 to the Registrant's Registration Statement on Form S-1 (File No. 333-201433), as amended, declared effective on February 11, 2015).
10.4#	Form of Notice of Stock Option Grant and Stock Option Agreement—Early Exercise for awards granted under 2010 Stock Incentive Plan (incorporated by reference to Exhibit 10.4 to the Registrant's Registration Statement on Form S-1 (File No. 333-201433), as amended, declared effective on February 11, 2015).
10.5#	2015 Stock Incentive Plan (incorporated by reference to Exhibit 10.5 to the Registrant's Registration Statement on Form S-1 (File No. 333-201433), as amended, declared effective on February 11, 2015).
10.6#	Form of Notice of Stock Option Grant and Non-Qualified Stock Option Agreement for awards granted under the 2015 Stock Incentive Plan (incorporated by reference to Exhibit 10.6 to the Registrant's Registration Statement on Form S-1 (File No. 333-201433), as amended, declared effective on February 11, 2015).
10.7#	Form of Notice of Restricted Stock Award and Restricted Stock Agreement for awards granted under the 2015 Stock Incentive Plan (incorporated by reference to Exhibit 10.7 to the Registrant's Registration Statement on Form S-1 (File No. 333-201433), as amended, declared effective on February 11, 2015).
10.8#	Form of Notice of Restricted Stock Unit Award and Restricted Stock Unit Agreement for Awards Granted under the 2015 Stock Incentive Plan (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed August 6, 2015).
10.9#	Employee Stock Purchase Plan (incorporated by reference to Exhibit 10.8 to the Registrant's Registration Statement on Form S-1 (File No. 333-201433), as amended, declared effective on February 11, 2015).
10.10	

	Lease (Standard Form), dated September 1, 2011, by and between Invitae Corporation (f/k/a Locus Development, Inc.) and Martin E. Harband, Trustee of the Harband Family Trust, as amended (incorporated by reference to Exhibit 10.12 to the Registrant's Registration Statement on Form S-1 (File No. 333-201433), as amended, declared effective on February 11, 2015).
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Exhibit Number	Description
10.11	Sublease, dated December 6, 2013, by and between Invitae Corporation and Sutter West Bay Hospitals (incorporated by reference to Exhibit 10.13 to the Registrant's Registration Statement on Form S-1 (File No. 333-201433), as amended, declared effective on February 11, 2015).
10.12	Lease, dated October 31, 2012, by and between Invitae Corporation and 278 University Investors, LLC (incorporated by reference to Exhibit 10.14 to the Registrant's Registration Statement on Form S-1 (File No. 333-201433), as amended, declared effective on February 11, 2015).
10.13	Sublease, dated November 21, 2014, by and between Invitae Corporation and InMobi Inc (incorporated by reference to Exhibit 10.15 to the Registrant's Registration Statement on Form S-1 (File No. 333-201433), as amended, declared effective on February 11, 2015).
10.14	Lease Agreement dated as of September 2, 2015 by and between 1400 16th Street LLC, a Delaware limited liability company, and Invitae Corporation (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed September 4, 2015).
10.15	Loan and Security Agreement dated as of July 17, 2015 between Silicon Valley Bank and Invitae Corporation (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed July 22, 2015).
10.16&	Loan and Security Agreement dated as of March 15, 2017 between Oxford Capital, LLC and Invitae Corporation (incorporated by reference to Exhibit 10.13 to the Registrant's Amendment No. 2 to Annual Report on Form 10-K for the year ended December 31, 2016).
10.17	Form of Warrant to Purchase Common Stock between Oxford Capital, LLC and Invitae Corporation (incorporated by reference to Exhibit 10.14 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2016).
10.18#	Offer Letter, dated May 19, 2017, between Invitae Corporation and Shelly Guyer (incorporated by referenced to Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed June 1, 2017).
10.19	Securities Purchase Agreement, dated as of July 31, 2017 (incorporated by referenced to Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed August 1, 2017).
10.20	Registration Rights Agreement, dated as of July 31, 2017 (incorporated by referenced to Exhibit 10.2 to the Registrant's Current Report on Form 8-K filed August 1, 2017).
10.21	Amendment to Registration Rights Agreement, dated as of July 31, 2017 (incorporated by referenced to Exhibit 10.3 to the Registrant's Current Report on Form 8-K filed August 1, 2017).
10.22	Amended and Restated Registration Rights Agreement, dated as of July 31, 2017 (incorporated by referenced to Exhibit 10.4 to the Registrant's Current Report on Form 8-K filed August 1, 2017).
10.23	Marketing and Laboratory Services Agreement dated as of September 25, 2017 by and between Invitae Corporation, Good Start Genetics, Inc. and CombiMatrix Molecular Diagnostics, Inc. (incorporated by referenced to Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed September 27, 2017).
12.1*	Statement regarding computation of ratios.

21.1* List of Subsidiaries.

23.1* Consent of Independent Registered Public Accounting Firm.

24.1* Power of Attorney (contained on the signature page to this Form 10-K).

31.1* Principal Executive Officer's Certifications Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.

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Exhibit Number	Description
31.2*	Principal Financial Officer's Certifications Pursuant to Section 302 of the Sarbanes Oxley Act of 2002.
32.1+	Certification Pursuant to 18 U.S.C. § 1350 (Section 906 of Sarbanes Oxley Act of 2002).
32.2+	Certification Pursuant to 18 U.S.C. § 1350 (Section 906 of Sarbanes Oxley Act of 2002).
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema
101.CAL	XBRL Taxonomy Extension Calculation Linkbase
101.DEF	XBRL Taxonomy Extension Definition Linkbase
101.LAB	XBRL Taxonomy Extension label Linkbase
101.PRE	XBRL Taxonomy Extension Presentation Linkbase

#Indicates management contract or compensatory plan or arrangement.
*Filed herewith.
@The schedules and exhibits to this agreement have been omitted pursuant to Item 601(b)(2) of Regulation S-K. A copy of any omitted schedule and/or exhibit will be furnished to the SEC upon request.
+In accordance with Item 601(b)(32)(ii) of Regulation S K and SEC Release No. 34 47986, the certifications furnished in Exhibits 32.1 and 32.2 hereto are deemed to accompany this Form 10 K and will not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934 (the "Exchange Act") or deemed to be incorporated by reference into any filing under the Exchange Act or the Securities Act of 1933 except to the extent that the registrant specifically incorporates it by reference.
&Confidential treatment has been granted with respect to certain portions of this exhibit.
Copies of the above exhibits not contained herein are available to any stockholder, upon payment of a reasonable per page fee, upon written request to: Chief Financial Officer, Invitae Corporation, 1400 16th Street, San Francisco, California 94103.

(c)Financial Statement Schedules: Reference is made to Item 15(a) 2 above.
ITEM 16. Form 10-K Summary.

Not applicable.

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SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

INVITAE CORPORATION

By: /s/ Sean E. George, Ph.D.
Sean E. George, Ph.D.
President and Chief Executive Officer

Date: March 5, 2018

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENT, that each person whose signature appears below constitutes and appoints Sean E. George and Lee Bendekgey, and each of them, his true and lawful attorneys in fact, each with full power of substitution, for him or her in any and all capacities, to sign any amendments to this report on Form 10 K and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each of said attorneys in fact or their substitute or substitutes may do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons, on behalf of the registrant on the dates and the capacities indicated.

Signature	Title	Date
/s/ Sean e. George, Ph.D. Sean E. George, Ph.D.	President and Chief Executive Officer (Principal Executive Officer) and Director	March 5, 2018
/s/ Lee Bendekgey Lee Bendekgey	Chief Operating Officer and Secretary	March 5, 2018
/s/ Shelly D. Guyer Shelly D. Guyer	Chief Financial Officer (Principal Financial Officer)	March 5, 2018
/s/ Patricia E. Dumond Patricia E. Dumond	Vice President, Finance (Principal Accounting Officer)	March 5, 2018
/s/ Randal W. Scott, Ph.D.	Executive Chairman of the Board of Directors	March 5, 2018

Randal W. Scott, Ph.D.		
/s/ Eric Aguiar, M.D. Eric Aguiar, M.D.	Director	March 5, 2018
/s/ Geoffrey S. Crouse Geoffrey S. Crouse	Director	March 5, 2018
/s/ Christine M. Gorjanc Christine M. Gorjanc	Director	March 5, 2018