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

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FORM 8-K

CURRENT REPORT
Pursuant to Section 13 or 15(d)
of the Securities Exchange Act of 1934

Date of Report (Date of earliest event reported): September 18, 2018

Akcea Therapeutics, Inc.

(Exact name of registrant as specified in its charter)

Delaware	**001-38137**	**47-2608175**
(State or other jurisdiction of incorporation)	(Commission File Number)	(IRS Employer Identification No.)

55 Cambridge Parkway **Suite 100** **Cambridge, Massachusetts**	**02142**
(Address of principal executive offices)	(Zip Code)

Registrant's telephone number, including area code: (617) 207-0202

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligations of the registrant under any of the following provisions:

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)
☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)
☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))
☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c)

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (§230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§240.12b-2 of this chapter).

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. ☑

Item 8.01. Other Events

Akcea Therapeutics, Inc. (the "Company") is filing this Current Report on Form 8-K to present recast consolidated financial statements for each of the three years in the period ended December 31, 2017, to reflect the Company's adoption of the new accounting standard for revenue recognition set forth in ASC 606, "Revenue From Contracts With Customers" ("ASC 606") as of January 1, 2018 using the full retrospective transition method. The financial information being recast in this Form 8-K was originally filed with the Securities and Exchange Commission (the "SEC") in the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2017 (the "2017 Form 10-K"), which was filed with the SEC on February 28, 2018.

The rules of the SEC require that when a registrant adopts ASC 606 using the full retrospective method and then prepares a new registration, proxy or information statement (or amends a previously filed registration, proxy, or information statement) that includes or incorporates by reference financial statements for financial periods prior to the adoption date, the registrant must recast the prior period financial statements included or incorporated by reference in the registration, proxy or information statement to reflect ASC 606, as if ASC 606 had been effective for such periods. Accordingly, the Company is filing this Form 8-K to recast its consolidated financial statements for each of the three years in the period ended December 31, 2017, to reflect ASC 606, as if ASC 606 had been effective for such periods. The updated financial statements do not represent a restatement of previously issued financial statements. The recast of the information contained in Items 7 and 8 of the Company's 2017 Form 10-K are presented in Exhibits 99.1 and 99.2 to this Form 8-K.

The information included in this Form 8-K is provided for informational purposes only in connection with the adoption of ASC 606 by the Company and does not amend or restate the Company's audited consolidated financial statements included in the Company's 2017 Form 10-K. This Form 8-K does not reflect events occurring after the Company filed its 2017 Form 10-K and does not modify or update the disclosures therein in any way, other than to reflect the adoption of the new revenue standard as described above. For developments subsequent to the filing of the 2017 Form 10-K, refer to the Company's Quarterly Reports on Form 10-Q for the quarters ended March 31, 2018 and June 30, 2018 and Current Reports on Form 8-K filed subsequent to the filing of the 2017 Form 10-K.

Item 9.01 Financial Statements and Exhibits.

(d) Exhibits

Exhibit No.	Description
23.1	Consent of Independent Registered Public Accounting Firm
99.1	Updates, where applicable, to Part II, Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations, from Akcea Therapeutic, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2017, as filed with the Securities and Exchange Commission on February 28, 2018
99.2	Updated Part II, Item 8. Financial Statements and Supplementary Data, from Akcea Therapeutic, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2017, as filed with the Securities and Exchange Commission on February 28, 2018
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

SIGNATURES

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

AKCEA THERAPEUTICS, INC.

Date: September 18, 2018

By: /s/ Paula Soteropoulos

Paula Soteropoulos
Chief Executive Officer

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in the following Registration Statements:

(1) Registration Statement (Form S-8 No. 333-225730) pertaining to the 2015 Equity Incentive Plan and 2017 Employee Stock Purchase Plan of Akcea Therapeutics, Inc., and
(2) Registration Statement (Form S-8 No. 333-219290) pertaining to the 2015 Equity Incentive Plan and 2017 Employee Stock Purchase Plan of Akcea Therapeutics, Inc;

of our report dated February 28, 2018 (except for Notes 1, 7, 8, 11 and 12, as to which the date is September 18, 2018) with respect to the consolidated financial statements of Akcea Therapeutics, Inc., included in this Current Report on Form 8-K.

/s/ Ernst & Young LLP

Boston, Massachusetts
September 18, 2018

AKCEA THERAPEUTICS, INC.
EXPLANATORY NOTE

Akcea Therapeutics, Inc., or Akcea, is filing this Current Report on Form 8-K to revise "Management's Discussion and Analysis of Financial Condition and Results of Operations" and "Financial Statements and Supplementary Data" comprising Items 7 and 8, respectively, of its Annual Report on Form 10-K for the fiscal year ended December 31, 2017, filed with the Securities and Exchange Commission, or the SEC, on February 28, 2018, or the 2017 Form 10-K. These sections have been recast to reflect Akcea's adoption of the Financial Accounting Standard Board's Accounting Standards Codification Topic 606 "Revenue from Contracts with Customers", or Topic 606, as of January 1, 2018 using the full retrospective transition method. The revised Items 7 and 8 have been updated in compliance with generally accepted accounting principles to reflect the retrospective adoption of Topic 606 for the respective periods noted.

This Form 8-K, with the exception of the foregoing, does not reflect events occurring after the date of filing of the 2017 Form 10-K or update disclosures to already disclosed subsequent events or that are affected by any further subsequent events. Consequently, all other information not affected by the additions described above is unchanged and reflects the disclosures and other information made at the dates of the filing of the 2017 Form 10-K and should be read in conjunction with our filings with the SEC subsequent to such dates, including amendments to such filings, if any.

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

This financial review presents our operating results for each of the three years in the period ended December 31, 2017, and our financial condition at December 31, 2017. Except for the historical information contained herein, the following discussion contains forward-looking statements which are subject to known and unknown risks, uncertainties and other factors that may cause our actual results to differ materially from those expressed or implied by such forward-looking statements. We discuss such risks, uncertainties and other factors in Item 1A of Part I of the 2017 Form 10-K. In addition, the following review should be read in connection with the information presented in our consolidated financial statements and the related notes to our consolidated financial statements herein.

Overview

We are a late-stage biopharmaceutical company focused on developing and commercializing drugs to treat patients with serious cardiometabolic diseases caused by lipid disorders. Our goal is to become the premier company offering treatments for inadequately treated lipid disorders. We are advancing a mature pipeline of four novel drugs with the potential to treat multiple diseases. Our drugs, volanesorsen, AKCEA-APO(a)-L$_{Rx}$, AKCEA-ANGPTL3-L$_{Rx}$ and AKCEA-APOCIII-L$_{Rx}$, are all based on antisense technology developed by Ionis Pharmaceuticals, Inc., or Ionis, which owns approximately 68% of our common stock. Our most advanced drug, volanesorsen, is currently under review by regulatory agencies in the U.S., EU, and Canada for the treatment of people with familial chylomicronemia syndrome, or FCS. In the U.S., the Food and Drug Administration, or FDA, assigned a Prescription Drug User Fee Act, or PDUFA, goal date of August 30, 2018 and scheduled an advisory committee meeting for May 10, 2018. In Canada, our New Drug Submission, or NDS, was granted Priority Review by Health Canada. FCS is a severe, rare, genetically defined lipid disorder characterized by extremely elevated levels of triglycerides. FCS has life-threatening consequences and the lives of patients with this disease are impacted daily by the associated symptoms. In our clinical program, we have observed consistent and substantial (>70%) decreases in triglycerides and improvements in other manifestations of FCS, including pancreatitis attacks and abdominal pain. We believe the safety and efficacy data from the volanesorsen program demonstrate a favorable risk-benefit profile for patients with FCS. Volanesorsen is also currently in Phase 3 clinical development for the treatment of familial partial lipodystrophy, or FPL.

We have made substantial progress in assembling the infrastructure to commercialize our drugs globally with a focus on lipid specialists as the primary call point. We have established operations in the U.S., UK, France, Canada and Germany as well as sales team members and additional field medical directors to further FCS disease education prior to our volanesorsen launch. A key element of our commercial strategy is to provide the specialized, patient-centric support required to successfully address rare disease patient populations. We believe our focus on treating patients with inadequately addressed lipid disorders will allow us to partner efficiently and effectively with the specialized medical community that supports these patients. Most recently, we worked with experts to potentially help simplify diagnosis criteria, resulting in a streamlined patient journey to lipid specialists. Through our FCSFocus.com website, we provide a disease education book and a care toolkit to help patients understand their disease and organize all of their medical records to enable smoother communication with physicians.

To maximize the commercial potential of two of the drugs in our pipeline, we initiated a strategic collaboration with Novartis Pharma AG, or Novartis, for the development and commercialization of AKCEA-APO(a)-L$_{Rx}$ and AKCEA-APOCIII-L$_{Rx}$. We believe Novartis brings significant resources and expertise to the collaboration that can accelerate our ability to deliver these potential therapies to the large populations of patients who have high cardiovascular risk due to inadequately treated lipid disorders. Under our agreement with Novartis, after we complete Phase 2 development of each of AKCEA-APO(a)-L$_{Rx}$ (planned for the second half of 2018) and AKCEA-APOCIII-L$_{Rx}$ (planned for 2019), and if, on a drug-by-drug basis, Novartis exercises its option to license a drug and pays us the $150.0 million license fee to do so, Novartis would conduct and pay for a Phase 3 cardiovascular outcome study in high-risk patients and, if approved, commercialize each such licensed drug worldwide. We plan to co-commercialize any licensed drug commercialized by Novartis in selected markets, under terms and conditions that we plan to negotiate with Novartis in the future, through the specialized sales force we are building to commercialize volanesorsen.

Our strategic collaboration with Novartis has a potential aggregate transaction value of over $1.0 billion, plus royalties, which we would generally be required to share equally with Ionis. The calculation of potential aggregate transaction value assumes that Novartis licenses, successfully develops and achieves regulatory approval for both AKCEA-APO(a)-L_{Rx} and AKCEA-APOCIII-L_{Rx} in the United States, Europe and Japan, and that Novartis achieves pre-specified sales targets with respect to both drugs. As part of our collaboration, we received $75.0 million in an upfront option payment, of which we retained $60.0 million and paid $15.0 million to Ionis as a sublicense fee. In addition, for AKCEA-APO(a)-L_{Rx} we are eligible to receive up to $600.0 million in milestone payments, including $25.0 million for the achievement of a development milestone, up to $290.0 million for the achievement of regulatory milestones and up to $285.0 million for the achievement of commercialization milestones. In addition, for AKCEA-APOCIII-L_{Rx} we are eligible to receive up to $530.0 million in milestone payments, including $25.0 million for the achievement of a development milestone, up to $240.0 million for the achievement of regulatory milestones and up to $265.0 million for the achievement of commercialization milestones. We are also eligible to receive tiered royalties in the mid-teens to low twenty percent range on net sales of AKCEA-APO(a)-L_{Rx} and AKCEA-APOCIII-L_{Rx}. Novartis will reduce these royalties upon the expiration of certain patents or if a generic competitor negatively impacts the product in a specific country. We will pay 50% of these license fees, milestone payments and royalties to Ionis as a sublicense fee. See Note 8, Strategic Collaboration with Novartis, to our consolidated financial statements for additional information.

Through 2016, we did not generate revenue and we have incurred net losses in each period since inception. In January 2017, we initiated our strategic collaboration with Novartis and began recognizing revenue under this collaboration. Our revenue for the year ended December 31, 2017 was $43.4 million, solely related to our strategic collaboration with Novartis. Our net losses have resulted from costs incurred in developing volanesorsen and the other drugs in our pipeline, preparing to commercialize volanesorsen and general and administrative activities associated with our operations. We expect to continue to incur significant expenses and increasing operating losses for the foreseeable future as we continue to develop volanesorsen and our other drugs, and seek regulatory approval for and prepare to commercialize volanesorsen. We expect to incur significant expenses to continue to build the infrastructure to support volanesorsen's commercialization, including manufacturing, marketing, sales and distribution functions. Further, we expect to incur additional costs associated with operating as a public company and in building our internal resources to become less reliant on Ionis.

As of December 31, 2017, we had cash, cash equivalents and short-term investments of $260.1 million. We have funded our operating activities through a $100.0 million cash contribution that we received from Ionis in 2015, $75.0 million from initiating our collaboration with Novartis that we received in the first quarter of 2017 and $106.0 million in drawdowns under our line of credit with Ionis that we received in the first and second quarters of 2017. In July 2017 we completed our initial public offering, or IPO, and raised $182.3 million in net proceeds including $50 million from the Novartis concurrent private placement and $25 million from Ionis. We plan to further advance our drugs and commercialization efforts with our cash on hand.

We believe that our existing cash, cash equivalents and short-term investments will be sufficient to fund our operations for at least 12 months from the original issuance date of the 2017 Form 10-K. However, we expect to raise additional funds in the future to continue developing the drugs in our pipeline and to further commercialize any approved drugs, including volanesorsen. We may seek to obtain additional financing in the future through the issuance of our common stock, through other equity or debt financings or through collaborations or partnerships with other companies. We may not be able to raise additional capital on terms acceptable to us, or at all, and any failure to raise capital as and when needed could compromise our ability to execute on our current business plan.

Our Relationship with Ionis

Prior to January 2015, the drugs we licensed from Ionis were part of Ionis' broad pipeline of antisense drugs. Ionis' employees performed all of the development, regulatory and manufacturing activities for these drugs either themselves or through third-party providers. As such, Ionis incurred all of the expenses associated with these activities and reported them in its consolidated financial statements. Ionis formed Akcea as a wholly owned subsidiary to complete development of and commercialize Ionis' drugs to treat lipid disorders. We began business operations in January 2015.

We exclusively licensed our pipeline of four novel drugs from Ionis effective in January 2015. Prior to then, Ionis had been advancing these drugs in development and incurring the expenses for those activities. Under our license agreement with Ionis, Ionis continued and is continuing to conduct development, regulatory and manufacturing activities for our drugs and charge us for this work. In this way, we benefit from Ionis' more than 25 years of experience developing and manufacturing antisense drugs. As we are building our development, regulatory and manufacturing capabilities and capacity, we expect to assume increasing responsibility for these functions and Ionis' responsibilities will decrease. We expect that our collaborative approach will allow us to build these capabilities and capacity while still working closely with Ionis as we transition our drug development activities. Moreover, because Ionis has been conducting the majority of the development activities for our drugs, we have been able to focus on building the commercial organization and conducting the pre-commercialization activities necessary to support the launch of volanesorsen, if approved for marketing.

We pay Ionis for the research and development expenses it incurs on our behalf, which include both external and internal expenses in accordance with our license agreement with Ionis. External research and development expenses include costs for contract research organizations, or CROs, costs to conduct nonclinical and clinical studies on our drugs, costs to acquire and evaluate clinical study data such as investigator grants, patient screening fees and laboratory work, and fees paid to consultants. Internal development expenses include costs for the work that Ionis' development employees perform for us. Ionis charges us a full-time equivalent rate that covers personnel-related expenses, including salaries and benefits, plus an allocation of facility-related expenses, including rent, utilities, insurance and property taxes, for those research and development employees who work either directly or indirectly on the development of our drugs. In accordance with the license agreement, we pay Ionis for external research and development expenses and internal research and development expenses. We also pay Ionis for the active pharmaceutical ingredient, or API, and drug product we use in our nonclinical and clinical studies for all of our drugs. Ionis manufactures the API for us and charges us a price per gram consistent with the price Ionis charges its pharmaceutical partners, which includes the cost for direct materials, direct labor and overhead required to manufacture the API. If we need the API filled in vials or pre-filled syringes for our clinical studies, Ionis will contract with a third party to perform this work and Ionis will charge us for the resulting cost.

Under the services agreement, Ionis also provides us certain services, including, without limitation, general and administrative support services and development support services. We pay Ionis for our share of the internal and external expenses for each of these functions based on our relative use of each function, plus an allocation of facility-related expenses. As our business grows and we assume increasing responsibility from Ionis, we are assuming direct responsibility for procuring and financing the services we currently receive from Ionis and Ionis' responsibility to provide us with these services is decreasing.

We do not pay a mark-up or profit on the external or internal expenses Ionis bills to us or on the cost of the drugs Ionis manufactures for us. Moreover, Ionis only charges us for the portion of its resources that we use. For example, we do not have to pay for a full-time person if we only need the person's skills for 50% of the time. In this way, we can increase our headcount as our requirements grow and as we assume increasing responsibility for our drugs from Ionis, rather than building capabilities and capacity in advance of full utilization. We believe that our expenses reasonably reflect the expenses we would have incurred if we had the capabilities and capacity in place to perform this work ourselves. Further, we do not believe that our expenses will increase significantly as we assume development, regulatory, manufacturing and administrative responsibilities from Ionis because we will only assume these functions when we believe we can do so in a cost-efficient manner. See Note 4, *Development, Commercialization and License Agreement and Services Agreement with Ionis*, to our consolidated financial statements for more information on our agreements with Ionis.

In addition, Ionis has helped fund our operations through a line of credit agreement that we entered into in January 2017 under which we borrowed $106.0 million. The outstanding principal and accrued interest automatically converted upon closing of our IPO into an aggregate of 13,438,339 shares of our common stock. Following the closing of our IPO, we no longer have access to the line of credit with Ionis.

Basis of Presentation

We consider our expense methodology and results to be reasonable for all periods we present. However, our allocations may not be indicative of the actual expenses we would have incurred had we operated as an independent, publicly traded company for the periods we present.

We discuss our agreements with Ionis in Note 4, *Development, Commercialization and License Agreement and Services Agreement with Ionis,* to our consolidated financial statements.

Critical Accounting Policies

We prepare our consolidated financial statements in conformity with accounting principles generally accepted in the United States, or GAAP. As such, we make certain estimates, judgments and assumptions that we believe are reasonable, based upon the information available to us. These judgments involve making estimates about the effect of matters that are inherently uncertain and may significantly impact our quarterly or annual results of operations and financial condition. In the following paragraphs, we describe our most significant accounting policies, which we believe are the most critical to aid in fully understanding and evaluating our reported financial results. As described below, there are specific risks associated with these critical accounting policies and we caution that future events rarely develop exactly as one may expect, and that best estimates may require adjustment.

The significant accounting policies, which we believe are the most critical to aid in fully understanding and evaluating our reported financial results, require the following:

- Assessing the propriety of revenue recognition and associated deferred revenue;
- Determining the appropriate cost estimates for unbilled preclinical and clinical development activities;
- Determining the stock-based compensation expense and valuation assumptions;
- Determining the fair value of our common stock prior to our IPO; and
- Determining the valuation allowance for net deferred tax assets.

Descriptions of these critical accounting policies follow.

Revenue Recognition

In May 2014, the Financial Accounting Standards Board, or FASB, issued Accounting Standards Update, or ASU, No. 2014-09, which amends the guidance for accounting for revenue from contracts with customers. This ASU supersedes the revenue recognition requirements in ASC Topic 605, Revenue Recognition, or Topic 605, and creates a new Topic 606, Revenue from Contracts with Customers, or Topic 606. In 2015 and 2016, the FASB issued additional ASUs related to Topic 606 that delayed the effective date of the guidance and clarified various aspects of the new revenue guidance, including principal versus agent considerations, identifying performance obligations, and licensing, and they include other improvements and practical expedients. Under Topic 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services.

To determine revenue recognition for arrangements that an entity determines are within the scope of Topic 606, the entity performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation. At contract inception, once the contract is determined to be within the scope of Topic 606, we assess the goods or services promised within each contract and determine those that are performance obligations, and assess whether each promised good or service is distinct. When we offer options for additional goods or services, such as an option to license a drug in the future or for additional goods or services to be provided in the future, we evaluate whether options are material rights that should be treated as additional performance obligations. We typically have not concluded that the option to license a drug or the options for additional goods or services that may be requested in the future under our collaboration agreement are material rights as the amounts attributable to such options represent standalone selling price, and therefore no consideration is allocated to these items at the inception of an agreement. When a partner exercises their option to license a drug or requests the additional goods or services, a new performance obligation is created for that item. Once performance obligations are identified, we then recognize as revenue the amount of the transaction price that we allocated to the respective performance obligation when (or as) each performance obligation is satisfied at a point in time or over time. If the performance obligation is satisfied over time, we recognize revenue based on the use of an output or input method. We have one revenue stream from our strategic collaboration, option and license agreement, or collaboration agreement with Novartis, which we entered into in January 2017. For a complete discussion of the accounting for our collaboration revenue, see Note 8, *Strategic Collaboration with Novartis*.

Effective January 1, 2018, we adopted Topic 606 using the full retrospective transition method. Under this method, we revised our consolidated financial statements for prior period amounts, as if Topic 606 had been effective for such periods. The references "as revised" used herein refer to revisions of data for the year ended December 31, 2017 as a result of our adoption of Topic 606. Additionally we have updated Note 1, *Organization and Significant Accounting Policies*, Note 7, *Income Taxes*, Note 8, *Strategic Collaboration with Novartis*, Note 11, *Basic and Diluted Net Loss Per Share*, and Note 12, *Quarterly Financial Data (Unaudited).*

Research and development revenue under collaborative agreements

We entered into the collaboration agreement with Novartis to develop and commercialize AKCEA-APO(a)-L_{Rx} and AKCEA-APOCIII-L_{Rx}. Under the collaboration agreement, we received a $75.0 million upfront payment. For each drug, we are responsible for completing a Phase 2 program, conducting an end-of-Phase 2 meeting with the FDA and delivering active pharmaceutical ingredient, or API. Under the collaboration agreement, Novartis has an exclusive option to develop and commercialize AKCEA-APO(a)-L_{Rx} and AKCEA-APOCIII-L_{Rx}. If Novartis exercises an option for one of these drugs, it will pay us a license fee and will assume all further global development, regulatory and commercialization activities for the licensed drug. We are also eligible to receive a development milestone payment, milestone payments if Novartis achieves pre-specified regulatory milestones, commercial milestone payments and tiered royalties on net sales from each drug under the collaboration.

Under the Stock Plan Agreement, or SPA, Novartis purchased 1.6 million shares of Ionis' common stock for $100.0 million in the first quarter of 2017 and paid a premium over the weighted average trading price at the time of purchase. Additionally, Novartis agreed to purchase up to $50.0 million of our common stock in a separate private placement concurrent with the completion of our IPO at a price per share equal to the initial public offering price, subject to a number of conditions. If we did not complete our IPO or a similar offering by the 15-month anniversary of the SPA, or if we completed an offering that did not meet the specified criteria for Novartis to invest, then Novartis would have been required to purchase $50.0 million of Ionis' common stock at a premium over the weighted average trading price of Ionis' common stock at the time of purchase.

We evaluated the Novartis agreements to determine whether we should treat the agreements separately or as a single arrangement. We considered that the agreements were negotiated concurrently and in contemplation of one another. Additionally, the same individuals were involved in the negotiations of both agreements. Based on these facts and circumstances, we concluded that we should treat both agreements as a single arrangement, which we refer to as the Novartis collaboration. We evaluated the provisions of the agreements on a combined basis.

Identifying performance obligations

We evaluate the performance obligations in a collaboration agreement to determine whether they are distinct.

At the commencement of our strategic collaboration, we identified the following four distinct performance obligations:

- Development activities for AKCEA-APO(a)-L_{Rx};
- Development activities for AKCEA-APOCIII-L_{Rx};
- API for AKCEA-APO(a)-L_{Rx}; and
- API for AKCEA-APOCIII-L_{Rx}.

The development activities and the supply of API are distinct because Novartis or another third party could provide these items without our assistance.

We determined the transaction price for the Novartis collaboration was $108.4 million, comprised of the following:

- $75.0 million from the upfront payment received;
- $28.4 million for the premium paid by Novartis, which represents the excess of the fair value Ionis received from Novartis' purchase of Ionis' stock at a premium in the first quarter of 2017; and
- $5.0 million for the potential premium Novartis would have paid if they had been required to purchase Ionis' stock in the future at a premium.

We are recognizing the $75.0 million upfront payment plus the premium paid by Novartis from its purchase of Ionis' stock and the premium associated with Novartis' obligation to purchase Ionis' stock if we did not complete our IPO because we are the party providing the services and API under the collaboration agreement.

None of the development or regulatory milestone payments have been included in the transaction price, as all milestone payments are fully constrained. As part of our evaluation of the constraint, we considered numerous factors, including the fact that achievement of the milestones is outside of our control and contingent upon the success of our clinical trials, Novartis' efforts, and the receipt of regulatory approval. We will re-evaluate the transaction price, including estimated variable consideration included in the transaction price and all constrained amounts, in each reporting period and as uncertain events are resolved or other changes in circumstances occur. Based on the distinct performance obligations under the Novartis collaboration, we allocated the $108.4 million transaction price based on relative stand-alone selling prices of each of our performance obligations as follows:

- $64.0 million for development services for AKCEA-APO(a)-L_{Rx};
- $40.1 million for development services for AKCEA-APOCIII-L_{Rx};
- $1.5 million for the delivery of AKCEA-APO(a)-L_{Rx} API; and
- $2.8 million for the delivery of AKCEA-APOCIII-L_{Rx} API.

We are recognizing revenue related to each of our performance obligations as follows:

- We will satisfy the development services performance obligation for AKCEA-APO(a)-L_{Rx} as the research and development services are performed. We determined that the period of performance of the research and development services was two years, or through December 2018. We recognize revenue related to research and development services performed using an input method by calculating costs incurred at each period end relative to total costs expected to be incurred;
- We will satisfy the development services performance obligation for AKCEA-APOCIII-L_{Rx} as the research and development services are performed. We determined that the period of performance of the research and development services was two and a half years, or through June 2019. We recognize revenue related to research and development services performed using an input method by calculating costs incurred at each period ended relative to total costs expected to be incurred;
- We recognized the amount attributed to the AKCEA-APO(a)-L_{Rx} API supply when we deliver API to Novartis; and
- We will recognize the amount attributed to the AKCEA-APOCIII-L_{Rx} API supply when we deliver API to Novartis.

At December 31, 2017, the aggregate transaction price allocated to our remaining performance obligations was $70.7 million, which we are recognizing over the estimated period of our performance obligation.

Additionally, we and Ionis entered into a SPA with Novartis. Under the SPA, in July 2017, Novartis purchased $50.0 million of our common stock in a separate private placement concurrent with the completion our IPO at a price per share equal to the IPO price. Our IPO is discussed in Note 9, *Initial Public Offering*.

During the year ended December 31, 2017, we earned revenue of $43.4 million from our relationship with Novartis, representing 100% of our revenue. We did not earn any revenue during the year ended December 31, 2016. Our consolidated balance sheet at December 31, 2017 included deferred revenue of $70.7 million related to our relationship with Novartis and no deferred revenue at December 31, 2016.

Estimated Liability for Research and Development Costs

We record accrued liabilities related to expenses for which vendors or service providers have not yet billed us. These liabilities are for products or services that we have received and primarily relate to ongoing, nonclinical and clinical studies. These costs primarily include third-party clinical management costs, laboratory and analysis costs, toxicology studies and investigator grants. We have drugs in concurrent, nonclinical and clinical studies at several sites throughout the world. To ensure that we have adequately provided for ongoing, nonclinical and clinical research and development costs during the period in which we incur such costs, we maintain an accrual to cover these costs. We update our estimate for this accrual on at least a quarterly basis. The assessment of these costs is a subjective process that requires judgment. Upon settlement, these costs may differ materially from the amounts accrued in our consolidated financial statements. Our historical accrual estimates have not been materially different from our actual amounts.

Stock-Based Compensation Expense and Valuation Assumptions

We measure stock-based compensation expense for equity-classified stock option awards based on the estimated fair value of the award on the date of grant. We recognize the value of the portion of the award that we ultimately expect to vest as stock-based compensation expense over the requisite service period in our statements of operations. We reduce stock-based compensation expense for estimated forfeitures at the time of grant and revise in subsequent periods if actual forfeitures differ from those estimates.

Prior to December 2015, Ionis granted our employees options to purchase shares of Ionis' common stock, or Ionis options. In December 2015, we granted our employees holding Ionis options additional options to purchase shares of our common stock, or Akcea options.

We determined the stock-based compensation expense for the Ionis options at the date of grant and recognized compensation expense over the vesting period of the Ionis options. In December 2015, we accounted for the issuance of the Akcea options as a modification to the original grant of the Ionis options because the grant of the Ionis options and Akcea options essentially represented a single stock award as the exercisability provisions of the Ionis options and Akcea options were interrelated and mutually exclusive. The total compensation expense measured on the modification date was the sum of the grant date fair value of the Ionis options plus any incremental compensation expense resulting from the grant of the Akcea options.

In 2016, we began concurrently granting Ionis options and Akcea options to our employees. Because the exercisability provisions of the awards are interrelated and mutually exclusive as described above, the fair values of the Ionis options and the Akcea options were determined on the date of grant and the option with the greater fair value is recognized over the vesting period of the awards. In 2017, we no longer concurrently granted Ionis options and Akcea options to our employees.

Following our IPO, we no longer grant Ionis options to our employees. Under the terms of the Ionis options, when we completed our IPO, the Ionis options our employees were holding were terminated. The termination of the Ionis options was determined not to be a modification, as the options were terminated based upon the existing contractual terms of the option agreements. As such, we will continue to recognize stock-based compensation expense based upon the valuation that we determined at the grant date for options issued in 2016 or the modification date for options issued in 2015 and 2017.

We recognize compensation expense for option awards using the accelerated multiple-option approach. Under the accelerated multiple-option approach, also known as the graded-vesting method, an entity recognizes compensation expense over the requisite service period for each separately vesting tranche of the award as though the award were in substance multiple awards, which results in the expense being front-loaded over the vesting period.

We and Ionis value our stock option awards using the Black-Scholes option pricing model. The determination of the grant date fair value of options using an option pricing model is affected principally by the estimated common stock fair value and requires management to make a number of other assumptions, including: the risk-free interest rate, expected dividend yield, expected volatility, expected term, rate of forfeiture and fair value of common stock.

Ionis considered the following factors in valuing options for its common stock granted to our employees:

- *Risk-free interest rate.* Ionis bases the risk-free interest rate assumption on the yields of U.S. Treasury securities with maturities that correspond to the term of the award.
- *Expected dividend yield.* Ionis bases the dividend yield assumption on its history and expectation of dividend payouts. Ionis has not paid dividends in the past and it does not expect to do so in the foreseeable future.
- *Expected volatility.* Ionis uses an average of the historical stock price volatility of Ionis' stock. Ionis computes its historical stock volatility based on the expected term of its awards.
- *Expected term.* The expected term of stock options Ionis has granted represents the period of time that it expects them to be outstanding. Ionis estimates the expected term of options it has granted based on actual and projected exercise patterns.
- *Rate of forfeiture.* Ionis estimates forfeitures at the time of grant and revises its estimates, if necessary, in subsequent periods if actual forfeitures differ from those estimates. It estimates forfeitures based on historical experience. Ionis' historical forfeiture estimates have not been materially different from its actual forfeitures.
- *Fair value of common stock.* Ionis uses the market closing price for its common stock on the date of grant as reported on NASDAQ to determine the fair value of Ionis' common stock on the date of grant.

We considered the following factors in valuing options for our common stock:

- *Risk-free interest rate.* We determine the risk-free interest rate assumption based on the yields of U.S. Treasury securities with maturities that correspond to the term of the award.
- *Expected dividend yield.* We assume a dividend yield of zero as we have not paid dividends in the past and do not expect we will pay dividends on our common stock for the foreseeable future.
- *Expected volatility.* We do not have sufficient history to estimate the volatility of our common stock. We calculate expected volatility based on reported data from selected publicly traded peer companies for which historical information is available. We plan to continue to use a peer group to calculate our volatility until the historical volatility of our common stock is sufficient to measure expected volatility for future option grants.
- *Expected term.* Our expected term estimates represent the period of time that we expect the options to be outstanding. As we do not have historical information, we use the simplified method for estimating the expected term. Under the simplified method, we calculate the expected term as the average of the time-to-vesting and the contractual life of the options. As we gain additional historical information, we will transition to calculating our expected term based on our exercise patterns.
- *Rate of forfeiture.* We estimate forfeitures based on Ionis' historical rates of forfeiture as we do not have similar historical information for ourselves. We and Ionis are engaged in similar businesses and we believe this is a good estimate of expected forfeitures. As we gain additional historical information, we will transition to using our historical forfeiture rate.
- *Fair value of common stock.* Prior to our IPO, we estimated the fair value of our common stock as our common stock has not historically been publicly traded. See "Fair Value of Common Stock Prior to Initial Public Offering" below. Upon completion of our IPO in July 2017, we use the market closing price for our common stock on the date of grant as reported on NASDAQ to determine the fair value of our common stock on the date of grant.

Fair Value of Common Stock Prior to Initial Public Offering

We granted all options to purchase shares of our common stock with an exercise price per share no less than the fair value per share of our common stock underlying those options on the date of grant. Historically, for all periods prior to our IPO, the fair values of the shares of common stock underlying our stock options were estimated on each grant date by our board of directors. Given the absence of a public trading market of 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. To determine the fair value of our common stock, our board of directors considered, among other things, contemporaneous valuations of our common stock prepared by an unrelated third-party valuation firm in accordance with the guidance provided by the American Institute of Certified Public Accountants 2013 Practice Aid, *Valuation of Privately-Held-Company Equity Securities Issued as Compensation*, or the Practice Aid. Our board of directors also considered various objective and subjective factors in estimating the fair value of our common stock on the date of grant, including:

- the prices, rights, preferences and privileges of our preferred stock relative to our common stock;
- our business, financial condition and results of operations, including related industry trends affecting our operations;
- the likelihood of achieving a liquidity event, such as an initial public offering or sale of our company, given prevailing market conditions;
- the lack of marketability of our common stock;
- the market performance of comparable publicly traded companies; and
- U.S. and global economic and capital market conditions and outlook.

Enterprise Valuation Methodologies

Our third-party valuation firm prepared our valuations in accordance with the guidelines in the Practice Aid, which prescribes several valuation approaches for setting the value of an enterprise, such as the cost, income and market approaches, and various methodologies for allocating the value of an enterprise to its common stock. The cost approach establishes the value of an enterprise based on the cost of reproducing or replacing the property less depreciation and functional or economic obsolescence, if present. The income approach establishes the value of an enterprise based on the present value of future cash flows that are reasonably reflective of a company's future operations, discounting to the present value with an appropriate risk adjusted discount rate or capitalization rate. The market approach is based on the assumption that the value of an asset is equal to the value of a substitute asset with the same characteristics. Our third-party valuation firm used the income and market valuation approaches to determine our stock price prior to completion of our IPO. When applying the income approach, our third-party valuation firm uses a discounted cash flow analysis based on our projections. When applying the market approach, our third-party valuation firm used the guideline publicly traded companies method choosing pharmaceutical companies whose business descriptions, including products and/or stage of development, are similar to ours. Our third-party valuation firm calculated our enterprise value under each of the income and market approaches and then used an equal weighting of these two approaches to arrive at our enterprise value.

Methods Used to Allocate Our Enterprise Value to Classes of Securities

In accordance with the Practice Aid, our third-party valuation firm considered the various methods for allocating the enterprise value across our classes and series of capital stock to determine the fair value of our common stock at each valuation date. The methods the third-party valuation firm considered consisted of the following:

Current Value Method

Under the current value method, once the fair value of the enterprise is established, the value is allocated to the various series of preferred and common stock based on their respective seniority, liquidation preference or conversion values, whichever is greatest. This method was considered, but not used in any of the valuations discussed below.

Option Pricing Method

The option pricing method, or OPM, treats common stock and preferred stock as call options on the total equity value of a company, with exercise prices based on the liquidation preference of the preferred stock. Under this method, the common stock has value only if the funds available for distribution to the stockholders exceed the value of the liquidation preference at the time of a liquidity event such as a merger, sale, or initial public offering, assuming the enterprise has funds available to make a liquidation preference meaningful and collectible by the stockholders. The common stock is modeled as a call option on the underlying equity value at a predetermined exercise price. In the model, the exercise price is based on a comparison with the total equity value, rather than, as in the case of a regular call option, a comparison with a per share stock price. The OPM uses the Black-Scholes option-pricing model to price the call option.

The valuation of our common stock as of January 1, 2015 used the OPM. We applied a discount to the valuation due to the lack of marketability of our stock. We calculated the discount for lack of marketability using the Finnerty model and applied it as applicable to each allocation.

Probability-Weighted Expected Return Method

The probability-weighted expected return method, or PWERM, considers various potential liquidity outcomes, including in our case an initial public offering, the sale of our company, dissolution and staying private, and assigns probabilities to each outcome to arrive at a weighted equity value.

We performed an updated valuation analysis of our common stock as of January 1, 2017 using a hybrid of the OPM and the PWERM, consistent with how such hybrid method is described in the Practice Aid. We calculated the discount for lack of marketability using the Finnerty model and applied it as applicable to each allocation.

Income Taxes

On December 22, 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Cuts and Jobs Act of 2017, or the "Tax Act". The Tax Act makes broad and complex changes to the U.S. tax code. The changes include, but are not limited to, reducing the U.S. federal corporate tax rate from 35% to 21%, imposing a mandatory one-time transition tax on certain unrepatriated earnings of foreign subsidiaries, introducing bonus depreciation that will allow for full expensing of qualified property, eliminating the corporate alternative minimum tax, or AMT, and changing how existing AMT credits can be realized.

The SEC staff issued Staff Accounting Bulletin No. 118, or 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 Tax Act.

In accordance with SAB 118, we provided our best estimate of the impact of the Tax Act in the period ending December 31, 2017 based on our understanding of the Tax Act and guidance available as of the date of this filing. We remeasured our existing net U.S. deferred tax assets using the enacted tax rate and other known significant changes to the tax code. This resulted in a total decrease in these assets by $19.1 million which was fully offset by the decrease in the valuation allowance. In addition, we recorded a $0.5 million long-term income tax receivable related to our estimated 2017 AMT liability because under the Tax Act, AMT credits are refundable from 2018 through 2021.

Prior to the completion of our IPO we filed our tax returns on a consolidated and combined basis with Ionis for federal and state income tax purposes, respectively. For financial statement purposes when we are required to file on a consolidated or combined basis, we calculate our income tax amounts, including net operating losses and tax credit carryforwards, using a separate return methodology which determines income taxes as if we were a separate taxpayer from Ionis. Effective July 19, 2017, the date of our IPO, we are no longer included in the consolidated federal income tax return with Ionis. We determined the amount of federal tax attributes, primarily net operating losses and tax credit carryforwards that transferred to us upon deconsolidation from Ionis.

We are still required to file most of our state tax returns on a consolidated or combined basis with Ionis. Therefore, for financial statement purposes we calculated our state income tax amounts using the separate return method. We have not yet determined the amount of state tax attributes, primarily net operating losses and tax credit carryforwards, which we would retain if we were to deconsolidate for state tax purposes from Ionis.

We account for income taxes using the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been recognized in our financial statements or tax returns. In addition, deferred tax assets are recorded for the future benefit of utilizing net operating losses and research and development credit carryforwards. Valuation allowances are provided when necessary to reduce deferred tax assets to the amount expected to be realized.

We apply the authoritative accounting guidance prescribing a threshold and measurement attribute for the financial recognition and measurement of a tax position taken or expected to be taken in a tax return. We recognize liabilities for uncertain tax positions based on a two-step process. The first step is to evaluate the tax position for recognition by determining if the weight of available evidence indicates that it is more likely than not that the position will be sustained on audit, including resolution of related appeals or litigation processes, if any. The second step requires us to estimate and measure the tax benefit as the largest amount that is more than 50% likely to be realized upon ultimate settlement.

Significant judgment is required in evaluating our uncertain tax positions and determining our provision for income taxes. Although we believe our reserves are reasonable, no assurance can be given that the final tax outcome of these matters will not be different from that which is reflected in our historical income tax provisions and accruals. We adjust these reserves for changing facts and circumstances, such as the closing of a tax audit or the refinement of an estimate. To the extent that the final tax outcome of these matters is different than the amounts recorded, such differences may impact the provision for income taxes in the period in which such determination is made.

We recognize interest and penalties related to unrecognized tax benefits within the income tax expense line in the accompanying consolidated statements of operations. Accrued interest and penalties are included within other long-term liabilities in the consolidated balance sheets.

Significant judgment is also required in determining any valuation allowance recorded against deferred tax assets. In assessing the need for a valuation allowance, we consider all available evidence, including scheduled reversal of deferred tax liabilities, past operating results, the feasibility of tax planning strategies and estimates of future taxable income. Estimates of future taxable income are based on assumptions that are consistent with our plans. Assumptions represent management's best estimates and involve inherent uncertainties and the application of management's judgment. Should actual amounts differ from our estimates, the amount of our tax expense and liabilities could be materially impacted.

We record a valuation allowance to reduce the balance of our net deferred tax assets to the amount we believe is more-likely-than-not to be realized. We have incurred financial statement losses since inception and as a result we have a full valuation allowance recorded against our net deferred tax assets. We regularly assess the future realization of our net deferred tax assets and will reduce the valuation allowance in any such period in which we determine that all, or a portion, of our deferred tax assets are more-likely-than-not to be realized.

We do not provide for a U.S. income tax liability and foreign withholding taxes on undistributed foreign earnings of our foreign subsidiaries. The earnings of non-U.S. subsidiaries are currently expected to be indefinitely reinvested in non-U.S. operations.

JOBS Act and Emerging Growth Company Status

Under Section 107(b) of the Jumpstart our Business Startups Act of 2012, or the JOBS Act, an emerging growth company, or EGC, can delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

We are in the process of evaluating the benefits of relying on other exemptions and reduced reporting requirements under the JOBS Act. Subject to certain conditions, as an EGC, we intend to rely on certain of these exemptions, including exemptions from the requirement to provide an auditor's attestation report on our system of internal control over financial reporting pursuant to Section 404(b) of the Sarbanes-Oxley Act of 2002. We will remain an EGC until the earlier to occur of (1) the last day of the fiscal year (a) following the fifth anniversary of the completion of our IPO, (b) in which we have total annual gross revenue of at least $1.07 billion or (c) in which we are deemed to be a "large accelerated filer" under the rules of the SEC, which means the market value of our common stock that is held by non-affiliates exceeds $700 million as of the prior June 30th and (2) the date on which we have issued more than $1.0 billion in non-convertible debt during the prior three-year period.

Components of Results of Operations

Revenue

Through 2016, we did not generate any revenue. In January 2017, we initiated a strategic collaboration with Novartis and began recognizing revenue under this collaboration. For the year ended December 31, 2017, we recognized $43.4 million in research and development revenue from our collaboration with Novartis.

Operating Expenses

Our operating expenses consist of research and development expenses and general and administrative expenses, which are described below.

Research and Development Expenses

Since our inception, we have focused on developing our lead drug, volanesorsen, and the other drugs in our pipeline. Our research and development expenses primarily consist of:

- salaries and related expenses for research and development personnel, including expenses related to stock-based compensation granted to personnel in development functions;
- fees paid to clinical study sites and vendors, including contractor research organizations, or CROs, in connection with our clinical studies, costs of acquiring and evaluating clinical study data such as investigator grants, patient screening fees, laboratory work and statistical compilation and analysis, and fees paid to clinical consultants;
- expenses to acquire clinical study materials, including fees paid to Ionis;
- other consulting fees paid to third parties;
- expenses related to compliance with drug development regulatory requirements;
- travel, facilities, depreciation and amortization, insurance and other expenses; and
- sublicense expenses related to partnered drugs that we licensed from Ionis.

As described above, Ionis charges us for many of the expenses listed above because it is performing many of the development activities for our drugs on our behalf. As we assume increasing responsibility for developing and manufacturing our drugs, we will also increase the amount of expenses that we directly incur. As Ionis' responsibilities decrease, the expenses Ionis charges us will also decrease. We do not expect our overall research and development expenses to change significantly as we transition work from Ionis to us. However, we expect our overall development expenses to increase as we advance our pipeline. This increase will be driven by external costs associated with larger clinical studies as the pipeline moves into the later stages of development, costs of manufacturing drug product to be used in clinical studies and for validation and regulatory purposes, regulatory costs associated with seeking approval for our drugs and costs associated with expanding our internal development organization to support our pipeline as it advances into the later stages of development.

We expense our research and development costs as we incur them. We do not track research and development expenses by project, with the exception of costs related to volanesorsen. We typically use our employees, consultants and infrastructure resources across all of our projects. Thus, some of our research and development expenses are not attributable to an individual project, but are included in other research and development projects in our results of operations.

Our expenses related to clinical studies are based on estimates of patient enrollment and related expenses at clinical investigator sites as well as estimates for the services received and efforts expended pursuant to contracts with CROs that we may use to conduct and manage our clinical studies on our behalf. We generally accrue expenses related to clinical studies based on contracted amounts applied to the level of patient enrollment and activity. If we modify timelines or contracts based upon changes in the clinical study protocol or scope of work to be performed, we modify our estimates of accrued expenses accordingly on a prospective basis.

Development activities are central to our business model. We cannot determine with certainty the timing of initiation, the duration or the costs to complete current or future clinical studies of our drugs, including volanesorsen. Clinical development timelines, the probability of success and development costs can differ materially from expectations. The cost of clinical studies may vary significantly over the life of a project as a result of differences arising during clinical development, including, among others:

- per patient study costs;
- the number of studies required for approval;
- the number of sites included in the studies;
- the length of time required to enroll suitable patients;
- the number of doses that patients receive;
- the number of patients that participate in the studies;
- the drop-out or discontinuation rates of patients;
- the duration of patient follow-up;
- potential additional safety monitoring or other studies requested by regulatory agencies;
- the number and complexity of analyses and tests performed during the study;
- the phase of development of the drug; and
- the efficacy and safety profile of the drug.

In addition, we expect to incur substantial expenses beyond our present and planned nonclinical and clinical studies to file for marketing authorization for our drugs in development, assuming the data are supportive.

We cannot forecast which drugs may be subject to future collaborations, when we will complete such arrangements, if at all, and to what degree such arrangements would affect our development plans and capital requirements.

General and Administrative Expenses

Our general and administrative expenses consist of salaries and personnel-related costs, including stock-based compensation, for our employees in executive, sales and marketing and administrative functions. Significant external general and administrative expenses also include costs associated with the pre-commercialization activities we are performing to prepare to launch volanesorsen, if approved, for marketing. Our general and administrative expenses also include professional fees for accounting, auditing and consulting services, legal services, investor relations, travel and facilities. As described above, Ionis charges us for many of the expenses associated with these functions, including, among others, accounting, human resources, legal and investor relations. We expect to assume responsibility from Ionis for these general and administrative functions as our business grows and we build our internal development and commercialization capabilities. As Ionis' efforts on our behalf decrease, so will the expenses Ionis charges us for those efforts. We expect the increase in expenses we will incur for performing the work ourselves will be largely offset by the decrease in expenses Ionis charges us. We do not expect our overall general and administrative expenses to change significantly as we transition work from Ionis to us.

We anticipate our general and administrative expenses to increase in the future to support our continued development and potential commercialization of volanesorsen and the continued development of the other drugs in our pipeline. In addition, we expect to incur increased expenses associated with expanding our sales and marketing team and commercialization infrastructure to support the launch of volanesorsen. Increases over and above the level of work Ionis is currently performing on our behalf will result in an increase in general and administrative expenses and could include costs related to hiring additional personnel, increased office space, implementing new IT systems and other costs associated with expanding our general and administrative functions.

Results of Operations

Comparison of the Years Ended December 31, 2017 and December 31, 2016

Revenue

For the year ended December 31, 2017, we recognized $43.4 million in research and development revenue from our collaboration with Novartis, which we initiated in January 2017. For the year ended December 31, 2016, we did not generate any revenue.

Operating Expenses

Operating expenses for the year ended December 31, 2017 were $163.9 million and increased compared to $83.5 million for the year ended December 31, 2016. Our operating expenses increased in part due to sublicensing expenses due to Ionis of $48.4 million related to our collaboration with Novartis, of which $33.4 million was non-cash and development activities including the initiation of a Phase 2b dose-ranging study of AKCEA-APO(a)-L_{Rx}.

In order to analyze and compare our results of operations to other similar companies, we believe it is important to exclude non-cash compensation expense related to equity awards from our operating expenses. We believe non-cash compensation expense is not indicative of our operating results or cash flows from our operations. Further, we internally evaluate the performance of our operations excluding it.

Research and Development Expenses

The following table sets forth our research and development expenses for the periods presented:

	Years Ended December 31,	
(in thousands)	**2017**	**2016**
External volanesorsen expenses	$ 26,505	$ 38,403
Other external research and development project expenses	21,789	11,567
Research and development personnel and overhead expenses	21,572	13,913
Sublicensing expenses	48,394	—
Total research and development expenses, excluding non-cash stock-based compensation expense	118,260	63,883
Non-cash stock-based compensation expense	8,630	4,576
Total research and development expenses	$ 126,890	$ 68,459

Research and development expenses were $118.3 million for 2017 and increased compared to $63.9 million for 2016. The increase in expenses was primarily due to sublicensing expenses related to our collaboration with Novartis, which we incurred in the first quarter of 2017, the majority of which were non-cash. The progression of our other drugs in development, including AKCEA-APO(a)-L_{Rx}, AKCEA-APOCIII-L_{Rx} and AKCEA-ANGPTL3-L_{Rx}, during 2017 also contributed to the increase in our expenses. In particular we commenced four Phase 2 trials in 2017. This increase in research and development expenses was offset in part by a decrease in external volanesorsen expenses primarily related to the completion of the COMPASS and APPROACH studies. All amounts exclude non-cash compensation expense related to equity awards.

General and Administrative Expenses

The following table sets forth our general and administrative expenses for the periods presented:

	Years Ended December 31,	
(in thousands)	**2017**	**2016**
General and administrative support expenses	$ 9,426	$ 5,591
Pre-commercialization expenses for volanesorsen	18,646	3,889
Total general and administrative expenses, excluding non-cash stock-based compensation expense	28,072	9,480
Non-cash stock-based compensation expense	8,909	5,573
Total general and administrative expenses	$ 36,981	$ 15,053

General and administrative expenses were $28.1 million for 2017 and increased compared to $9.5 million for 2016. Our general and administrative expenses increased due to the ongoing buildout of our commercial organization and advancement of pre-commercialization activities necessary to launch volanesorsen, if approved for marketing in the US, Canada and certain EU countries. All amounts exclude non-cash compensation expense related to equity awards.

Investment Income

Investment income for 2017 totaled $1.8 million compared to $0.3 million for 2016. The increase in investment income was primarily due to a higher average short-term investment balance and an increase in the interest rates on high quality debt and U.S. government agencies investments during 2017 compared to 2016.

Interest Expense

Interest expense is comprised entirely of interest incurred under our line of credit agreement with Ionis. Interest expense for 2017 totaled $1.7 million. We incurred no interest expense for 2016. The outstanding principal and accrued interest under our line of credit converted into 13,438,339 shares of our common stock in connection with the closing of our IPO in July 2017 and we no longer have access to this line of credit following the closing of our IPO.

Net Loss and Net Loss Per Share

Net loss for 2017 was $121.6 million compared $83.2 million for 2016. Basic and diluted net loss per preferred share for the year ended December 31, 2017 was $1.80 compared to $2.88 for 2016. Basic and diluted net loss per common share for the year ended December 31, 2017 was $3.08. We had no outstanding common stock at December 31, 2016. We incurred a higher net loss in 2017 compared to 2016 primarily due to the increase in expenses related to pre-commercialization and development activities for our drugs, sublicensing expenses related to our collaboration with Novartis, the ongoing global expansion of our company and becoming and operating as a public company.

Comparison of the Years Ended December 31, 2016 and December 31, 2015

Revenue

Through 2016, we did not generate any revenue.

Operating Expenses

Operating expenses for 2016 were $83.5 million and increased compared to $61.4 million for 2015 as a result of the following:

- We were conducting more and later-stage clinical studies in 2016 than we were in 2015, including the continuation of our Phase 3 studies for volanesorsen in patients with FCS and FPL.
- Our operating expenses also increased in 2016 as we continued to build our organization and advance the pre-commercialization activities necessary to launch volanesorsen, if approved for marketing.

Research and Development Expenses

The following table sets forth our research and development expenses for the periods presented:

	Years Ended December 31,	
(in thousands)	**2016**	**2015**
External volanesorsen expenses	$ 38,403	$ 23,137
Other external research and development project expenses	11,567	19,199
Research and development personnel and overhead expenses	13,913	7,722
Total research and development expenses, excluding non-cash stock-based compensation expense	63,883	50,058
Non-cash stock-based compensation expense	4,576	827
Total research and development expenses	$ 68,459	$ 50,885

Research and development expenses were $63.9 million for 2016 and increased compared to $50.1 million for 2015. The increase in expenses was primarily due to our Phase 3 studies for volanesorsen, which continued to advance, and the progression of our other drugs, including AKCEA-APO(a)-L_{Rx} and AKCEA-ANGPTL3-L_{Rx}. All amounts exclude non-cash compensation expense related to equity awards.

General and Administrative Expenses

The following table sets forth our general and administrative expenses for the periods presented:

(in thousands)	Years Ended December 31, 2016	2015
General and administrative support expenses	$ 5,591	$ 3,424
Pre-commercialization expenses for volanesorsen	3,889	1,460
Total general and administrative expenses, excluding non-cash stock-based compensation expense	9,480	4,884
Non-cash stock-based compensation expense	5,573	5,669
Total general and administrative expenses	$ 15,053	$ 10,553

General and administrative expenses were $9.5 million for 2016 and compared to $4.9 million for 2015. Our general and administrative expenses increased primarily because we were continuing to build the organization and advance pre-commercialization activities necessary to launch volanesorsen, if approved for marketing. All amounts exclude non-cash compensation expense related to equity awards.

Investment Income

Investment income for 2016 totaled $0.3 million compared to $16,000 for 2015. The increase in investment income was due to a higher average cash balance.

Net Loss and Net Loss Per Share

Net loss for 2016 was $83.2 million compared $61.4 million for 2015. Basic and diluted net loss per preferred share for the year ended December 31, 2016 was $2.88 compared to $2.13 for 2015. We had a higher net loss in 2016 compared to 2015 primarily due to the increase in expenses related to development activities for our drugs.

Liquidity and Capital Resources

At December 31, 2017, we had cash, cash equivalents and short-term investments of $260.1 million and an accumulated deficit of $296.2 million.

We have funded our operating activities through a $100.0 million cash contribution that we received from Ionis in 2015, $75.0 million from initiating our collaboration with Novartis that we received in the first quarter of 2017 and $106.0 million in drawdowns under our line of credit with Ionis that we received in the first and second quarters of 2017. Our borrowings under our line of credit agreement with Ionis converted into shares of our common stock at the IPO price in connection with the closing of our IPO in July 2017. We no longer have access to the line of credit. Additionally, in July 2017 we received $182.3 million in net proceeds from our IPO including $25.0 million Ionis invested in our IPO and the Novartis concurrent private placement of $50 million.

At December 31, 2017, we had working capital of $178.4 million, compared to a working capital deficit of $19.3 million at December 31, 2016. Working capital increased in 2017 primarily due to the increase in our cash and short-term investments from proceeds related to our IPO and concurrent private placement with Novartis and a decrease in our cash payable to Ionis under our development, commercialization and license agreement and services agreement. As of December 31, 2017, our outstanding payable to Ionis was $14.4 million. In January 2017, we initiated a strategic collaboration with Novartis and we received $75.0 million in an upfront payment, of which we retained $60.0 million and paid Ionis $15.0 million as a sublicense fee under our license agreement with Ionis, in May 2017.

We do not currently have any approved drugs and, therefore, we do not expect to generate significant revenue from drug sales unless and until we or our partners obtain regulatory approval for and commercialize volanesorsen or one of our other drugs in development. We anticipate that we will continue to incur losses for the foreseeable future, and we expect the losses to increase as we continue to develop, seek regulatory approval for, and begin to commercialize our drugs. We are subject to all of the risks incident in developing and commercializing new drugs and we may encounter unforeseen expenses, difficulties, complications, delays and other unknown factors that may adversely affect our business.

Future Funding Requirements

We will need to raise additional funding in the future to continue developing the drugs in our pipeline and to commercialize any approved drug, including expanding our commercial efforts around volanesorsen. We believe that our existing cash, cash equivalents and short-term investments will be sufficient to fund our operations for at least 12 months from the original issuance date of the 2017 Form 10-K. Until such time, if ever, as we can generate substantial product revenue, we may finance our cash needs through additional financing in the future through the issuance of our common stock, through other equity or debt financings or through collaborations or partnerships with other companies. In any event, we may not generate significant revenue from product sales prior to the use of our existing cash, cash equivalents and short-term investments. We do not have any committed external source of funds and we no longer have access to our line of credit with Ionis. Additional capital may not be available on reasonable terms, if at all. To the extent that we raise additional capital through the sale of stock or convertible debt securities, the ownership interest of our stockholders will be diluted and the terms of these securities may include liquidation or other preferences that adversely affect the rights of our common stockholders. Debt financing, if available, may involve agreements that include increased fixed payment obligations and covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures, declaring dividends, selling or licensing intellectual property rights and other operating restrictions that could adversely affect our ability to conduct our business. If we raise additional funds through collaborations or licensing arrangements with third parties, we may have to relinquish valuable rights to our drugs or grant licenses on terms that may not be favorable to us. If we cannot raise additional funds through stock offerings or debt financings when needed, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and commercialize our drugs even if we would otherwise prefer to develop and commercialize the drugs ourselves.

Our forecast of the period of time through which our financial resources will be adequate to support our operations involves risks and uncertainties, and actual results could vary as a result of a number of factors. We have based this estimate on assumptions that may prove to be wrong, and we could use our available capital resources sooner than we currently expect. The amount and timing of future funding requirements, both near- and long-term, will depend on many factors, including, but not limited to:

- the design, initiation, progress, size, timing, costs and results of our clinical and nonclinical studies;
- the outcome, timing and cost of regulatory approvals by the FDA and comparable foreign regulatory authorities, including the potential for the FDA or comparable foreign regulatory authorities to require that we perform more studies than, or evaluate clinical endpoints other than, those that we currently expect;
- the number and characteristics of drugs that we may pursue;
- our need to expand our development activities, including our need and ability to hire additional employees;
- the effect of competing technological and market developments;
- the cost of establishing sales, marketing, manufacturing and distribution capabilities for our drugs;
- our strategic collaborators' success in developing and commercializing our drugs;
- our need to add infrastructure, implement internal systems and hire additional employees to operate as a public company; and
- the revenue, if any, generated from commercial sales of our drugs for which we receive marketing authorization, which may be affected by market conditions, including obtaining coverage and adequate reimbursement of our drugs from third-party payors, including government programs and managed care organizations, and competition within the therapeutic class to which our drugs are assigned.

If we cannot expand our operations or otherwise capitalize on our business opportunities because we lack sufficient capital, our business, financial condition and results of operations could be materially adversely affected.

Contractual Obligations and Commitments

The following table summarizes our contractual obligations as of December 31, 2017, which consist of our operating leases for our office facility. The table provides a breakdown of when our operating lease obligations become due (in thousands):

Contractual obligations	Total	Less than 1 year	1 - 3 years	3 - 5 years
Operating lease obligations	$ 820	$ 486	$ 334	$ —

We have not included potential milestone payments, sublicense fees and royalties that we may be required to pay Ionis for the license of intellectual property. We have not included these potential obligations in the table above because they are contingent upon the occurrence of future events and we do not know the timing and likelihood of such potential obligations with certainty.

The table above does not include certain general and administrative and development support services for which we will pay Ionis under our services agreement or obligations under agreements that we can cancel without a significant penalty. We describe our agreements with Ionis in more detail in Note 4, *Development, Commercialization and License Agreement and Services Agreement with Ionis*, to our consolidated financial statements.

Due to the uncertainty with respect to the timing of future cash flows associated with our unrecognized tax benefits, we are unable to make reasonably reliable estimates of the period of cash settlement with the respective taxing authorities. Therefore, we have excluded $5 million of gross unrecognized tax benefits from our contractual obligations table above.

In addition to contractual obligations, we had outstanding purchase orders as of December 31, 2017 and 2016 for the purchase of services and materials as part of our normal course of business.

Recently Issued Accounting Pronouncements

We describe the recently issued accounting pronouncements that apply to us in Note 1 to our consolidated financial statements, *Organization and Significant Accounting Policies*.

Off-Balance Sheet Arrangements

We did not have any off-balance sheet arrangements during the period presented, as defined in the rules and regulations of the SEC.

Exhibit 99.2

Item 8. Financial Statements and Supplementary Data

AKCEA THERAPEUTICS, INC.
INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm

The Board of Directors and Stockholders of Akcea Therapeutics, Inc.

Opinion on the Financial Statements
We have audited the accompanying consolidated balance sheets of Akcea Therapeutics, Inc. (the Company) as of December 31, 2017 and 2016, and the related consolidated statements of operations, comprehensive loss, stockholders' equity 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.

Adoption of ASU No. 2014-09
As discussed in Note 1 to the consolidated financial statements, the Company changed its method of accounting for revenue from contracts with customers in 2017 due to the adoption of ASU No. 2014-09, Revenue from Contracts with Customers (ASC 606) and subsequent amendments thereto.

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 2016

Boston, Massachusetts
February 28, 2018, except for Notes 1, 7, 8, 11 and 12, as to which the date is September 18, 2018

AKCEA THERAPEUTICS, INC.
CONSOLIDATED BALANCE SHEETS
(in thousands, except share and per share data)

	December 31,	
	2017	2016
ASSETS	(as revised)	
Current assets:		
Cash and cash equivalents	$ 58,367	$ 7,857
Short-term investments	201,763	—
Contracts receivable	5,413	—
Other current assets	1,302	1,209
Total current assets	266,845	9,066
Property, plant and equipment, net	77	177
Licenses, net	1,221	1,341
Deposits and other assets	661	100
Total assets	$ 268,804	$ 10,684
LIABILITIES AND STOCKHOLDERS' EQUITY (DEFICIT)		
Current liabilities:		
Accounts payable	$ 2,381	$ 476
Payable to Ionis Pharmaceuticals, Inc.	14,365	24,355
Accrued compensation	4,083	2,505
Accrued liabilities	7,570	1,041
Current portion of deferred revenue	58,192	—
Other current liabilities	1,875	33
Total current liabilities	88,466	28,410
Long-term portion of deferred rent	12	21
Long-term portion of deferred revenue	12,501	—
Total liabilities	100,979	28,431
Stockholders' equity (deficit):		
Series A convertible preferred stock, $0.001 par value; no and 28,884,540 shares authorized, no and 28,884,540 shares issued and outstanding at December 31, 2017 and 2016, respectively; aggregate liquidation value of $0 and $610,304 as of December 31, 2017 and 2016, respectively	—	100,000
Common stock, $0.001 par value; 100,000,000 shares authorized, 66,541,629 and no shares issued and outstanding at December 31, 2017 and 2016, respectively	67	—
Additional paid-in capital	464,430	56,936
Accumulated other comprehensive loss	(451)	(21)
Accumulated deficit	(296,221)	(174,662)
Total stockholders' equity (deficit)	167,825	(17,747)
Total liabilities and stockholders' equity (deficit)	$ 268,804	$ 10,684

See accompanying notes.

AKCEA THERAPEUTICS, INC.
CONSOLIDATED STATEMENTS OF OPERATIONS
(in thousands, except for share and per share data)

	Years Ended December 31,		
	2017	2016	2015
	(as revised)		
Revenue:			
Research and development revenue under collaborative agreements	$ 43,401	$ —	$ —
Total revenue	43,401	—	—
Expenses:			
Research and development	126,890	68,459	50,885
General and administrative	36,981	15,053	10,553
Total operating expenses	163,871	83,512	61,438
Loss from operations	(120,470)	(83,512)	(61,438)
Other income (expense):			
Investment income	1,813	295	16
Interest expense	(1,731)	—	—
Other income	104	—	—
Loss before income tax expense	(120,284)	(83,217)	(61,422)
Income tax expense	(1,275)	—	—
Net loss	$ (121,559)	$ (83,217)	$ (61,422)
Net loss per share of preferred stock, basic and diluted	$ (1.80)	$ (2.88)	$ (2.13)
Weighted-average shares of preferred stock outstanding, basic and diluted	15,748,009	28,884,540	28,884,540
Net loss per share of common stock, basic and diluted	$ (3.08)	$ —	$ —
Weighted-average shares of common stock outstanding, basic and diluted	30,262,768	—	—

See accompanying notes.

AKCEA THERAPEUTICS, INC.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS
(in thousands)

	Years Ended December 31,		
	2017	2016	2015
	(as revised)		
Net loss	$ (121,559)	$ (83,217)	$ (61,422)
Unrealized gains (losses) on investments, net of tax	(337)	75	(75)
Currency translation adjustment	(93)	(21)	—
Comprehensive loss	$ (121,989)	$ (83,163)	$ (61,497)

See accompanying notes.

AKCEA THERAPEUTICS, INC.
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
Years Ended December 31, 2017, 2016 and 2015
(In thousands)

	Convertible Preferred Stock		Common Stock		Additional Paid In	Accumulated Other Comprehensive	Accumulated	Total Stockholders' Equity
	Shares	Amount	Shares	Amount	Capital	Loss	Deficit	(Deficit)
Description							(as revised)	(as revised)
Balance at December 31, 2014	—	$ —	—	$ —	$ 31,602	$ —	$ (30,023)	$ 1,579
Net loss	—	—	—	—	—	—	(61,422)	(61,422)
Ionis investment in Akcea	—	—	—	—	8,689	—	—	8,689
Change in unrealized losses, net of tax	—	—	—	—	—	(75)	—	(75)
Issuance of Series A convertible preferred stock	28,885	100,000	—	—	—	—	—	100,000
Stock-based compensation expense	—	—	—	—	6,496	—	—	6,496
Balance at December 31, 2015	28,885	$ 100,000	—	$ —	$ 46,787	$ (75)	$ (91,445)	$ 55,267
Net loss	—	—	—	—	—	—	(83,217)	(83,217)
Change in unrealized gains, net of tax	—	—	—	—	—	75	—	75
Currency translation adjustment	—	—	—	—	—	(21)	—	(21)
Stock-based compensation expense	—	—	—	—	10,149	—	—	10,149
Balance at December 31, 2016	28,885	$ 100,000	—	$ —	$ 56,936	$ (21)	$ (174,662)	$ (17,747)
Net loss	—	—	—	—	—	—	(121,559)	(121,559)
Change in unrealized gains (losses), net of tax	—	—	—	—	—	(337)	—	(337)
Currency translation adjustment	—	—	—	—	—	(93)	—	(93)
Conversion of convertible preferred stock to common stock	(28,885)	(100,000)	28,885	29	99,971	—	—	—
Initial public offering of common stock, net of commissions, underwriting discounts and offering costs	—	—	17,969	18	132,273	—	—	132,291
Issuance of common stock in connection with conversion of line of credit with Ionis Pharmaceuticals Inc. together with accrued interest	—	—	13,438	14	107,717	—	—	107,731
Issuance of common stock in connection with private placement	—	—	6,250	6	49,994	—	—	50,000
Stock-based compensation expense	—	—	—	—	17,539	—	—	17,539
Balance at December 31, 2017	—	$ —	66,542	$ 67	$ 464,430	$ (451)	$ (296,221)	$ 167,825

See accompanying notes.

AKCEA THERAPEUTICS, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)

	Years Ended December 31,		
	2017	2016	2015
	(as revised)		
Operating activities:			
Net loss	$ (121,559)	$ (83,217)	$ (61,422)
Adjustments to reconcile net loss to net cash used in operating activities:			
Depreciation	108	12	—
Amortization of licenses	120	119	119
Amortization of premium on investments, net	499	170	18
Non-cash interest expense for line of credit with Ionis Pharmaceuticals, Inc.	1,731	—	—
Non-cash sublicensing expense	33,394	—	—
Stock-based compensation expense	17,539	10,149	6,496
Changes in operating assets and liabilities:			
Contracts receivable	(5,413)	—	—
Other current and long-term assets	(1,761)	64	(286)
Accounts payable	1,905	(54)	239
Payable to Ionis Pharmaceuticals, Inc.	(43,385)	15,157	9,198
Accrued compensation	1,578	1,582	923
Deferred rent	(15)	20	35
Accrued liabilities	6,587	637	405
Income taxes payable	1,789	—	—
Deferred revenue	70,693	—	—
Net cash used in operating activities	(36,190)	(55,361)	(44,275)
Investing activities:			
Purchases of short-term investments	(301,377)	(16,638)	(35,975)
Proceeds from sale of short-term investments	98,778	51,464	960
Purchases of property, plant and equipment	(9)	(179)	(10)
Net cash (used in) provided by investing activities	(202,608)	34,647	(35,025)
Financing activities:			
Proceeds from issuance of Series A convertible preferred stock to Ionis Pharmaceuticals, Inc.	—	—	100,000
Capital contribution from Ionis Pharmaceuticals, Inc.	—	—	8,689
Proceeds from issuance of common stock, net of underwriters' discounts	135,438	—	—
Proceeds from sale of common stock to Novartis in private placement	50,000	—	—
Proceeds from line of credit from Ionis Pharmaceuticals, Inc.	106,000	—	—
Offering costs paid	(2,037)	(818)	—
Net cash provided by (used in) financing activities	289,401	(818)	108,689
Effect of exchange rates on cash	(93)	—	—
Net increase (decrease) in cash and cash equivalents	50,510	(21,532)	29,389
Cash and cash equivalents at beginning of period	7,857	29,389	—
Cash and cash equivalents at end of period	$ 58,367	$ 7,857	29,389
Supplemental disclosures of non-cash financing activities:			
Unpaid deferred offering costs	$ —	$ 291	—
Conversion of preferred stock to common stock upon initial public offering	$ 100,000	—	—
Conversion of line of credit from Ionis Pharmaceuticals, Inc. into common stock	$ 107,731	$ —	—

In conjunction with our initial public offering (Note 9), the line of credit with Ionis Pharmaceuticals Inc., together with accrued interest, totaling $107.7 million was converted into 13,438,339 shares of our common stock and all of the Series A convertible preferred stock was converted into 28,884,540 shares of our common stock.

See accompanying notes.

1. Organization and Significant Accounting Policies

Basis of Presentation

The consolidated financial statements include the accounts of Akcea Therapeutics, Inc. ("we," "our," and "us") and our wholly owned subsidiaries: Akcea Therapeutics UK Ltd., or Akcea UK (formed in August 2016), Akcea Intl Ltd., or Akcea Intl (formed in February 2017), Akcea Therapeutics Canada, Inc., or Akcea Canada (formed in May 2017), Akcea Therapeutics France SAS, or Akcea France (formed in September 2017), Akcea Therapeutics Germany GmbH, or Akcea Germany (formed in December 2017), and Akcea Therapeutics Securities Corporation, or Akcea Securities Corp. (formed in December 2017). All intercompany transactions and balances were eliminated in consolidation.

Organization and Business Activity

We were incorporated in Delaware in December 2014. We were organized by Ionis Pharmaceuticals, Inc., or Ionis, to focus on developing and commercializing drugs to treat patients with serious cardiometabolic diseases caused by lipid disorders. On July 19, 2017, we completed our initial public offering, or IPO. As of December 31, 2017, Ionis owns approximately 68% of our common stock and is our majority shareholder. Prior to our IPO, we were wholly owned by Ionis.

Revenue Recognition

In May 2014, the Financial Accounting Standards Board, or FASB, issued Accounting Standards Update, or ASU, No. 2014-09, which amends the guidance for accounting for revenue from contracts with customers. This ASU supersedes the revenue recognition requirements in ASC Topic 605, Revenue Recognition, or Topic 605, and creates a new Topic 606, Revenue from Contracts with Customers, or Topic 606. In 2015 and 2016, the FASB issued additional ASUs related to Topic 606 that delayed the effective date of the guidance and clarified various aspects of the new revenue guidance, including principal versus agent considerations, identifying performance obligations, and licensing, and they include other improvements and practical expedients. Under Topic 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services.

To determine revenue recognition for arrangements that an entity determines are within the scope of Topic 606, the entity performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation. At contract inception, once the contract is determined to be within the scope of Topic 606, we assess the goods or services promised within each contract and determine those that are performance obligations, and assess whether each promised good or service is distinct. When we offer options for additional goods or services, such as an option to license a drug in the future or for additional goods or services to be provided in the future, we evaluate whether options are material rights that should be treated as additional performance obligations. We typically have not concluded that the option to license a drug or the options for additional goods or services that may be requested in the future under our collaboration agreement are material rights as the amounts attributable to such options represent standalone selling price, and therefore no consideration is allocated to these items at the inception of an agreement. When a partner exercises their option to license a drug or requests the additional goods or services, a new performance obligation is created for that item. Once performance obligations are identified, we then recognize as revenue the amount of the transaction price that we allocated to the respective performance obligation when (or as) each performance obligation is satisfied at a point in time or over time. If the performance obligation is satisfied over time, we recognize revenue based on the use of an output or input method. We have one revenue stream from our strategic collaboration, option and license agreement, or collaboration agreement, with Novartis Pharma AG, or Novartis, which we entered into in January 2017. For a complete discussion of the accounting for our collaboration revenue, see Note 8, Strategic Collaboration with Novartis.

Effective January 1, 2018, we adopted Topic 606 using the full retrospective transition method. Under this method, we revised our consolidated financial statements, including our consolidated balance sheet as of December 31, 2017 and statements of operations, comprehensive loss, stockholders' equity and cash flows for the year ended December 31, 2017, for prior period amounts, as if Topic 606 had been effective for such periods. The references "as revised" used herein refer to revisions of data for the year ended December 31, 2017 as a result of our adoption of Topic 606.

Refer to Note 8, *Strategic Collaboration with Novartis*, where we discuss our Novartis collaboration agreement in more detail.

Research and development revenue under collaborative agreements

We entered into the collaboration agreement with Novartis to develop and commercialize AKCEA-APO(a)-L_{Rx} and AKCEA-APOCIII-L_{Rx}. Under the collaboration agreement, we received a $75.0 million upfront payment. For each drug, we are responsible for completing a Phase 2 program, conducting an end-of-Phase 2 meeting with the FDA and delivering active pharmaceutical ingredient, or API. Under the collaboration agreement, Novartis has an exclusive option to develop and commercialize AKCEA-APO(a)-L_{Rx} and AKCEA-APOCIII-L_{Rx}. If Novartis exercises an option for one of these drugs, it will pay us a license fee and will assume all further global development, regulatory and commercialization activities for the licensed drug. We are also eligible to receive a development milestone payment, milestone payments if Novartis achieves pre-specified regulatory milestones, commercial milestone payments and tiered royalties on net sales from each drug under the collaboration.

Additionally, we and Ionis entered into a stock purchase agreement, or SPA, with Novartis. Under the SPA, Novartis purchased 1.6 million shares of Ionis' common stock for $100.0 million in the first quarter of 2017 and paid a premium over the weighted average trading price at the time of purchase. Additionally, Novartis agreed to purchase up to $50.0 million of our common stock in a separate private placement concurrent with the completion of our IPO at a price per share equal to the initial public offering price, subject to a number of conditions. If we did not complete our IPO or a similar offering by the 15-month anniversary of the SPA, or if we completed an offering that did not meet the specified criteria for Novartis to invest, then Novartis would have been required to purchase $50.0 million of Ionis' common stock at a premium over the weighted average trading price of Ionis' common stock at the time of purchase.

We evaluated the Novartis agreements to determine whether we should treat the agreements separately or as a single arrangement. We considered that the agreements were negotiated concurrently and in contemplation of one another. Additionally, the same individuals were involved in the negotiations of both agreements. Based on these facts and circumstances, we concluded that we should treat both agreements as a single arrangement, which we refer to as the Novartis collaboration. We evaluated the provisions of the agreements on a combined basis.

Identifying performance obligations

We evaluate the performance obligations in a collaboration agreement to determine whether they are distinct.

At the commencement of our strategic collaboration, we identified the following four distinct performance obligations:

- Development activities for AKCEA-APO(a)-L_{Rx};
- Development activities for AKCEA-APOCIII-L_{Rx};
- API for AKCEA-APO(a)-L_{Rx}; and
- API for AKCEA-APOCIII-L_{Rx}.

The development activities and the supply of API are distinct because Novartis or another third party could provide these items without our assistance.

We determined the transaction price for the Novartis collaboration was $108.4 million, comprised of the following:

- $75.0 million from the upfront payment received;
- $28.4 million for the premium paid by Novartis, which represents the excess of the fair value Ionis received from Novartis' purchase of Ionis' stock at a premium in the first quarter of 2017; and
- $5.0 million for the potential premium Novartis would have paid if they had been required to purchase Ionis' stock in the future at a premium.

We are recognizing the $75.0 million upfront payment plus the premium paid by Novartis from its purchase of Ionis' stock and the premium associated with Novartis' obligation to purchase Ionis' stock if we did not complete our IPO because we are the party providing the services and API under the collaboration agreement.

None of the development or regulatory milestone payments have been included in the transaction price, as all milestone payments are fully constrained. As part of our evaluation of the constraint, we considered numerous factors, including the fact that achievement of the milestones is outside of our control and contingent upon the success of our clinical trials, Novartis' efforts, and the receipt of regulatory approval. We will re-evaluate the transaction price, including estimated variable consideration included in the transaction price and all constrained amounts, in each reporting period and as uncertain events are resolved or other changes in circumstances occur. Based on the distinct performance obligations under the Novartis collaboration, we allocated the $108.4 million transaction price based on relative stand-alone selling prices of each of our performance obligations as follows:

- $64.0 million for development services for AKCEA-APO(a)-L_{Rx};
- $40.1 million for development services for AKCEA-APOCIII-L_{Rx};
- $1.5 million for the delivery of AKCEA-APO(a)-L_{Rx} API; and
- $2.8 million for the delivery of AKCEA-APOCIII-L_{Rx} API.

We are recognizing revenue related to each of our performance obligations as follows:

- We will satisfy the development services performance obligation for AKCEA-APO(a)-L$_{Rx}$ as the research and development services are performed. We determined that the period of performance of the research and development services was two years, or through December 2018. We recognize revenue related to research and development services performed using an input method by calculating costs incurred at each period end relative to total costs expected to be incurred;
- We will satisfy the development services performance obligation for AKCEA-APOCIII-L$_{Rx}$ as the research and development services are performed. We determined that the period of performance of the research and development services was two and a half years, or through June 2019. We recognize revenue related to research and development services performed using an input method by calculating costs incurred at each period ended relative to total costs expected to be incurred;
- We recognized the amount attributed to the AKCEA-APO(a)-L$_{Rx}$ API supply when we deliver API to Novartis; and
- We will recognize the amount attributed to the AKCEA-APOCIII-L$_{Rx}$ API supply when we deliver API to Novartis.

At December 31, 2017, the aggregate transaction price allocated to our remaining performance obligations was $70.7 million, which we are recognizing over the estimated period of our performance obligation.

Under the SPA, in July 2017, Novartis purchased $50.0 million of our common stock in a separate private placement concurrent with the completion of our IPO at a price per share equal to the IPO price. Our IPO is discussed in Note 9, *Initial Public Offering*.

During the year ended December 31, 2017, we earned revenue of $43.4 million from our relationship with Novartis, representing 100% of our revenue. Through December 31, 2016, we did not generate revenue. Our consolidated balance sheet at December 31, 2017 included deferred revenue of $70.7 million related to our relationship with Novartis.

Research and Development Expenses

Our research and development expenses include wages, benefits, facilities, supplies, external services, clinical study and manufacturing costs and other expenses that are directly related to our research and development activities. We expense research and development costs as we incur them. We do not conduct research activities and no such costs are included in these amounts.

If we make payments for research and development services prior to the services being rendered, we record those amounts as prepaid assets on our balance sheet and we expense them as the services are provided.

Sublicensing Expenses

We incur sublicense expenses under our development, commercialization and license agreement and services agreement with Ionis related to the drugs we have licensed under the agreement. We include our sublicense fee expenses in our research and development expenses on our consolidated results of operations since the applicable drugs are not yet approved for marketing. We recognize sublicense fee expenses in the period they are incurred. For example, in the first quarter of 2017, we incurred $48.4 million of sublicense fee expenses related to our collaboration with Novartis, of which $33.4 million of these expenses were non-cash and were related to the premium Novartis paid and the potential premium Novartis would have paid on Ionis' stock if we did not complete our IPO. Under the Novartis collaboration, we will recognize $108.4 million of revenue over the period of our performance, which began in February 2017. In 2017, we recognized $48.4 million of sublicensing expense, all of which was recognized in the first quarter of 2017. The $48.4 million is comprised of the following:

- $15.0 million for the portion of the $75.0 million upfront payment we received upon initiating the Novartis collaboration that we paid in cash to Ionis;
- $28.4 million for the premium paid by Novartis for its purchase of Ionis' stock in the first quarter of 2017, which is a non-cash expense. We determined the fair value of the premium by calculating the stated premium and applying a discount for lack of marketability because Ionis initially issued unregistered shares to Novartis; and
- $5.0 million for the premium associated with Novartis' obligation to purchase Ionis' stock if we did not complete our IPO, which is a non-cash expense. We determined the fair value of the potential premium at the inception of the collaboration by calculating the value of the future premium based upon the stated premium, adjusting for the probability of us completing an IPO by the 15-month anniversary of the SPA and applying a discount for lack of marketability because Ionis would have issued unregistered shares to Novartis if it purchased Ionis' common stock.

We will pay 50% of all future license fees, milestone payments and royalties we receive to Ionis as a sublicense fee.

Estimated Liability for Research and Development Costs

We record accrued liabilities related to expenses for which vendors or service providers have not yet billed us. These liabilities are for products or services that we have received and primarily relate to ongoing nonclinical and clinical studies. These costs primarily include third-party clinical management costs, laboratory and analysis costs, toxicology studies and investigator grants. We have drugs in concurrent nonclinical and clinical studies at several sites throughout the world. To ensure that we have adequately provided for ongoing nonclinical and clinical research and development costs during the period in which we incur such costs, we maintain an accrual to cover these costs. We update our estimate for this accrual on at least a quarterly basis. The assessment of these costs is a subjective process that requires judgment. Upon settlement, these costs may differ materially from the amounts accrued in our consolidated financial statements. Our historical accrual estimates have not been materially different from our actual amounts.

License

As part of our founding in 2015, we obtained an exclusive license from Ionis for specific patents that Ionis owns and maintains related to our drug pipeline. We recorded our license from Ionis as a capital contribution using the carryover basis of Ionis' historical cost for the related patents. For comparative purposes, we have assumed that we obtained the license as of January 1, 2014. We are amortizing our capitalized license over its estimated useful life, which is the term of the underlying individual patents owned by Ionis. The weighted average remaining amortizable life of our license from Ionis is 12.2 years at December 31, 2017. The gross value of the license recorded on our consolidated balance sheet at December 31, 2017 and 2016 was $1.7 million. Accumulated amortization related to this license was $478,000, and $358,000 for the periods ended December 31, 2017 and 2016, respectively. Amortization expense related to this license was $120,000, $119,000 and $119,000 for the years ended December 31, 2017, 2016 and 2015, respectively.

We estimated amortization expense for our license from Ionis in each of the next five years is as follows:

Years Ending December 31, (in thousands)	**Amortization**
2018	$ 120
2019	$ 120
2020	$ 120
2021	$ 118
2022	$ 112

For additional detail of Akcea's license agreement with Ionis see Note 4, *Development, Commercialization and License Agreement and Services Agreement with Ionis*.

Concentration of Credit Risk

Financial instruments that potentially subject us to concentrations of credit risk consist primarily of cash, cash equivalents, short-term investments and receivables. We place our cash, cash equivalents and short-term investments with reputable financial institutions. We primarily invest our excess cash in commercial paper and debt instruments of the U.S. Treasury, financial institutions, corporations and U.S. government agencies with strong credit ratings and an investment grade rating at or above A-1, P-1 or F-1 by Moody's, Standard & Poor's, or S&P, or Fitch, respectively. We have established guidelines relative to diversification and maturities that maintain safety and liquidity. We periodically review and modify these guidelines to maximize trends in yields and interest rates without compromising safety and liquidity.

Cash Equivalents and Short-Term Investments

We consider all liquid investments with maturities of three months or less when we purchase them to be cash equivalents. Our short-term investments have initial maturities of greater than three months from date of purchase. We classify our short-term investments as available-for-sale and we carry them at fair market value based upon prices for identical or similar items on the last day of the fiscal period. We record unrealized gains and losses as a separate component of comprehensive income (loss) and we include net realized gains and losses in investment income (expense) on our consolidated statement of operations. We use the specific identification method to determine the cost of securities sold.

Property, Plant and Equipment

We carry our leasehold improvements and equipment at cost and depreciate it using the straight-line method over its estimated useful life. At December 31, 2017 and 2016, our leasehold improvements consisted of improvements to our office facility that we are amortizing over the shorter of the lease term or the estimated useful life of the asset. At December 31, 2017 and 2016, our equipment consisted of computer equipment that we are depreciating over three years.

Fair Value of Financial Instruments

We have estimated the fair value of our financial instruments. The amounts reported for cash equivalents, accounts payable and accrued expenses approximate fair value because of their short maturities. We report our investment securities at their estimated fair value based on quoted market prices for identical or similar instruments.

Operating Leases

We lease our office space in a building in Cambridge, Massachusetts under a non-cancelable operating lease, which commenced in April 2015 and was subsequently amended and expanded in February 2016 and March 2017. A portion of our lease currently expires in July 2018 and a portion of it expires in April 2020.

Annual future minimum payments under our operating lease for our office space in Cambridge, Massachusetts are as follows (in thousands) for each year indicated:

	Cambridge Office Space Operating Lease
2018	$ 486
2019	250
2020	84
Total minimum payments	$ 820

Rent expense for the year ended December 31, 2017, 2016 and 2015 was $677,000, $435,000 and $183,000, respectively. We recognize rent expense on a straight-line basis over the lease term for the lease of our office space, which resulted in a deferred rent balance of $39,000 and $54,000 at December 31, 2017 and 2016, respectively.

Use of Estimates

The preparation of consolidated financial statements in conformity with U.S. GAAP requires our management to make estimates and assumptions that affect the amounts reported in the consolidated financial statements and accompanying notes. Actual results could differ from those estimates.

Translation of Foreign Currency

For our foreign subsidiaries that report in a functional currency other than United States dollars, we translate their assets and liabilities into United States dollars using the exchange rate at the balance sheet date. We translate revenue and expenses at the monthly average exchange rates for the period. We translate capital accounts at the historical exchange rate in effect at the date of the transaction. We include foreign currency translation adjustments as a component of accumulated other comprehensive loss within the consolidated statements of comprehensive loss.

Segment Information

We operate as a single segment because our chief decision maker reviews operating results on an aggregate basis and manages our operations as a single operating segment.

Stock-Based Compensation Expense

We measure stock-based compensation expense for equity-classified awards, principally related to stock options, restricted stock units, or RSUs, and stock purchase rights under our employee stock purchase plan, or ESPP, based on the estimated fair value of the award on the date of grant. We recognize the value of the portion of the award that we ultimately expect to vest as stock-based compensation expense over the requisite service period in our consolidated statements of operations. We reduce stock-based compensation expense for estimated forfeitures at the time of grant and revise the expense in subsequent periods if actual forfeitures differ from those estimates.

We value our stock option awards and stock purchase rights under our ESPP using the Black-Scholes model. The determination of the grant date fair value of options using an option pricing model is affected principally by our estimated common stock fair value and requires us to make a number of other assumptions, including: the expected life of the option, the volatility of the underlying stock, the risk-free interest rate and expected dividends.

The fair value of RSUs is based on the market price of our common stock on the date of grant. The RSUs we have granted vest annually over a four-year period.

Prior to December 2015, Ionis granted our employees options to purchase shares of Ionis' common stock, or Ionis options. In December 2015, we granted our employees holding Ionis options additional options to purchase shares of our common stock, or Akcea options.

We determined the stock-based compensation expense for the Ionis options at the date of grant and recognized compensation expense over the vesting period of the Ionis options. In December 2015, we accounted for the issuance of the Akcea options as a modification to the original grant of the Ionis options because the grant of the Ionis options and Akcea options essentially represented a single stock award as the exercisability provisions of the Ionis options and Akcea options grants were interrelated and mutually exclusive. The total compensation expense measured on the modification date was the sum of the grant date fair value of the Ionis options plus any incremental compensation cost resulting from the grant of the Akcea options.

In 2016, we began concurrently granting Ionis options and Akcea options to our employees. Because the exercisability provisions of the awards are interrelated and mutually exclusive as described above, the fair values of the Ionis options and the Akcea options were determined on the date of grant and the option with the greater fair value was recognized over the vesting period of the awards. In 2017, we no longer concurrently granted Ionis and Akcea options. Our board of directors only receive grants under the Akcea option plan.

Following our IPO, we no longer grant Ionis options to our employees. Under the terms of the Ionis options, when we completed our IPO, the Ionis options our employees were holding were terminated. The termination of the Ionis options was determined not to be a modification, as the options were terminated based upon the existing contractual terms of the option agreements. As such, we will continue to recognize expense based on the valuation that was determined upon the grant date for options issued in 2016 or the modification date for options issued in 2015 and 2017.

The fair value of stock options granted under our 2015 Equity Incentive Plan is based on the fair value of our common stock on the date of grant. The fair value of stock options granted under the Ionis 2011 Equity Incentive Plan is based on the fair value of Ionis' common stock on the date of grant. Options granted to employees vest over a four-year period, with 25 percent exercisable at the end of one year from the date of the grant and the balance vesting ratably, on a monthly basis, thereafter and have a term of ten years. Options granted to directors vest annually over a four-year period and have a term of ten years.

See Note 6, *Stockholders' Equity (Deficit),* for additional information regarding our stock-based compensation plans.

Accumulated Other Comprehensive Loss

Accumulated other comprehensive loss is comprised of unrealized gains and losses on investments, net of taxes and currency translation adjustments. The following table summarizes changes in accumulated other comprehensive loss for the years ended December 31, 2017, 2016 and 2015 (in thousands):

	Years Ended December 31,		
	2017	2016	2015
Beginning balance accumulated other comprehensive loss	$ (21)	$ (75)	$ —
Unrealized gains (losses) on investments, net of tax (1)	(337)	75	(75)
Currency translation adjustment	(93)	(21)	—
Net other comprehensive income (loss)	(430)	54	(75)
Ending balance accumulated other comprehensive loss	$ (451)	$ (21)	$ (75)

(1) There was no tax benefit for other comprehensive income (loss) for the years ended December 31, 2017, 2016 and 2015.

Income Taxes

On December 22, 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Cuts and Jobs Act of 2017, or the Tax Act. The Tax Act makes broad and complex changes to the U.S. tax code. The changes include, but are not limited to, reducing the U.S. federal corporate tax rate from 35% to 21%, imposing a mandatory one-time transition tax on certain unrepatriated earnings of foreign subsidiaries, introducing bonus depreciation that will allow for full expensing of qualified property, eliminating the corporate alternative minimum tax, or AMT, and changing how existing AMT credits can be realized.

The SEC staff issued Staff Accounting Bulletin No. 118, or 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 Tax Act.

Prior to the completion of our IPO we filed our tax returns on a consolidated and combined basis with Ionis for federal and state income tax purposes, respectively. For financial statement purposes when we are required to file on a consolidated or combined basis, we calculate our income tax amounts, including net operating losses and tax credit carryforwards, using a separate return methodology which determines income taxes as if we were a separate taxpayer from Ionis. Effective July 19, 2017, the date of our IPO, we are no longer included in the consolidated federal income tax return with Ionis. We determined the amount of federal tax attributes, primarily net operating losses and tax credit carryforwards that transferred to us upon deconsolidation from Ionis. We are still required to file most of our state tax returns on a consolidated or combined basis with Ionis. Therefore, for financial statement purposes we calculated our state income tax amounts using the separate return method. We have not yet determined the amount of state tax attributes, primarily net operating losses and tax credit carryforwards, which we would retain if we were to deconsolidate for state tax purposes from Ionis.

We account for income taxes using the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been recognized in our financial statements or tax returns. In addition, deferred tax assets are recorded for the future benefit of utilizing net operating losses and research and development credit carry forwards. Valuation allowances are provided when necessary to reduce deferred tax assets to the amount expected to be realized.

We apply the authoritative accounting guidance prescribing a threshold and measurement attribute for the financial recognition and measurement of a tax position taken or expected to be taken in a tax return. We recognize liabilities for uncertain tax positions based on a two-step process. The first step is to evaluate the tax position for recognition by determining if the weight of available evidence indicates that it is more likely than not that the position will be sustained on audit, including resolution of related appeals or litigation settlement. The second step is to estimate and measure the tax benefit as the largest amount that is more than 50% likely to be realized upon ultimate settlement.

We recognize interest and penalties related to unrecognized tax benefits within the income tax expense line in the accompanying consolidated statements of operations. Accrued interest and penalties are included within other long-term liabilities in the consolidated balance sheets.

Significant judgment is required in evaluating our uncertain tax positions and determining our provision for income taxes. Although we believe our reserves are reasonable, no assurance can be given that the final tax outcome of these matters will not be different from that which is reflected in our historical income tax provisions and accruals. We adjust these reserves for changing facts and circumstances, such as the closing of a tax audit or the refinement of an estimate. To the extent that the final tax outcome of these matters is different than the amounts recorded, such differences may impact the provision for income taxes in the period in which such determination is made.

Significant judgment is also required in determining any valuation allowance recorded against deferred tax assets. In assessing the need for a valuation allowance, we consider all available evidence, including scheduled reversal of deferred tax liabilities, past operating results, the feasibility of tax planning strategies and estimates of future taxable income. Estimates of future taxable income are based on assumptions that are consistent with our plans. Assumptions represent management's best estimates and involve inherent uncertainties and the application of management's judgment. Should actual amounts differ from our estimates, the amount of our tax expense and liabilities could be materially impacted.

We record a valuation allowance to reduce the balance of our net deferred tax assets to the amount we believe is more-likely-than-not to be realized. We have incurred financial statement losses since inception and as a result we have a full valuation allowance recorded against our net deferred tax assets. We regularly assess the future realization of our net deferred tax assets and will reduce the valuation allowance in any such period in which we determine that all, or a portion, of our deferred tax assets are more-likely-than-not to be realized.

We do not provide for a U.S. income tax liability and foreign withholding taxes on undistributed foreign earnings of our foreign subsidiaries. The earnings of non-U.S. subsidiaries are currently expected to be indefinitely reinvested in non-U.S. operations.

Impact of Recently Issued Accounting Standards

In May 2014, the Financial Accounting Standards Board, or FASB, issued Accounting Standards Update, or ASU, No. 2014-09, which amends the guidance for accounting for revenue from contracts with customers. This ASU supersedes the revenue recognition requirements in ASC Topic 605, *Revenue Recognition*, or Topic 605, and creates a new Topic 606, *Revenue from Contracts with Customers*, or Topic 606. Under Topic 606, an entity recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services.

To determine revenue recognition for arrangements that an entity determines are within the scope of Topic 606, the entity performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the entity satisfies a performance obligation. At contract inception, once the contract is determined to be within the scope of Topic 606, we assess the goods or services promised within each contract and determine those that are performance obligations, and assess whether each promised good or service is distinct. When we offer options for additional goods or services, such as an option to license a drug in the future or for additional goods or services to be provided in the future, we evaluate whether options are material rights that should be treated as additional performance obligations. We typically have not concluded that the option to license a drug or the options for additional goods or services that may be requested in the future under our collaboration agreement are material rights as the amounts attributable to such options represent standalone selling price, and therefore no consideration is allocated to these items at the inception of an agreement. When a partner exercises their option to license a drug or requests the additional goods or services, a new performance obligation is created for that item. Once performance obligations are identified, we then recognize as revenue the amount of the transaction price that we allocated to the respective performance obligation when (or as) each performance obligation is satisfied at a point in time or over time. If the performance obligation is satisfied over time, we recognize revenue based on the use of an output or input method. We have one revenue stream from our strategic collaboration, option and license agreement, or collaboration agreement, with Novartis Pharma AG, or Novartis, which we entered into in January 2017. For a complete discussion of the accounting for our collaboration revenue, see Note 4, Strategic Collaboration with Novartis.

Effective January 1, 2018, we adopted Topic 606 using the full retrospective transition method. Under this method, we revised our consolidated financial statements for prior period amounts as if Topic 606 had been effective for such periods. The references "as revised" used herein refer to revisions of data for the year ended December 31, 2017 as a result of our adoption of Topic 606.

2. Investments

As of December 31, 2017, we primarily invested our excess cash in debt instruments of the U.S. Treasury, financial institutions, corporations and U.S. government agencies with strong credit ratings and an investment grade rating at or above A-1, P-1 or F-1 by Moody's, S&P or Fitch, respectively. We have established guidelines relative to diversification and maturities that maintain safety and liquidity. We periodically review and modify these guidelines to maximize trends in yields and interest rates without compromising safety and liquidity.

All of our available-for-sale securities are available to us for use in our current operations. As a result, we categorized all of these securities as current assets even though the stated maturity of some individual securities may be one year or more beyond the balance sheet date.

As of December 31, 2016, we only invested in money market funds which were classified in cash and cash equivalents on our balance sheet.

The following is a summary of our investments at December 31, 2017 (in thousands):

	Cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Value
Available-for-sale securities (1):				
Corporate debt securities	$ 132,434	$ —	$ (206)	$ 132,228
Debt securities issued by U.S. government agencies	38,135	—	(59)	38,076
Total securities with a maturity of one year or less	170,569	—	(265)	170,304
Corporate debt securities	8,267	—	(35)	8,232
Debt securities issued by U.S. government agencies	23,264	—	(37)	23,227
Total securities with a maturity of one to two years	31,531	—	(72)	31,459
Total available-for-sale securities	$ 202,100	$ —	$ (337)	$ 201,763

(1) Our available-for-sale securities are held at amortized cost.

We believe that the decline in value of these securities is temporary and primarily related to the change in market interest rates since purchase. We believe it is more likely than not that we will be able to hold our debt securities to maturity. Therefore, we anticipate a full recovery of our debt securities' amortized cost basis at maturity.

3. Fair Value Measurements

We use a three-tier fair value hierarchy to prioritize the inputs used in our fair value measurements. These tiers include: Level 1, defined as observable inputs such as quoted prices in active markets for identical assets, which includes our money market funds and treasury securities classified as available-for-sale securities; Level 2, defined as inputs other than quoted prices in active markets that are either directly or indirectly observable, which includes our fixed income securities and commercial paper classified as available-for-sale securities; and Level 3, defined as unobservable inputs in which little or no market data exists, therefore requiring us to develop our own assumptions. We have not historically held any Level 3 investments. Our securities have been classified as Level 1 or Level 2. We obtain the fair value of our Level 2 investments from our custodian bank and from a professional pricing service. We validate the fair value of our Level 2 investments by understanding the pricing model used by the custodian banks or professional pricing service provider and comparing that fair value to the fair value based on observable market prices. We recognize transfers between levels of the fair value hierarchy on the date of the event or change in circumstances that caused the transfer. We did not have any Level 3 investments or liabilities at December 31, 2017 and 2016. For the years ended December 31, 2017 and 2016, there were no transfers between our Level 1 and Level 2 investments.

The following table presents the major security types we held at December 31, 2017 that we regularly measured and carried at fair value. The table segregates each security by the level within the fair value hierarchy of the valuation techniques we utilized to determine the respective securities' fair value (in thousands):

	At December 31, 2017	Quoted Prices in Active Markets (Level 1)	Significant Other Observable Inputs (Level 2)
Cash equivalents (1)	$ 48,430	$ 48,430	$ —
Corporate debt securities (2)	140,460	—	140,460
Debt securities issued by U.S. government agencies (2)	61,303	—	61,303
Total	$ 250,193	$ 48,430	$ 201,763

(1) Included in cash and cash equivalents on our consolidated balance sheets.
(2) Included in short-term investments on our consolidated balance sheets.

At December 31, 2016, the Company held $7.1 million of money market fund investments which are Level 1 investments and are considered cash equivalents.

4. Development, Commercialization and License Agreement and Services Agreement with Ionis

We entered into a development, commercialization and license agreement and a services agreement in December 2015 with Ionis. The following section summarizes these related party agreements with Ionis.

Development, Commercialization and License Agreement

Our development, commercialization and license agreement, or the license agreement, with Ionis granted exclusive rights to us to develop and commercialize volanesorsen, AKCEA-APO(a)-L$_{Rx}$, AKCEA-APOCIII-L$_{Rx}$, and AKCEA-ANGPTL3-L$_{Rx}$, which are collectively referred to as the Lipid Drugs. Ionis has granted an exclusive license to certain patents to develop and commercialize products containing the Lipid Drugs. Ionis also granted us a non-exclusive license to the Ionis antisense platform technology for us to develop and commercialize products containing the Lipid Drugs. Ionis also granted us non-exclusive rights under its manufacturing technology to manufacture the Lipid Drugs in our own facility or at a contract manufacturer. As a part of this agreement both companies agreed not to work with any other parties to develop or commercialize other RNA-targeting drugs that are designed to inhibit any of the Lipid Drug targets so long as we are developing or commercializing the Lipid Drugs.

We and Ionis share development responsibilities for the Lipid Drugs. We pay Ionis for the research and development expenses it incurs on our behalf, which include both external and internal expenses. External research and development expenses include costs for contract research organizations, or CROs, costs to conduct nonclinical and clinical studies on our drugs, costs to acquire and evaluate clinical study data, such as investigator grants, patient screening fees and laboratory work, and fees paid to consultants. Internal research and development expenses include costs for the work that Ionis' research and development employees perform for us. Ionis charges us a full-time equivalent rate that covers personnel-related expenses, including salaries and benefits, plus an allocation of facility-related expenses, including rent, utilities, insurance and property taxes, for those development employees who work either directly or indirectly on the development of our drugs. We also pay Ionis for the active pharmaceutical ingredient, or API, and drug product we use in our nonclinical and clinical studies for all of our drugs. Ionis manufactures the API for us and charges us a price per gram consistent with the price Ionis charges its pharmaceutical partners, which includes the cost for direct materials, direct labor and overhead required to manufacture the API. If we need the API filled in vials for our clinical studies and Ionis contracts with a third party to perform this work, Ionis will charge us for the resulting cost.

As we commercialize each of the Lipid Drugs, we will pay Ionis royalties from the mid-teens to the mid-twenty percent range on sales related to the Lipid Drugs that we sell. If we sell a Lipid Drug for a Rare Disease Indication (defined in the agreement as less than 500,000 patients worldwide or an indication that required a Phase 3 program of less than 1,000 patients and less than two years of treatment), we will pay a higher royalty rate to Ionis than if we sell a Lipid Drug for a Broad Disease Patient Population (defined in the agreement as more than 500,000 patients worldwide or an indication that required a Phase 3 program of 1,000 or more patients and two or more years of treatment). Other than with respect to the drugs licensed to Novartis under the collaboration agreement, if our annual sales reach $500.0 million, $1.0 billion and $2.0 billion, we will be obligated to pay Ionis sales milestones in the amount of $50.0 million for each sales milestone reached by each Lipid Drug. If and when triggered, we will pay Ionis each of these sales milestones over the subsequent 12 quarters in equal payments.

We may terminate this agreement if Ionis is in material breach of the agreement. Ionis may terminate this agreement if we are in material breach of the agreement. In each circumstance the party that is in breach will have an opportunity to cure the breach prior to the other party terminating this agreement.

In the first quarter of 2017, we entered into letter agreements with Ionis to reflect the agreed upon payment terms with respect to the upfront option payment that we received from Novartis and to allocate the premium that Novartis paid for Ionis' common stock in connection with our strategic collaboration with Novartis. For additional detail regarding our strategic collaboration with Novartis see Note 8, *Strategic Collaboration with Novartis.*

Services Agreement

Our services agreement with Ionis is designed to be flexible to adjust for our increasing capabilities in various functions. Under the services agreement, Ionis provides us certain services, including, without limitation, general and administrative support services and development support services. Ionis allocated a certain percentage of personnel to perform the services that it provides to us based on its good faith estimate of the required services. We pay Ionis for these allocated costs, which reflect the Ionis full-time equivalent, or FTE, rate for the applicable personnel, plus out-of-pocket expenses such as occupancy costs associated with the FTEs allocated to providing us these services. We do not pay a mark-up or profit on the external or internal expenses Ionis bills to us. Ionis invoices us quarterly for all amounts due under the services agreement and payments are due within 30 days of the receipt of an invoice.

In addition, as long as Ionis continues to consolidate our financials, we will comply with Ionis' policies and procedures and internal controls. As long as we are consolidated into Ionis' financial statements under U.S. GAAP, we may continue to access the following services from Ionis:

- investor relations services,
- human resources and personnel services,
- risk management and insurance services,
- tax related services,
- corporate record keeping services,
- financial and accounting services,
- credit services, and
- COO/CFO/CBO oversight.

However, if we wanted to provide for our own human resources and personnel services, and doing so would not negatively impact Ionis' internal controls and procedures for financial reporting, we can negotiate in good faith with Ionis for a reduced scope of services related to human resources and personnel services. When Ionis determines it should no longer consolidate our financials, we may mutually agree with Ionis in writing to extend the term in six-month increments.

We can establish our own benefits programs or can continue to use Ionis' benefits, however we must provide Ionis a minimum advance notice to opt-out of using Ionis' benefits. We do not currently plan to establish our own benefits program at this time or in the near future.

As of December 31, 2017 and 2016, we owed Ionis $14.4 million and $24.4 million, respectively.

The following table summarizes the amounts included in our operating expenses that were generated by transactions with Ionis for the following periods (in thousands):

	Years Ended December 31,		
	2017	2016	2015
Services performed by Ionis	$ 9,742	$ 8,599	$ 7,162
Active pharmaceutical ingredient manufactured by Ionis	6,012	12,648	5,620
Sublicensing expenses	48,394	—	—
Out-of-pocket expenses paid by Ionis	37,426	42,367	40,771
Total expenses generated by transactions with Ionis	101,574	63,614	53,553
Payable balance to Ionis at the beginning of the period	24,355	9,198	—
Less: amounts contributed by Ionis in the form of capital	—	—	(8,689)
Less: total amounts paid to Ionis during the period	(78,170)	(48,457)	(35,666)
Less: non-cash sublicensing expenses	(33,394)	—	—
Total amount payable to Ionis at period end	$ 14,365	$ 24,355	$ 9,198

5. Line of Credit Agreement with Ionis

In January 2017, we entered into a line of credit agreement with Ionis for up to $150.0 million. We had $106.0 million outstanding as of June 30, 2017. We used a portion of the $106.0 million to pay our intercompany expenses. The amounts we borrowed under the line of credit bore interest at an annual interest rate of 4%, compounded monthly. The outstanding principal and accrued interest under our line of credit converted into 13,438,339 shares of our common stock in connection with the closing of our IPO. We no longer have access to this line of credit following the closing of our IPO. Our IPO is discussed in Note 9, *Initial Public Offering*. For the year ended December 31, 2017, interest expense was $1.7 million. For the years ended December 31, 2016 and 2015, we incurred no interest expense.

6. Stockholders' Equity (Deficit)

Series A Convertible Preferred Stock

In December 2015, we issued and sold to Ionis an aggregate of 28,884,540 shares of Series A convertible preferred stock for a total purchase price of $100.0 million plus the grant of the rights and licenses we received under the development, commercialization and license agreement with Ionis. The $100.0 million of proceeds we received was recorded in Series A convertible preferred stock on our consolidated balance sheet. We had 28,884,540 shares of Series A convertible preferred stock authorized, issued and outstanding as of December 31, 2016, of which all was held by Ionis.

Conversion

Shares of our Series A convertible preferred stock were convertible 1:1 into common stock, subject to certain adjustments for reorganizations, reclassifications, stock splits, stock dividends and dilutive issuances. All shares of Series A convertible preferred stock automatically converted into common stock upon completion of the IPO in July 2017. As of December 31, 2017, we had no shares of Series A convertible preferred stock issued or outstanding. Our IPO is discussed in Note 9, *Initial Public Offering*.

Preferred Stock

In July 2017, our board of directors approved an amendment and restatement of our certificate of incorporation to, among other things, change the authorized shares of our preferred stock to 10,000,000 shares with a par value of $0.001, all of which are undesignated. Our board of directors may establish the rights, preference and privileges of the preferred stock from time to time. The amended and restated certificate of incorporation was approved by our stockholders and became effective upon the completion of our IPO and the filing of the amended and restated certificate of incorporation with the State of Delaware in July 2017. As of December 31, 2017, there were no shares of Preferred Stock outstanding.

Common Stock

At December 31, 2017 and 2016, we had 100,000,000 shares of common stock authorized, of which 66,541,629 and none were issued and outstanding as of December 31, 2017 and 2016, respectively.

In May 2017, our board of directors approved an amendment to our certificate of incorporation to (1) effect a reverse stock split on outstanding shares of our common stock and preferred stock on a one-for-2.555 basis, (2) change the authorized shares of our preferred stock to 40,000,000 and (3) modify the threshold for automatic conversion of our preferred stock into shares of our common stock in connection with an IPO to eliminate the price per share threshold and only require that we raise at least $50.0 million in gross proceeds (collectively, the "Charter Amendment"). The par values of the common stock and preferred stock were not adjusted as a result of the reverse stock split. The amendment to our certificate of incorporation was approved by our stockholder and became effective upon the filing with the State of Delaware in June 2017. All issued and outstanding common stock and preferred stock and related share and per share amounts contained in these consolidated financial statements have been retroactively adjusted to reflect the reverse stock split for all periods presented.

Stock Plans

2015 Equity Incentive Plan

In December 2015, our board of directors and stockholder adopted and approved our 2015 Equity Incentive Plan, or the 2015 Plan. In May 2017 and June 2017, our board of directors and stockholder, respectively, approved an amendment to our 2015 Equity Incentive Plan in order to, among other things, increase the number of shares of common stock reserved for issuance thereunder to 8,500,000 shares of common stock in conjunction with the IPO.

As of December 31, 2017, the aggregate number of shares of common stock that may be issued pursuant to stock awards under the 2015 Plan was 8,500,000 shares, not including an additional 5,000,000 shares approved by the Board of Directors in December 2017, subject to shareholder approval. The 2015 Plan also provides for the grant of nonstatutory stock options, or NSOs, incentive stock options, or ISOs, stock appreciation rights, restricted stock awards and restricted stock unit awards. At December 31, 2017, a total of 7,905,110 options were outstanding, of which 2,964,262 were exercisable, 33,820 restricted stock unit awards were outstanding, and 561,070 shares were available for future grant under the 2015 Plan.

2017 Employee Stock Purchase Plan

In May 2017 and June 2017, our board of directors and stockholder, respectively, approved our 2017 Employee Stock Purchase Plan, or 2017 ESPP, which became effective upon the completion of our IPO, and the reservation for issuance thereunder of 500,000 shares of common stock. In addition, the number of shares of common stock that may be issued under the ESPP will automatically increase commencing on January 1, 2018 and ending on (and including) January 1, 2027 in an amount equal to the lesser of (i) 1% of the total number of shares of Common Stock outstanding on December 31st of the preceding calendar year, and (ii) 500,000 shares of Common Stock. During the year ended December 31, 2017, no shares were issued under our 2017 ESPP. At December 31, 2017, accrued liabilities included $175,000 of ESPP contributions related to our first enrollment period for which the related shares were issued on January 2, 2018.

Stock Option Activity

The following table summarizes the stock option activity for the year ended December 31, 2017 (in thousands, except per share and contractual life data) for the 2015 Plan:

	Number of Shares	Weighted Average Exercise Price per Share	Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value
Outstanding at December 31, 2016	5,064	$ 6.48	9.11	—
Granted	2,890	$ 15.14		
Cancelled/forfeited/expired	(49)	$ 7.70		
Outstanding at December 31, 2017	7,905	$ 9.64	8.51	$ 63,971
Exercisable at December 31, 2017	2,964	$ 6.48	7.84	$ 32,251

The weighted-average estimated fair value of options granted were $10.40, $4.13 and $4.01 for the years ended December 31, 2017, 2016 and 2015, respectively. For the year ended December 31, 2017, no stock options were exercised. As of December 31, 2017, total unrecognized estimated non-cash stock-based compensation expense related to non-vested stock options was $27.9 million. We will adjust total unrecognized compensation cost for future forfeitures. We expect to recognize the cost of non-cash stock-based compensation expense related to non-vested stock options over a weighted average amortization period of 1.31 years.

The following table summarizes the stock option activity for the year ended December 31, 2017 (in thousands, except per share and contractual life data) for options granted to our employees under the Ionis 2011 Equity Incentive:

	Number of Shares	Weighted Average Exercise Price per Share	Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value
Outstanding at December 31, 2016	801	$ 54.92	5.72	2,203
Granted	628	$ 45.76		
Cancelled/forfeited/expired	(1,429)	$ 50.90		
Outstanding at December 31, 2017	—	$ —	—	$ —
Exercisable at December 31, 2017	—	$ —	—	$ —

The weighted average grant-date fair value of options to purchase Ionis common stock granted to Akcea employees were $24.23, $23.02 and $27.99 for the years ended December 31, 2017, 2016 and 2015, respectively.

Stock-based Compensation Expense and Valuation Information

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

	Years Ended December 31,		
	2017	2016	2015
Research and development expenses	$ 8,630	$ 4,576	$ 827
General and administrative expenses	8,909	5,573	5,669
Total	$ 17,539	$ 10,149	$ 6,496

Determining Fair Value

Valuation. We measure stock-based compensation expense for equity-classified awards related to stock options and stock purchase rights under the ESPP at the grant date, based on the estimated fair value of the award and we recognize the expense over the employee's requisite service period.

We use the Black-Scholes model to estimate the fair value of stock options granted and stock purchase rights under our ESPP. The expected term of stock options granted represents the period of time that we expect them to be outstanding. We estimate the expected term of options granted based on actual and projected exercise patterns. We recognize compensation expense for stock options granted and stock purchase rights under the ESPP using the accelerated multiple-option approach. Under the accelerated multiple-option approach (also known as the graded-vesting method), an entity recognizes compensation expense over the requisite service period for each separately vesting tranche of the award as though the award were in substance multiple awards, which results in the expense being front-loaded over the vesting period.

In valuing our options, we made a number of assumptions, including the risk-free interest rate, expected dividend yield, expected volatility, expected term, rate of forfeitures and fair value of common stock. We considered the following factors in applying these assumptions:

Risk-Free Interest Rate. We determine the risk-free interest rate assumption based on the yields of U.S. Treasury securities with maturities that correspond to the term of the award.

Expected Dividend Yield. We assume a dividend yield of zero as we have not paid dividends in the past and do not expect to pay dividends on our common stock for the foreseeable future.

Expected Volatility. We do not have sufficient history to estimate the volatility of our common stock. We calculate expected volatility based on reported data from selected publicly traded peer companies for which historical information is available. We plan to continue to use a peer group to calculate our volatility until the historical volatility of our common stock is sufficient to measure expected volatility for future option grants.

Expected Term. The expected term estimates represent the period of time that we expect the options to be outstanding. As we do not have historical information, we use the simplified method for estimating the expected term. Under the simplified method we calculate the expected term as the average time-to-vesting and the contractual life of the options. As we gain additional historical information, we will transition to calculating our expected term based on our exercise patterns.

Rate of Forfeiture. We estimate forfeitures based on Ionis' historical rates of forfeiture as we do not have similar historical information for ourselves. We and Ionis are engaged in similar businesses and we believe this is a good estimate of expected forfeitures. As we gain additional historical information, we will transition to using our historical forfeiture rate.

Fair Value of Common Stock. Prior to our IPO our board of directors estimated the fair value of our common stock considering, among other things, contemporaneous valuations of our common stock prepared by an unrelated third-party valuation firm in accordance with the guidance provided by the American Institute of Certified Public Accountants 2013 Practice Aid, Valuation of Privately-Held-Company Equity Securities Issued as Compensation. Subsequent to the IPO, we use the market closing price for our common stock on the date of grant as reported on Nasdaq to determine the fair value of our common stock on the date of grant.

For the years ended December 31, 2017, 2016 and 2015, we used the following weighted-average assumptions in our Black-Scholes calculations for stock option grants under our 2015 Equity Incentive Plan:

Employee Stock Options:

	Years Ended December 31,		
	2017	2016	2015
Risk-free interest rate	1.9%	1.6%	2.0%
Dividend yield	0.0%	0.0%	0.0%
Volatility	79.5%	71.4%	67.9%
Expected life	6.06 years	6.08 years	6.08 years

Board of Director Stock Options:

	Years Ended December 31,	
	2017	2016
Risk-free interest rate	1.9%	2.0%
Dividend yield	0.0%	0.0%
Volatility	79.4%	79.6%
Expected life	6.25 years	6.08 years

In valuing options for Ionis common stock, Ionis made a number of assumptions, including the risk-free interest rate, expected dividend yield, expected volatility, expected term, rate of forfeiture and fair value of common stock. Ionis considered the following factors in applying these assumptions:

Risk-Free Interest Rate. Ionis bases the risk-free interest rate assumption on the yields of U.S. Treasury securities with maturities that correspond to the term of the award.

Expected Dividend Yield. Ionis bases the dividend yield assumption on its history and expectation of dividend payouts. Ionis has not paid dividends in the past and it does not expect to pay dividends for the foreseeable future.

Expected Volatility. Ionis uses an average of the historical stock price volatility of Ionis' stock. It computed the historical stock volatility based on the expected term of the awards.

Expected Term. The expected term of stock options Ionis has granted represents the period of time that it expects them to be outstanding. Ionis estimated the expected term of options Ionis has granted based on actual and projected exercise patterns.

Rate of Forfeiture. Ionis estimates forfeitures at the time of grant and revises, if necessary, in subsequent periods if actual forfeitures differ from those estimates. Ionis estimates forfeitures based on historical experience. Ionis' historical forfeiture estimates have not been materially different from its actual forfeitures.

Fair Value of Common Stock. Ionis uses the market closing price for its common stock on the date of grant as reported on Nasdaq to determine the fair value of Ionis' common stock on the date of grant.

For the years ended December 31, 2017, 2016 and 2015, Ionis used the following weighted-average assumptions in its Black-Scholes calculations for stock option grants under the Ionis 2011 Equity Incentive Plan:

Employee Stock Options:

	Years Ended December 31,		
	2017	2016	2015
Risk-free interest rate	1.9%	1.5%	1.5%
Dividend yield	0.0%	0.0%	0.0%
Volatility	65.8%	59.4%	54.1%
Expected life	4.5 years	4.5 years	4.5 years

Restricted Stock Units:

In October 2017, we issued 33,820 RSUs to certain employees. The expense recognized for these awards is based on the grant date fair value of our common stock multiplied by the number of units granted. We recognized $75,000 of related expense during the year ended December 31, 2017 related to RSUs. We did not incur stock-based compensation expense for the years ended December 31, 2016 and 2015 related to RSUs.

The following table presents a summary of our RSU activity and related information (in thousands, except per share data):

	Number of Shares	Weighted Average Grant Date Fair Value per Share
Unvested restricted stock units at December 31, 2016	—	$ —
Granted	34	23.04
Vested	—	—
Forfeited	—	—
Unvested restricted stock units at December 31, 2017	34	$ 23.04

The weighted-average grant date fair values of RSUs granted during the year ended December 31, 2017 was $23.04 per share. There were no awards of RSUs during the years ended December 31, 2016 and 2015. No RSUs vested during the year ended December 31, 2017. As of December 31, 2017, total unrecognized estimated non-cash stock-based compensation expense related to unvested RSUs was $0.6 million. We expect to recognize the cost of non-cash stock-based compensation expense related to the unvested RSUs over a remaining weighted-average period of approximately 2.3 years.

In addition to granting RSUs, we issued cash awards to certain employees, which will vest annually over four years starting on the employee's hire date, provided that the employee continues to remain employed through each vesting date. The target payment amount totals $1.0 million of which we recognized expense of $124,000 during the year ended December 31, 2017.

7. Income Taxes

Loss before income taxes is comprised of (in thousands):

	Years Ended December 31,		
	2017 (as revised)	2016	2015
United States	$ (108,691)	$ (83,217)	$ (61,422)
Foreign	(11,593)	—	—
Loss before income tax expense	$ (120,284)	$ (83,217)	$ (61,422)

The provision (benefit) for income taxes is comprised of (in thousands):

	Years Ended December 31,		
	2017	2016	2015
Current:			
Federal	$ —	$ —	$ —
State	1,041	—	—
Foreign	234	—	—
Total current	1,275	—	—
Deferred:			
Federal	—	—	—
State	—	—	—
Foreign	—	—	—
Total deferred	—	—	—
Income tax expense	$ 1,275	$ —	$ —

There is no provision for income taxes for the years ended December 31, 2016 and 2015 because we have historically incurred net operating losses and we maintain a full valuation allowance against our net deferred tax assets.

We have taxable income for the year ending December 31, 2017 primarily due to the income we recognized from our Novartis collaboration. We recorded income tax expense of $1.3 million for the year ended December 31, 2017, which primarily consists of state and foreign income tax.

The reconciliation between our effective tax rate on loss from continuing operations and the statutory U.S. tax rate is as follows (in thousands):

	Years Ended December 31,					
	2017		2016		2015	
	(as revised)					
Pre-tax loss	$ (120,284)		$ (83,217)		$ (61,422)	
Statutory rate	(42,099)	35.0%	(29,126)	35.0%	(21,498)	35.0%
State income tax net of federal benefit	(2,371)	2.0%	(4,099)	4.9%	(3,194)	5.2%
Impact of foreign tax rate differential	4,072	(3.4)%	—	0.0%	—	0.0%
Net change in valuation allowance	(18,917)	15.7%	43,438	(52.1)%	30,857	(50.2)%
Tax credits	4,189	(3.5)%	(11,007)	13.2%	(6,187)	10.0%
IPO/Deconsolidation adjustment	37,911	(31.5)%	—	0.0%	—	0.0%
Tax Cut and Jobs Act	19,046	(15.8)%	—	0.0%	—	0.0%
Nondeductible items and other	(556)	0.5%	794	(1.0)%	22	0.0%
Effective rate	$ 1,275	(1.0)%	$ —	0.0%	$ —	0.0%

Significant components of our deferred tax assets and liabilities as of December 31, 2017 and 2016 are as follows (in thousands):

	December 31,	
	2017	2016
Deferred Tax Assets:	(as revised)	
Net operating loss carryovers	$ 1,157	$ 48,813
Tax credits	29,334	30,057
Stock-based compensation	7,515	6,620
Deferred revenue	29,256	—
Other	240	1,251
Total deferred tax assets	67,502	86,741
Deferred Tax Liabilities:		
Intangible assets	(125)	(281)
Total deferred tax liabilities	(125)	(281)
Valuation allowance	(67,377)	(86,460)
Net deferred tax assets and liabilities	$ —	$ —

On December 22, 2017, the U.S. government enacted comprehensive tax legislation commonly referred to as the Tax Cuts and Jobs Act of 2017, or Tax Act. The Tax Act makes broad and complex changes to the U.S. tax code. The changes include, but are not limited to, reducing the U.S. federal corporate tax rate from 35% to 21%, imposing a mandatory one-time transition tax on certain unrepatriated earnings of foreign subsidiaries, introducing bonus depreciation that will allow for full expensing of qualified property, eliminating the corporate alternative minimum tax, or AMT, and changing how existing AMT credits can be realized, and modifying or repealing many business tax deductions and credits.

As a result of the tax rate reduction, we remeasured our existing net U.S. deferred tax assets using the enacted rate and other known existing changes to the tax code. This resulted in a total decrease in these assets by $19.1 million, the tax effect of which was fully offset by a decrease in the valuation allowance.

As a result of the repeal of the corporate AMT, we recorded a $0.5 million long-term income tax receivable related to our 2017 estimated AMT liability because under the Tax Act, AMT tax credits are now refundable from 2018 through 2021. The net effect of the repeal of the corporate AMT on our income tax provision is zero.

In accordance with the Securities and Exchange Commission Staff Accounting Bulletin No. 118, we provided our best estimate of the impact of the Tax Act in the period ended December 31, 2017 based on our understanding of the Tax Act and guidance available as of the date of this filing. We have recognized provisional tax impacts related to deemed repatriated earnings, the revaluation of our deferred tax assets and the impact of the repeal of the corporate AMT. Our preliminary analysis resulted in no deemed repatriation amount under Section 965(a) and no net financial statement impact from the revaluation of our deferred tax assets due to the change in the corporate tax rate and no net financial statement impact due to the repeal of the corporate AMT. The ultimate impact may differ materially from these provisional amounts due to, among other things, additional analysis, changes in our interpretations and assumptions, additional regulatory guidance that may be issued, and other actions we may take as a result of the Tax Act.

Prior to the completion of our IPO we filed our tax returns on a consolidated and combined basis with Ionis for federal and state income tax purposes, respectively. For financial statement purposes when we are required to file on a consolidated or combined basis, we calculate our income tax amounts, including net operating losses and tax credit carryforwards, using a separate return methodology which determines income taxes as if we were a separate taxpayer from Ionis. Effective July 19, 2017, the date of our IPO, we are no longer included in the consolidated federal income tax return with Ionis. We determined the amount of federal tax attributes, primarily net operating losses and tax credit carryforwards, that transferred to us upon deconsolidation from Ionis.

We are still required to file most of our state tax returns on a consolidated or combined basis with Ionis. Therefore, for financial statement purposes we calculated our state income tax amounts using the separate return method. We have not yet determined the amount of state tax attributes, primarily net operating losses and tax credit carryforwards, which we would retain if we were to deconsolidate for state tax purposes from Ionis.

At December 31, 2017, we had federal and state tax net operating loss carry forwards on a separate basis of approximately $5.3 million and $1.2 million, respectively, available to reduce future taxable income, if any. If not realized, the federal and state loss carryforwards will begin to expire in years 2034 and 2027, respectively. We also have federal research and development tax credit carry forwards of approximately $33.3 million that will begin to expire in 2034.

Utilization of the net operating loss carry forwards and credits may be subject to an annual limitation due to the ownership change limitations provided by the Internal Revenue Code of 1986, as amended, and similar state provisions. The annual limitation may result in the expiration of net operating losses and credits before utilization.

We record a valuation allowance to reduce the balance of our net deferred tax assets to the amount we believe is more-likely-than-not to be realized. We have incurred financial statement losses since inception and as a result we have a full valuation allowance recorded against our net deferred tax assets. We regularly assess the future realization of our net deferred tax assets and will reduce the valuation allowance in any such period in which we determine that all, or a portion, of our deferred tax assets are more-likely-than-not to be realized.

Our valuation allowance decreased by $19.1 million from December 31, 2016 to December 31, 2017. The decrease relates primarily to the remeasurement of our net deferred tax assets as required by the Tax Act and the impact from our deconsolidation from Ionis, offset partially by increases from current year activity.

Historically, we recognized excess tax benefits associated with stock-based compensation to stockholders' equity only when realized. We followed the with and without approach excluding any indirect effects of the excess tax deductions to determine when we should realize excess tax benefits relating to stock-based compensation. Under this approach, we do not realize our excess tax benefits related to stock-based compensation until after we utilize all our other tax benefits available to us.

In March 2016, the FASB issued amended guidance to simplify certain aspects of stock-based payment accounting. Under the amended guidance, we will recognize excess tax benefits and tax deficiencies as income tax expense or benefit in our consolidated statement of operations on a prospective basis. As we have a valuation allowance, this change will impact our net operating loss carryforward and the valuation allowance disclosures.

We analyze our filing positions in all the U.S. federal, state and foreign jurisdictions where we are required to file income tax returns to determine if we have any uncertain tax positions on any income tax returns. We recognize the impact of an uncertain tax position on an income tax return at the largest amount that the relevant taxing authority is more-likely-than not to sustain upon audit. We do not recognize a tax benefit if the position has a less than 50 percent likelihood of being sustained upon examination.

The following table summarizes our gross unrecognized tax benefits (in thousands):

	Years Ended December 31,		
	2017	2016	2015
Beginning balance of unrecognized tax benefits	$ 5,012	$ 1,766	$ 138
Additions related to the current year	1,723	3,246	1,628
Decreases related to prior year tax positions	(1,734)	—	—
Ending balance of unrecognized tax benefits	$ 5,001	$ 5,012	$ 1,766

Due to our valuation allowance, there are no unrecognized tax benefits at December 31, 2017 that would impact our effective tax rate, if recognized.

We do not foresee any material changes to our gross unrecognized tax benefits within the next twelve months.

We recognize interest and/or penalties related to income tax matters in income tax expense. We did not recognize any accrued interest and penalties related to gross unrecognized tax benefits during the year ended December 31, 2017.

We are subject to taxation in the United States and various state and foreign jurisdictions. The tax years for 2014 through 2016 are subject to examination by the U.S. federal, state and foreign tax authorities.

8. Strategic Collaboration with Novartis

In January 2017, we initiated a strategic collaboration with Novartis for the development and commercialization of AKCEA-APO(a)-L_{Rx} and AKCEA-APOCIII-L_{Rx}. Under the Novartis collaboration, Novartis has an exclusive option to further develop and commercialize these drugs. We are responsible for completing a Phase 2 program, conducting an end-of-Phase 2 meeting with the FDA and providing initial quantities of the active pharmaceutical ingredient, or API, for each drug. If Novartis exercises an option for one of these drugs, Novartis will be responsible for all further global development, regulatory and co-commercialization activities and costs for such drug.

We received a $75.0 million upfront payment in the first quarter of 2017, of which we retained $60.0 million and we paid Ionis $15.0 million as a sublicense fee under our license agreement with Ionis. If Novartis exercises its option for a drug, Novartis will pay us a license fee equal to $150.0 million for each drug licensed by Novartis. In addition, for AKCEA-APO(a)-L_{Rx}, we are eligible to receive up to $600.0 million in milestone payments, including $25.0 million for the achievement of a development milestone, up to $290.0 million for the achievement of regulatory milestones and up to $285.0 million for the achievement of commercialization milestones. In addition, for AKCEA-APOCIII-L_{Rx}, we are eligible to receive up to $530.0 million in milestone payments, including $25.0 million for the achievement of a development milestone, up to $240.0 million for the achievement of regulatory milestones and up to $265.0 million for the achievement of commercialization milestones. We will earn the next milestone payment of $25.0 million under this collaboration if Novartis advances the Phase 3 study for either drug. We are also eligible to receive tiered royalties in the mid-teens to low twenty percent range on net sales of AKCEA-APO(a)-L_{Rx} and AKCEA-APOCIII-L_{Rx}. Novartis will reduce these royalties upon the expiration of certain patents or if a generic competitor negatively impacts the product in a specific country. We will pay 50% of these license fees, milestone payments and royalties to Ionis as a sublicense fee. We plan to co-commercialize any licensed drug commercialized by Novartis in selected markets under terms and conditions that we plan to negotiate with Novartis in the future, through the specialized sales force we are building to commercialize volanesorsen.

The agreement with Novartis will continue until the earlier of the date that all of Novartis' options to obtain the exclusive licenses under the agreement expire unexercised or, if Novartis exercises its options, until the expiration of all payment obligations under the agreement. In addition, the agreement as a whole or with respect to any drug under the agreement may terminate early under the following situations:

- Novartis may terminate the agreement as a whole or with respect to any drug at any time by providing written notice to us;
- Either we or Novartis may terminate the agreement with respect to any drug by providing written notice to the other party in good faith that we or Novartis have determined that the continued development or commercialization of the drug presents safety concerns that pose an unacceptable risk or threat of harm in humans or would violate any applicable law, ethical principles or principles of scientific integrity;
- Either we or Novartis may terminate the agreement for a drug by providing written notice to the other party upon the other party's uncured failure to perform a material obligation related to the drug under the agreement, or the entire agreement if the other party becomes insolvent; and
- We may terminate the agreement if Novartis disputes or assists a third party to dispute the validity of any of our or Ionis' patents.

Additionally, we and Ionis entered into a SPA with Novartis. Under the SPA, in July 2017, as part of our IPO, Novartis purchased $50.0 million of our common stock in a separate private placement concurrent with the completion of our IPO at a price per share equal to the IPO price. Our IPO is discussed in Note 9, *Initial Public Offering*.

During the year ended December 31, 2017, we earned revenue of $43.4 million from our relationship with Novartis, representing 100% of our revenue. Through December 31, 2016, we did not generate revenue. Our consolidated balance sheet at December 31, 2017 included deferred revenue of $70.7 million related to our relationship with Novartis.

9. Initial Public Offering

On July 19, 2017, we completed our IPO. Total net proceeds were $182.3 million, including the following:

- $132.3 million from the sale of 17,968,750 shares of our common stock in our IPO of which $25 million was invested by Ionis; and
- $50.0 million from the purchase of 6,250,000 shares by Novartis in a concurrent private placement.

In addition, both of the following occurred in connection with the completion of our IPO on July 19, 2017:

- the conversion of all outstanding shares of Series A convertible preferred stock into 28,884,540 shares of our common stock; and
- the conversion of $106.0 million of outstanding principal plus accrued interest from the line of credit into 13,438,339 shares of common stock.

10. Employment Benefits

We have an employee 401(k) salary deferral plan covering all employees. Employees may make contributions by withholding a percentage of their salary up to the IRS annual limit $18,000 and $24,000 in 2017 for employees under 50 years old and employees 50 years old or over, respectively. We made approximately $299,000, $211,000 and $28,000 in matching contributions for the years ended December 31, 2017, 2016 and 2015, respectively.

11. Basic and Diluted Net Loss Per Share

We issued 28,884,540 shares of Series A convertible preferred stock in December 2015. Prior to the completion of our IPO, we used the Series A convertible preferred stock to calculate basic net loss per share because there was no common stock outstanding during these periods, and the Series A convertible preferred stock represented the lowest subordinated form of outstanding equity that would have been required to absorb our losses. For purposes of calculating diluted net loss per share, we considered the conversion of the Series A convertible preferred stock using its 1:1 conversion ratio and the potential dilutive effect of employee stock options.

The Series A convertible preferred stock converted into common stock in conjunction with the IPO in July 2017. As a result there were 66,541,629 shares of common stock issued and outstanding and there were no longer any outstanding shares of Series A convertible preferred stock. We determined that the Series A convertible preferred stock was in substance common stock during the period that it was outstanding because the Series A convertible preferred stock was the lowest form of subordinated equity outstanding during that period and therefore this class of stock would have been required to absorb our losses. Accordingly, we are using the two-class method for computing EPS.

The two-class method is an earnings allocation formula that determines EPS for each class of common stock and participating security according to dividends declared (or accumulated) and participation rights in undistributed earnings. For the purposes of calculating EPS under the two-class method, we have allocated the net loss between the common stock and the Series A convertible preferred stock.

Basic EPS for each class of stock is computed by dividing total distributable losses applicable to preferred and common stock, including the 6% cumulative dividend contractually due to Series A convertible preferred shareholders, by the weighted-average of preferred and common shares outstanding during the requisite period. The cumulative preferred stock dividend was not paid upon completion of the IPO because the IPO was not a liquidation event or a change in control. Prior to the IPO, the 6% cumulative Series A convertible preferred stock dividend was considered as required under the two-class method regardless of whether those dividends were actually distributed.

The following table summarizes the distributable losses for the years ended December 31, 2017, 2016 and 2015 (in thousands):

	Years Ended December 31,		
	2017 (as revised)	2016	2015
Net loss	$ (121,559)	$ (83,217)	$ (61,422)
Preferred stock dividend	(20,100)	—	—
Distributable losses	$ (141,659)	$ (83,217)	$ (61,422)

The following table summarizes the reconciliation of weighted-average shares outstanding used in the calculation of basic EPS for the years ended December 31, 2017, 2016 and 2015:

	Years Ended December 31,		
Determination of shares:	2017	2016	2015
Weighted-average preferred shares outstanding	15,748,009	28,884,540	28,884,540
Weighted-average common shares outstanding	30,262,768	—	—
Total weighted-average shares outstanding	46,010,777	28,884,540	28,884,540

The following table summarizes the calculation of basic EPS for the years ended December 31, 2017, 2016 and 2015 (in thousands, except per share amounts):

	Years Ended December 31,		
	2017 (as revised)	2016	2015
Losses attributable to preferred shares	$ (48,485)	$ (83,217)	$ (61,422)
Less: Assumed dividend to preferred shares	20,100	—	—
Income (losses) allocated to preferred shares	$ (28,385)	$ (83,217)	$ (61,422)
Weighted-average preferred shares outstanding	15,748	28,885	28,885
Basic loss per preferred share	$ (1.80)	$ (2.88)	$ (2.13)
Losses allocated to common shares	$ (93,174)	$ —	$ —
Weighted-average common shares outstanding	30,263	—	—
Basic loss per common share	$ (3.08)	$ —	$ —

The following table presents amounts that were excluded from the calculation of diluted net loss per share, due to their anti-dilutive effect:

	Years Ended December 31,		
	2017	2016	2015
Options to purchase common stock	7,905,110	5,063,585	2,905,006
Unvested restricted stock	33,820	—	—
Employee stock purchase plan	9,488	—	—

12. Quarterly Financial Data (Unaudited)

The following financial information reflects all normal recurring adjustments, which are, in the opinion of management, necessary for a fair statement of the results of the interim periods. Summarized quarterly data for the years ended December 31, 2017 and 2016 are as follows (in thousands, except per share data):

2017 Quarters	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
			(as revised)	
Revenue	$ 6,094	$ 5,713	$ 9,906	$ 21,688
Operating expenses	$ 69,470	$ 25,402	$ 26,013	$ 42,986
Income (loss) from operations	$ (63,376)	$ (19,689)	$ (16,107)	$ (21,298)
Net income (loss)	$ (63,856)	$ (20,359)	$ (17,637)	$ (19,707)
Net (loss) income per preferred share – basic and diluted (1) (2) (3)	$ (2.21)	$ (0.70)	$ (0.01)	$ —
Net loss per common share – basic and diluted (1) (2) (3)	—	—	$ (0.33)	$ (0.30)

2016 Quarters	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Revenue	$ —	$ —	$ —	$ —
Operating expenses	$ 16,049	$ 13,706	$ 19,902	$ 33,855
Income (loss) from operations	$ (16,049)	$ (13,706)	$ (19,902)	$ (33,855)
Net income (loss)	$ (15,962)	$ (13,615)	$ (19,809)	$ (33,831)
Net loss per preferred share – basic and diluted (1) (3)	$ (0.55)	$ (0.47)	$ (0.69)	$ (1.17)

(1) We computed net loss per share independently for each of the quarters presented. Therefore, the sum of the quarterly net loss per share will not necessarily equal the total for the year.

(2) For the purposes of calculating EPS under the two-class method since our IPO in July 2017, we have allocated the net loss between the common stock and the Series A convertible preferred stock for the three-month period ended September 30, 2017. We determined it was appropriate to allocate losses to the Series A convertible preferred stock because it was the lowest form of subordinated equity during such period and because Ionis, the sole holder of the Series A convertible preferred stock, was absorbing our losses during such period. Basic EPS for each class of stock is computed by dividing total distributable losses applicable to preferred and common stock, including the 6% cumulative dividend contractually due to Series A convertible preferred shareholders, by the weighted-average of preferred and common shares outstanding during the requisite period. The cumulative preferred stock dividend was not paid upon completion of the IPO because the IPO was not a liquidation event or a change in control. Prior to the IPO, the 6% cumulative Series A convertible preferred stock dividend was considered as required under the two-class method regardless of whether those dividends were actually distributed.

The following table summarizes the distributable losses for the quarter ended September 30, 2017 (in thousands):

	September 30, 2017 (as revised)
Net loss	$ (17,637)
Preferred stock dividend	(1,791)
Distributable losses	$ (19,428)

The following table summarizes the reconciliation of weighted-average shares outstanding used in the calculation of basic EPS for the quarter ended September 30, 2017:

Determination of shares:	September 30, 2017
Weighted-average preferred shares outstanding	5,651,323
Weighted-average common shares outstanding	53,522,615
Total weighted-average shares outstanding	59,173,938

The following table summarizes the calculation of basic EPS for the quarter ended September 30, 2017 (in thousands, except per share amounts):

	September 30, 2017 (as revised)
Losses attributable to preferred shares	$ (1,855)
Less: Assumed dividend to preferred shares	1,791
Income (losses) allocated to preferred shares	$ (64)
Weighted-average preferred shares outstanding	5,651,323
Basic income (loss) per preferred share	$ (0.01)
Losses allocated to common shares	$ (17,573)
Weighted-average common shares outstanding	53,522,615
Basic loss per common share	$ (0.33)

(3) We did not include dilutive common equivalent shares in the computation of diluted net loss per share because the effect would have been antidilutive.