DAWSONJAMES SECURITIES

Member FINRA/SIPC

INSTITUTIONAL RESEARCH

Life Sciences

INITIATION REPORT

Toll Free: 561-391-5555 ♦ www.DawsonJames.com ♦ 1 North Federal Highway - Suite 500 ♦ Boca Raton, FL 33432

OpGen (Nasdaq/OPGN)

BUY **Acuitas Acuity**

OpGen is a precision medicine company using molecular diagnostics and bioinformatics to help combat infectious disease

June 19, 2017

Robert M. Wasserman
Senior Research Analyst
561-212-3265
rwasserman@dawsonjames.com

Investment Highlights

1) OpGen is progressing well with its Acuitas Rapid diagnostic tests, moving the new product line into full development this year with a near-term goal of making the tests available for external research use sometime this year. First target for Acuitas Rapid Test is complicated urinary tract infections (cUTI), a large (1.5 million patients in the US) hard to serve market, where OpGen is working to reduce diagnosis time from 2 days or more to 3 hours or less. The Company made two presentations at scientific conferences related to Rapid Tests already this year, and is lining up distribution, supply and development partnerships for both the US and International markets.

2) The Company is also advancing its Acuitas Lighthouse products as well, building off its 2016 development agreement with Merck by adding recent partnerships with Intermountain Healthcare and the District of Columbia Hospital Association. On tap for later this year in addressing the $2.5 billion multi-drug resistant organism (MDRO) market will be further testing of 10,000 MDROs to support deployment of the Acuitas Lighthouse Knowledgebase system and presenting results of ongoing studies.

3) Longer-term, the Company expects to continue to develop and integrate its Acuitas Rapid Tests and Lighthouse database system, through new initiatives such as co-marketing relationships, acquisition of related products, expanded distribution, and contracts with both hospital groups and pharma companies. The combined markets for the two products are large, with $500 million estimated potential revenues for MDRO-oriented surveillance software, trials and outcome studies fueling a $2 billion potential market for Acuitas Rapid Tests, in the areas of much-needed rapid diagnostics for blood, urine, respiratory ailments, wounds and microbiome (digestive tract) systems.

Current Price	**$0.59**
Price Target	**$2.00**

Estimates	F2015A	F2016A	F2017E
Revenues($000s)	**$3,158**	**$4,026**	**$3,712**
1Q March	472	1,077	772 A
2Q June	375	1,183	860 E
3Q September	981	760	950 E
4Q December	1,330	1,007	1,060 E
EPS (diluted)	**($2.20)**	**($1.10)**	**($0.67)**
1Q March	(5.61)	(0.36)	(0.19) A
2Q June	(0.84)	(0.37)	(0.16) E
3Q September	(0.38)	(0.23)	(0.14) E
4Q December	(0.38)	(0.21)	(0.14) E
EBITDA/Share	($1.68)	($1.01)	($0.61)
EV/EBITDA (x)	N/A	N/A	N/A

Stock Data	
52-Week Range	$0.52-$4.65
Shares Outstanding (mil.)	27.4
Market Capitalization (mil.)	$16.2
Enterprise Value (mil.)	$15.5
Debt to Capital (3/17)	64.3%
Book Value/Share (3/17)	$0.02
Price/Book	29.2 x
Average Trading Volume (3-month)	307,400
Insider Ownership	67.9%
Institutional Ownership	1.8%
Short interest (Millions)	1.8
Dividend / Yield	$0.00/0.0%

Price target and ratings changes over the past 3 yrs:
Initiated - June 19, 2017 - Buy - Price Target $2.00

Conclusion

OpGen is making good progress in transitioning its diagnostic product line to its new Acuitas Rapid Tests and Acuitas Lighthouse Knowledgebase offerings, which are targeting the large, expanding multi-drug resistant organism market. While this transitioning is happening, however, OPGN shares have suffered, and the stock is currently trading at significant valuation discounts to its peer diagnostic products group. With several new partnerships signed recently, and more to possibly come in the future to go along with new regulatory approvals and product launches, we believe OPGN shares are poised for a bounce-back as positive news flow continues into the future, and thus we are initiating coverage on OPGN shares with a BUY rating and 12-18 month price target of $2.00 per share.

Company Business/History

OpGen is a precision medicine company using molecular diagnostics and bioinformatics to help combat infectious disease. The Company is developing molecular information products and services to combat infectious disease in global healthcare settings, helping to guide clinicians with more rapid information about life threatening infections, improve patient outcomes, and decrease the spread of infections caused by multidrug-resistant microorganisms (MDRO). OpGen's proprietary DNA tests and bioinformatics address the rising threat of antibiotic resistance by helping physicians and other healthcare providers optimize patient care decisions and protect the hospital biome through customized screening and surveillance products and services. OpGen's molecular diagnostics and bioinformatics offerings combine its Acuitas DNA tests, Acuitas Lighthouse bioinformatics services and Clinical Laboratory Improvement Amendments (CLIA) lab services for MDRO surveillance. The Company is working to deliver the following products and services, some in development, to a global network of customers and partners, including:

• Acuitas DNA tests, which provide rapid microbial identification, and antibiotic resistance gene information. These products include the QuickFISH® family of FDA-cleared and CE-marked diagnostics used to rapidly detect pathogens in positive blood cultures, the Acuitas MDRO Gene Test to detect, type, track, and trend antibiotic resistant organisms in real-time and the Acuitas Rapid Test in development. OpGen's goal is to provide actionable, precise diagnostic information powered by pathogen surveillance data collected through hospital screening programs and a network of hospital and public health laboratories globally.

• Acuitas Lighthouse bioinformatics systems, which are cloud-based HIPAA compliant bioinformatics offerings that combine clinical lab test results with patient and hospital information and provide analytics to help manage MDROs in the hospital and patient care environment. These include Acuitas Lighthouse informatics, which can be specific to a healthcare facility, public health department or collaborator, such as a pharmaceutical company, and Acuitas Lighthouse Knowledgebase, a proprietary data warehouse in development to include genomic data matched with antibiotic susceptibility information for microbes and patient information from healthcare providers, in which OpGen is beginning to collect and store MDRO information from a variety of sources for use with its Acuitas Rapid Test in development.

There is rising global concern about the profound health and macroeconomic consequences if the growing threat of antimicrobial resistance is not tackled. Drug resistant infections currently claim at least 50,000 lives each year in the United States and Europe alone, with many hundreds of thousands more dying in other areas of the world. Recognizing this emerging threat, the White House issued a National Action Plan for Combating Antibiotic Resistance Bacteria in March 2015. The National Action Plan aims to achieve major reductions in the incidence of these urgent and serious threats and improvements in antibiotic stewardship during the next five years. The 2016 U.S. government budget included approximately $1 billion to help combat drug resistant

infections. Three key areas have been highlighted for investment: rapid diagnostics, surveillance, and new antibiotics.

OpGen is focusing on rapid diagnostics, where the Company's current tests help identify microorganisms and determine their antibiotic resistance genes and susceptibility faster than conventional diagnostics, and also on developing more rapid diagnostic tests to provide pathogen identification and antibiotic resistance information within one to three hours of specimen collection. Through the use of the Acuitas data warehouse, the Company is working to provide antibiotic decision support tools to help physicians interpret and act on this information. A second area of focus is surveillance of microbial infections and colonization with MDROs in the hospital environment. These products and services are designed to help enable effective response to resistant organisms and to help control MDRO transmission and outbreaks in the hospital.

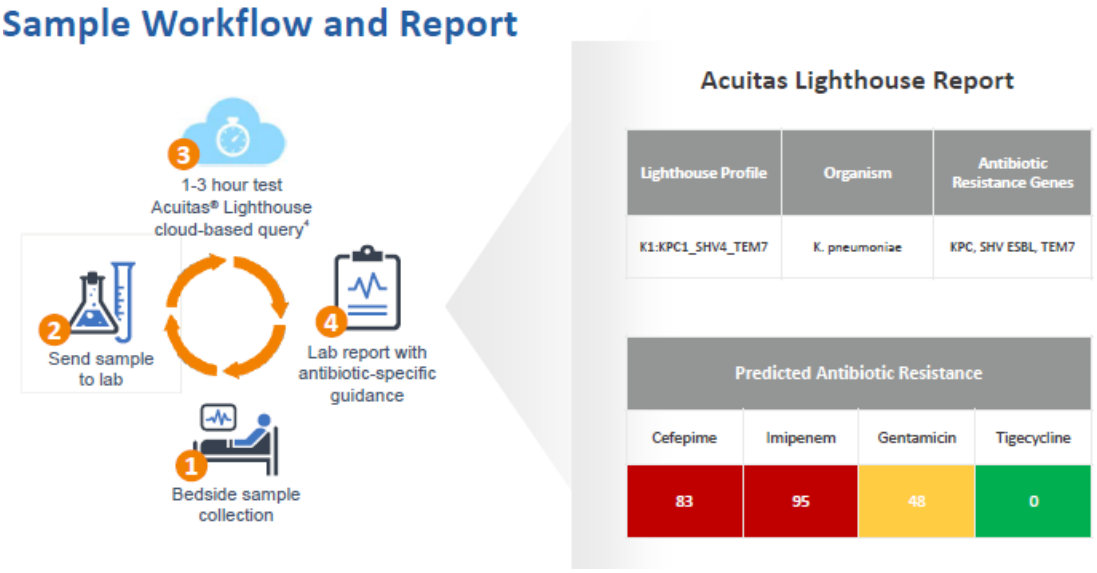
The diagnostic paradigm for management of drug resistant infections is poised for change. In acute care settings, initial treatment today relies heavily on initial use of broad spectrum antibiotics on an empiric basis. For example, it is common for patients to receive the antibiotic vancomycin for treatment of potential Gram positive infections such as Staphylococcus and the antibiotic cefipime for treatment of potential Gram negative infections from organisms such as Escherichia coli, Klebsiella pneumoniae, or Pseudomonas. These powerful antibiotics are often prescribed without previous knowledge of whether the organism they are intended to treat is present. Current methods require 2-4 days to determine the organism identification and antibiotic susceptibility. During this period in advance of receiving the correct diagnosis, patients may often be over-treated or treated with an ineffective antibiotic leading to potentially undesirable outcomes such as morbidity from expanded infection, drug resistance, and opportunistic infections. If the diagnosis is that the initial empiric antibiotic therapy was incorrect, a new therapy must be chosen which may result in poor clinical outcomes, additional length of stay, and increased healthcare costs.

Improved diagnostics for detection of resistant bacteria and characterization of resistance patterns will help healthcare providers make optimal treatment decisions earlier and assist public health officials in taking action to prevent and control disease. Improved and more rapid diagnostics will also help decrease unnecessary or inappropriate use of antibiotics. Optimal precision medicine tests for combatting infectious disease will provide diagnostic information in the first hours after presentation of the acutely ill patient to the healthcare facility in order to impact initial antibiotic selection decisions. Conventional microbiology methods have been largely unchanged, and it is unlikely that they will be adapted to provide rapid one to three-hour diagnostic tests for high resolution microbial analysis. DNA analysis technology, such as the Acuitas DNA tests in development, which have the potential to help revolutionize rapid diagnostics for microbiology. DNA tests are highly accurate and can be performed in just 30 minutes to an hour.

OpGen's FDA-cleared QuickFISH rapid pathogen identification tests are examples of such rapid detection technology; they currently provide rapid pathogen analysis within 30 minutes after a positive blood culture report. OpGen is working on tests to accelerate such pathogen analysis to occur within one to three hours of specimen collection. In addition, DNA sequencing technology now makes it possible to sequence the entire genome of microbes for subsequent analysis, antibiotic selection decision making software, and microbe tracking. The Company's suite of DNA-based products and products in development are intended to provide actionable, precise diagnostics powered by microbial surveillance data. The high resolution Acuitas DNA tests use multiplex PCR to help provide reliable and accurate detection of drug resistance. The QuickFISH tests are powered by PNA technology and provide rapid pathogen identification, typically in less than 30 minutes from a positive blood culture result. The Acuitas MDRO Gene Test is used for determining if ICU patients are colonized with MDROs. Positive samples are confirmed using microbiological methods and the Acuitas Resistome Test for high resolution genotyping. Test results are maintained in the Acuitas Lighthouse data warehouse for subsequent interpretation by physicians and healthcare providers. OpGen is developing a new disruptive testing paradigm that is believed could provide results in one to three hours from specimen collection

and help address many of the current issues with testing for antibiotic resistance. The new high resolution Acuitas Rapid Test is designed to detect the key resistome profiles of Gram negative organisms. The product is anticipated to be used initially for research use only in infection control and clinical research. Ultimately, following receipt of appropriate regulatory approvals, it is anticipated that the Acuitas Rapid Test will be used in the clinical setting to provide pathogen and antibiotic resistance gene information to aid in decision making for patients with complicated urinary tract infections, complicated pneumonia, and blood stream infections.

OpGen is also developing a smart cloud based clinical database that is called the Acuitas Lighthouse Knowledgebase that will include critical infection control information and provide additional analysis of Acuitas resistance test results to provide additional insight to aid initial antibiotic selection and clinical decision making. The proprietary Acuitas Lighthouse Knowledgebase distills large amounts of data into one actionable profile. OpGen believes this disruptive approach will be globally applicable and could be an important new weapon in the fight against drug resistant bacteria. The figure below describes the potential workflow and anticipated results from this new testing approach:



Source: OpGen

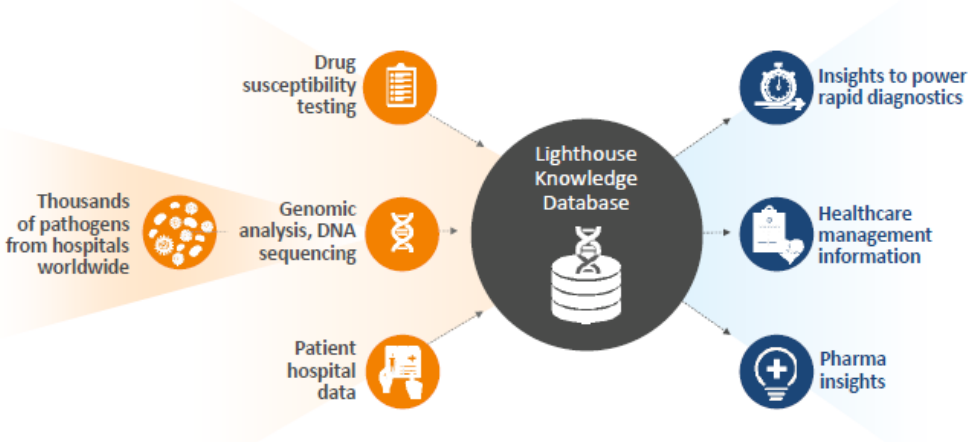
OpGen is using its current product and service offerings, and will use its products in development to build a comprehensive precision medicine solution for combatting infectious diseases with a focus on developing diagnostic tests for rapid pathogen identification and genetic profiling, antibiotic resistance analysis and advanced bioinformatics to store and analyze MDRO and other infectious disease data for hospitals, out-patient settings and other healthcare providers. More rapid genetic identification methods may reduce morbidity from MDROs, reduce healthcare costs through reduced length of stay, and assist in the identification of targeted antibiotic therapy. Current conventional microbiology, largely unchanged in 50 years, requires one to two days for growth and phenotypic analysis and often leads to the use of broad spectrum antibiotic therapy in the early stages of infection. OpGen's current QuickFISH and PNA FISH FDA-cleared, CE-marked diagnostic tests can accelerate accurate pathogen identification by one to three days when compared to conventional methods by providing identification of the pathogen within 30 to 90 minutes of positive blood culture results. The Company is working to:

- Expand its rapid diagnostics product offerings through development of the Acuitas Rapid Test, with a goal of achieving one to three-hour antibiotic resistance analysis from the time of specimen collection;

- Grow the Acuitas Lighthouse data warehouse offerings for resistance and susceptibility data in a hospital, hospital system, or broader community through the creation of the Acuitas Lighthouse Knowledgebase;
- Continue development of the Acuitas Lighthouse informatics and decision-making software and work to install Acuitas Lighthouse access at all customer sites in the United States and globally who meet minimum test volume license requirements;
- Accelerate the commercialization of the Acuitas Gene Tests and Acuitas Lighthouse informatics;
- Expand lab service offerings and capabilities through the supply of kits for use on the Company's DNA probe assay platform and commercially available rapid diagnostic testing systems, and develop additional MDRO DNA sequencing tests and informatics;
- Partner with reference laboratories, government agencies, diagnostic companies and information technology providers to offer the Acuitas Lighthouse informatics and Acuitas Lighthouse Knowledgebase on a global basis; and
- Accelerate growth through strategic partnerships, which may include companies developing rapid diagnostic tests for MDROs, sponsored research programs with governments and industry, and strategic acquisitions.

OpGen believes its products and services, including those in development, can be integrated into a MDRO and antibiotic single solution for assisting healthcare providers to rapidly combat infectious diseases. By seeking to address institutional needs for informatics, genetic analysis and microbiologic testing, the Company is working to establish a market leadership position in MDRO analysis. OpGen is focused on developing products and services to help hospitals reduce hospital acquired infection rates by helping to rapidly identify patients colonized with MDROs who should receive contact precautions, and helping to guide antibiotic therapy in a variety of healthcare settings.

OpGen is working to build a unique and highly proprietary molecular information business. This approach combines FDA-cleared and CE-marked rapid diagnostics and CLIA lab-based MDRO surveillance tests with the Acuitas Lighthouse data warehouse. The Company is developing an integrated solution based on a genomic knowledgebase of drug resistant pathogens. Thus approach involves sourcing thousands of pathogens from hospitals worldwide and completing genomic analysis including DNA sequencing, and drug susceptibility testing of each individual pathogen. These data are combined along with hospital patient data and other information in the Acuitas Lighthouse Knowledgebase. It is anticipated that using this information and insights derived from it to will help power the Company's rapid diagnostic products, healthcare management solutions and new applications to support pharmaceutical companies.



Source: OpGen

Recent Agreements/Initiatives

In May 2016, OpGen and the District of Columbia Hospital Association ("DCHA") announced the completion of the first city wide quantification of MDROs. The study was conducted with Washington DC's public health departments to gauge the prevalence of the multidrug-resistant Gram-negative bacteria CRE in healthcare facilities throughout the District of Columbia. The results revealed the prevalence of CRE and other CRO was 5.1% and 6.4%, respectively. The study also reported a wide range of variability across the 16 institutions tested providing direction for concentrated intervention.

In July 2016, OpGen completed the Intermountain Healthcare ("IHC") Retrospective MDRO Health Outcome Study. The study was one of the largest of its kind ever conducted in an integrated health system. In total, 900,000 hospital admissions were evaluated over an eight-year period at IHC, including 22 hospitals and affiliated clinics, to help evaluate actual healthcare costs of MDRO and *C. difficile* infections and to provide proprietary data sets to help guide OpGen's commercialization and R&D activities. The researchers found that a 222% increase was observed in the prevalence of *C. difficile* infections as well as a 322% increase in ESBL (extended spectrum beta lactamase) positive organisms. The study documented total costs of hundreds of millions of dollars and average individual patient costs of between $25,000 and $80,000. Total costs are projected to double over the next seven years.

In October 2016, the Company entered into a research collaboration with Merck Sharp & Dohme Corp., a wholly owned subsidiary of Merck (MRK/Not Rated), to develop new rapid diagnostics and information technology products to help combat the threat of antimicrobial resistance. The companies will collaborate to support OpGen's development of rapid DNA tests and a genomic knowledgebase of antibiotic-resistant pathogens for predicting antibiotic susceptibility based on test results. Under the terms of the agreement, Merck will provide access to its archive of over 200,000 bacterial pathogens gathered over the last 15 years through the Study for Monitoring Antimicrobial Resistance Trends ("SMART"), one of the world's largest surveillance studies of antimicrobial resistance supported by Merck in collaboration with International Health Management Associates ("IHMA"). OpGen will perform genomic analysis, microbiology testing for drug resistance, and incorporate this information into its Acuitas Lighthouse Knowledgebase and the development of rapid DNA tests such as the Acuitas Rapid Test in development. OpGen will initially perform molecular analyses on up to 10,000 pathogens to identify markers of resistance to support rapid decision making use of the Acuitas Lighthouse data warehouse, and to speed development of OpGen's rapid diagnostic platforms. Merck will gain access to the high-resolution genotype data for the SMART isolates as well as access to Acuitas Lighthouse informatics to support internal research and development programs. Earlier, in July 2015, the Company entered into a Purchase Agreement with Merck GHI, pursuant to which Merck GHI purchased 1.1 million shares of OPGN at $4.40 per share for gross proceeds of $5.0 million, and OpGen also issued to Merck GHI an 8% Senior Secured Promissory Note in the principal amount of $1.0 million with a two-year maturity date.

FISH Products

OpGen has commercialized 15 QuickFISH, PNA FISH and XpressFISH diagnostic test products in the United States and Europe for the identification of various infectious pathogens. The pathogens identified and differentiated by these FISH products are:

QuickFISH	**PNA FISH**	**XpressFISH**
Staphylococcus	Staphylococcus	MRSA
Enterococcus	Enterococcus	MSSA
Gram-negative bacteria	Gram-negative bacteria	
Gram –positive bacteria	Gram-positive bacteria	
Candida	Candida	

OpGen's FISH products can provide pathogen identification and differentiation within 20 to 90 minutes of positive blood culture results. Differentiation of the pathogen, such as, for example differentiating a methicillin resistant Staphylococcus aureus ("MRSA") infection from a methicillin susceptible Staphylococcus aureus ("MSSA") infection provides actionable information that can be used by the healthcare provider to determine appropriate antibiotic therapy.

OpGen currently has approximately 100 U.S. hospital customers purchasing its FISH products, and the Company also sells its FISH products to hospitals in 10 countries with antibiotic stewardship programs. OpGen's hospital customers include academic medical centers, tertiary care hospitals and community hospitals.

An example of the usefulness of QuickFISH products at Winter Haven Hospital in Florida was described in a recent publication "The Impact of Implementation of Rapid QuickFISH Testing for Detection of Coagulase Negative Staphylococci at a Community-Based Hospital," *American Journal of Clinical Pathology*, January 2016. In such case study OpGen's QuickFISH products demonstrated clinical utility and cost effectiveness in the more rapid identification and differentiation of staph-infected patients which resulted in a 90% reduction in pathogen identification (1.4 hours as compared to 17.2 hours from a positive blood culture), decreased utilization of Vancomycin antibiotic therapy, a 30% reduction in length of stay and annual savings of approximately $764,000.

Other Acuitas Products

OpGen's high resolution DNA tests are marketed under the Acuitas trade name. The Company has developed Acuitas DNA tests for use in CLIA labs such as the Acuitas MDRO Gene Test and OpGen is developing a rapid Acuitas DNA test for use in hospital laboratories that will combine rapid pathogen identification and detection of antibiotic resistance genes.

- The Acuitas MDRO Gene Test is, perhaps, the first CLIA lab-based test able to provide information regarding the presence of ten MDRO resistance genes from one patient specimen. The ten drug-resistant genes identified by the Acuitas MDRO Gene Test are associated with CRE, ESBL and VRE organisms, and are gastrointestinal organisms frequently associated with antibiotic-resistant infections. The test results can be used by healthcare providers to identify patients colonized with organisms expressing the drug-resistant genes or who are actively infected.
- The Acuitas CR Elite Test adds the ability for the healthcare provider to order a microbiology culture screen to be performed from the same specimen sent for the Acuitas MDRO Gene Test, thereby

providing additional information about the organism(s) associated with an active infection, as well as an antibiotic susceptibility profile for such organism(s).

- The Acuitas Resistome Test, launched in the second quarter of 2015, is a more comprehensive MDRO molecular test which detects 49 genes covering over 900 subtypes associated with antibiotic resistance. The test includes additional resistance genes for carbapenemases, ESBLs and AmpC genes, in replacement of the vancomycin resistant genes found in the Acuitas MDRO Gene Test. The Company believes that the AmpC targets of the Acuitas Resistome Test are more specific for Gram-negative bacteria, thereby strengthening the coverage provided by the Acuitas Resistome Test to detect resistance genes found in Klebsiella pneumoniae, Escherichia coli, Acinetobacter baumannii, Pseudomonas aeruginosa, Enterobacter cloacae, and Citrobacter freundii. OpGen uses Acuitas Resistome Test results for Acuitas Lighthouse profiling of specimens collected in hospitals and clinical isolates from infected patients. Information from the Acuitas Resistome Test provides additional gene detection information to supplement the Acuitas MDRO Gene Test. Acuitas Resistome Test results can be used in conjunction with the Acuitas CR Elite Test to provide high resolution Acuitas Lighthouse profiles. The Company's goal is to provide DNA test-based Acuitas Lighthouse profiles, within 24 hours of sample receipt, and, using the Acuitas CR Elite Test to supplement the Acuitas Lighthouse profiles, with biologically derived, phenotypic antibiotic susceptibility data within 84 hours. OpGen anticipates improving the accuracy, over time, of the Acuitas Resistome Test by performing DNA sequence analysis of microbial isolates within the Acuitas Lighthouse data warehouse. The Company believes its menu of genotypic and phenotypic tests, along with the Acuitas Lighthouse bioinformatics platform profiles, will enable better surveillance and epidemiology, improved infection control practices, improved antibiotic stewardship and individualized patient care, as well as help to facilitate outbreak detection and response in healthcare settings. OpGen also anticipates combining tests for infectious diseases such as *C. difficile*, MRSA and others to provide enhanced MDRO screening and patient management offerings.

In Development: Acuitas Lighthouse

OpGen's Acuitas Lighthouse bioinformatics platform enables proactive MDRO management to prevent in-hospital transmission events and to help improve patient outcomes. Using the Acuitas Lighthouse informatics, launched in December 2015, the Company offers trend analysis of patient specific data, data specific to individual hospital facilities and health systems, which can be provided safely and confidentially to healthcare providers. Acuitas Lighthouse's dynamic profiling incorporates identity, phenotype and MDRO gene presence and assigns unique microbe identifiers, or Acuitas Lighthouse informatics profiles, based on MDRO gene composition, and antibiotic susceptibility, or AST, data. The Company believes its Acuitas Lighthouse profiling will provide a comprehensive diagnostic tracking tool for MDRO infections in the hospital setting. It is based on the CLIA- and HIPAA-compliant LIMS database system. In addition, OpGen has developed a web-based portal to allow its customers access to LIMS-based lab reports and Acuitas Lighthouse data reports.

OpGen is also focused on further developing Acuitas Lighthouse into the Acuitas Lighthouse Knowledgebase, to provide an evergreen database for comprehensive testing and bioinformatics analysis to help guide antibiotic therapy decision making with continual global pathogen data from CLIA lab and hospital customers, with such data to be used to:

- Assist in accelerating more rapid diagnosis with improved molecular susceptibility data;
- Provide MDRO screening and surveillance capabilities to hospitals to identify pathogen and resistance profiles; and
- Potentially accelerate new antibiotic development as the data are used to reveal genetic resistance patterns to direct drug discovery.

During 2016, the Company completed initial development of its genomic discovery engine including custom genotyping and DNA sequencing tests. OpGen completed development of the informatics infrastructure

including the data warehouse and portal to support large-scale pathogen testing for the Acuitas Lighthouse Knowledgebase.

Other Products

Prior to a shift in focus to developing and commercializing its MDRO products, OpGen had developed and commercialized the Argus Whole Genome Mapping System, MapIt Services and MapSolver bioinformatics products and services. Such products and services were sold to academic, public health and corporate customers to allow them to perform Whole Genome Mapping and analysis of microbial, plant, animal and human genomes for life sciences applications. The Company has more than ten years of experience mapping microbial genomes. Customers for these products included government and public health agencies such as the CDC, FDA, USDA and biodefense organizations, who use the Argus and MapSolver products in research and development, food safety and public health settings. In 2016, OpGen ceased production of its Whole Genome Mapping products and notified its customers that the Company would no longer support these products and services.

In September 2013, OpGen entered into a technology development agreement with Hitachi High-Technologies Corporation ("Hitachi") to commercialize the Whole Genome Mapping technology for mapping, assembly and analysis of human DNA. Under that agreement, OpGen developed cloud-based human genome map assembly capabilities. The technology development agreement ended in December 2015; there was no further activity under this agreement in 2016.

In June 2016, however, OpGen entered into a license agreement with Hitachi, pursuant to which various matters were resolved with respect to previously delivered milestones under the technology development agreement and which provided a non-exclusive development license and a commercial products license to the Whole Genome Mapping technology. The license agreement grants Hitachi designated development and commercialization rights. OpGen is not an active participant with Hitachi under the license agreement. During the year ended December 31, 2016, the Company recognized $137,603 of revenue related to the license agreement.

Research and Development

OpGen's R&D focus is to continue to invest in the development of additional Acuitas gene tests, the Acuitas Lighthouse bioinformatics platform, and QuickFISH rapid identification tests. The current focus is on completing the development of product offerings to provide actionable, precise diagnostics powered by the Acuitas Lighthouse Knowledgebase for rapid diagnostics of pathogens, determination of the appropriate antibiotics to treat the infection and accumulation of actionable surveillance data to provide information useful for monitoring and controlling outbreaks and promoting antibiotic stewardship. For the years ended December 31, 2016 and 2015, research and development expenses for OpGen were $8.6 million and $6.0 million, respectively.

Ongoing research and development efforts include:

- Development of the Acuitas Rapid Test, capable of providing genetic resistance information for up to 150 drug resistance genes in one to three hours from specimen collection, and a cloud-based Acuitas Lighthouse Knowledgebase for interpretation of test results and clinical decision making support tools to help select appropriate antibiotic therapies;
- Development of more rapid molecular diagnostic products to achieve actionable pathogen identification and differentiation in the first few hours of presentation or symptoms;
- Automating QuickFISH products through digital imaging and analysis, new formats requiring less hands on time to process samples, multiplex formats that allow for testing of a broader range of microorganisms;

- Continued investments in the Acuitas Lighthouse bioinformatics platform, focused on (i) data warehouse and portal for MDRO data and (ii) antibiotic analysis;
- Further development of the Acuitas MDRO Gene Test, Acuitas Resistome Test and DNA sequencing; and
- Converting CLIA lab-based products to IVD kits that can be sold, upon receipt of FDA clearance and other approvals, directly to customers and to other clinical reference laboratories.

The chart below depicts OpGen's ongoing Acuitas Lighthouse and Rapid Test research and development programs and their stage of development:

	Status
Genomic Discovery Engine	
CLIA Lab for microbial sequence/antibiotic phenotype analysis	Complete/Commercial
Custom genotyping & DNA sequencing tests	Complete/Commercial
Verification of test performance	Complete
Test thousands of pathogens	Underway
Informatics Infrastructure	
Lighthouse Data Warehouse & Portal	Complete/Commercial
Antibiotic analytics engine	Complete
Genotype/phenotype predictive algorithms	Underway
Database of ~10,000 MDRO pathogens	Underway – 2Q 2017
Rapid Test Development	
Initial performance confirmation on top pathogens	Complete
Design & development of initial test	Underway – Q3 2017
Clinical performance evaluation	Q3/Q4 2017
Initial commercialization	Q1 2018

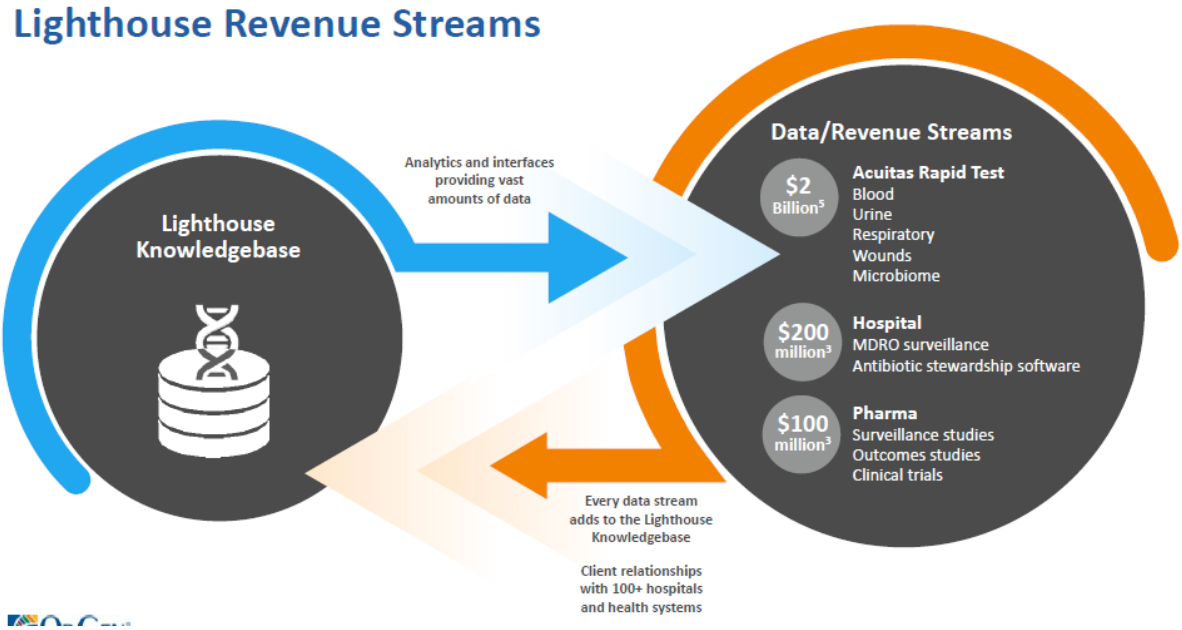
Source: OpGen

Sales and Marketing

OpGen currently sells and markets its products and services in the United States through a 12-person sales and marketing organization including direct sales professionals and a dedicated marketing support organization. Internationally, the Company sells its products through a network of distributors in 16 countries, and OpGen also operates a subsidiary in Denmark that provides support for European customers and to distributors in other parts of the world. In addition, the Company is involved in pilot programs in approximately 10 countries to demonstrate the clinical and cost effectiveness of its FISH products. OpGen is working to expand its market reach by entering into strategic co-marketing relationships with larger diagnostic and pharmaceutical companies and by expanding the network of distributors globally. The chart below depicts in greater detail the Company's sales and marketing strategy related to its Acuitas rapid test:

Source: OpGen

OpGen's strategic focus is on selling to health systems and larger healthcare ecosystems such as individual cities or regions. The collaboration with Intermountain Healthcare in Utah and the DC-HARP study in Washington, DC are examples of company initiatives to deploy its technology across multi-hospital healthcare settings. OpGen is also working to expand this successful initial project to a funded pilot implementation across multiple healthcare facilities in the city. The Company further anticipates that its direct sales organization, working in conjunction with regional and health system high-level cooperation efforts, will sell and support its genomic diagnostic products, including MDRO surveillance and rapid diagnostics, and its Acuitas Lighthouse informatics offerings. In the United States, the Company anticipates that the Acuitas Rapid Test will become a lead product. As OpGen works to gain appropriate regulatory approvals for this new product, the Company plans to conduct clinical trial evaluations to document test performance and potential improved healthcare outcomes and reduced costs. Each testing site is anticipated to have access to MDRO surveillance CLIA lab services and the Acuitas Lighthouse Knowledgebase. The chart below outlines potential revenue streams for the Acuitas Lighthouse product line:



Source: OpGen

Intellectual Property

OpGen relies on a combination of patents, copyrights and trademarks, as well as contracts, such as confidentiality, invention assignment and licensing agreements, as well as on trade secret laws to protect unpatented know-how and continuing technological innovation, and finally reasonable security measures in place to maintain confidentiality.

At present, OpGen holds total license or ownership rights to 172 patents, including 12 pending United States non-provisional patent applications, and 68 issued United States patents. These include license or ownership rights to 99 patents, including 1 pending United States non-provisional patent applications, and 45 issued United States patents related to FISH products, of which these issued patents began to expire in March 2017 and will be fully expired by January 2029. In addition, related to Acuitas products, OpGen has license or ownership rights to 22 patents, including 4 pending United States non-provisional patent applications and no issued United States patents, and related to other products, the Company has license or ownership rights to 51 patents, including 7 pending United States non-provisional patent applications, and 23 issued United States patents related to other products, of which some begin to expire in April 2017 and will be fully expired by January 2032. The Company intends to file additional patent applications in the United States and abroad to strengthen its intellectual property rights.

Manufacturing

OpGen manufactures its FDA-cleared and CE-marked PNA FISH and QuickFISH products in its Woburn, Massachusetts facility. The Company is currently operating this facility under a five-year lease. Specialty reagents for OpGen's CLIA laboratory are manufactured at the Company's Gaithersburg, Maryland facility. Manufacturing of FDA-cleared products is performed under the current Good Manufacturing Practices - Quality System Regulation as required by the FDA for the manufacture of IVD labeled products. These regulations carefully control the manufacture, testing and release of IVD products as well as raw material receipt and control. OpGen also has ongoing post-market vigilance responsibilities under FDA regulations, and is subject to periodic inspections by the FDA to determine compliance with the FDA's requirements, including primarily the quality system regulations and medical device reporting regulations. The results of these inspections can include inspectional observations on FDA's Form 483, warning letters, or other forms of enforcement. OpGen's Woburn, Massachusetts facility was inspected by the FDA in 2015, and following such inspection, the FDA issued a report of its findings and observations, typically referred to as "Form 483 observations," primarily related to the quality systems and testing policies and documentation. The Company has responded, or intends to respond, to all inspection observations within the required timeframe and is working with the FDA's Office of Compliance to satisfy the identified deficiencies.

Laboratory Operations

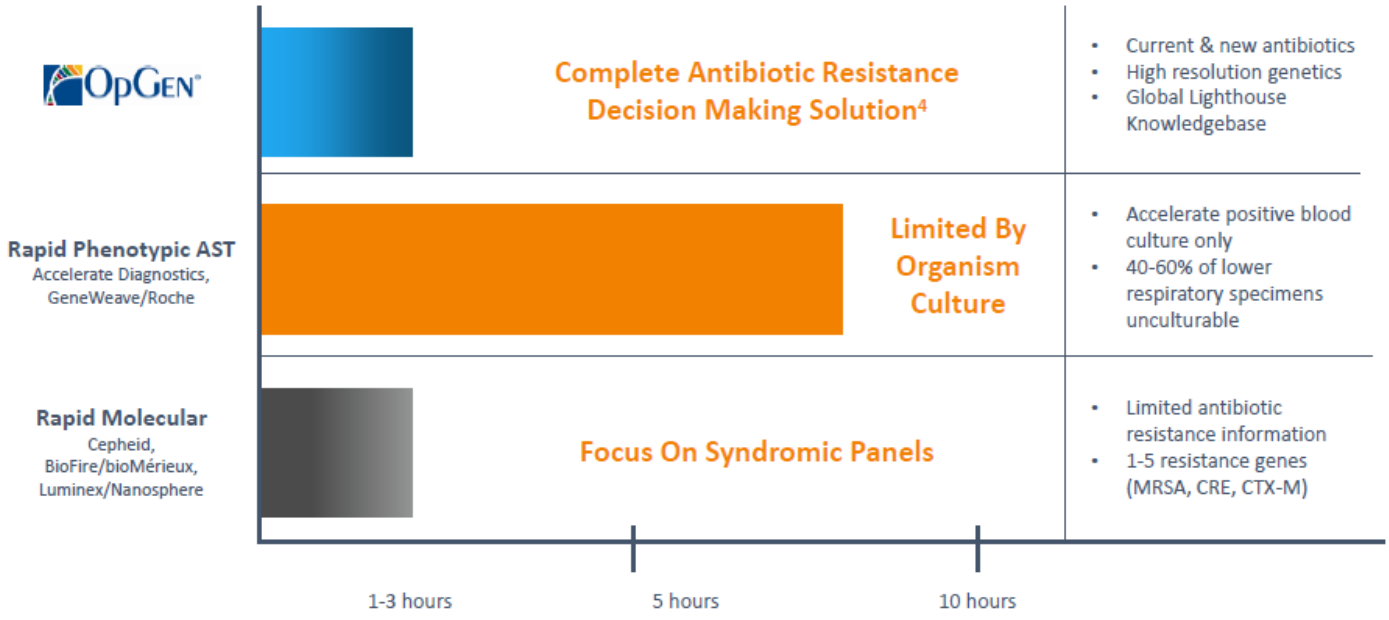
OpGen's laboratory operations are headquartered at its CLIA-certified laboratory in Gaithersburg, Maryland, where all Acuitas testing is performed. Samples are transported to the laboratory by FedEx or by courier, and once received, samples are assessed for acceptability, accessioned into the LIMS, prepared for processing and analyzed with traditional microbiology culture methods or using molecular testing instrumentation. Laboratory test data is housed in a proprietary LIMS database that is CLIA laboratory compliant. Customers access CLIA laboratory test results through individual PDF test reports and through the Acuitas Lighthouse informatics. OpGen's laboratory also performs testing for research and development purposes and for both the creation and ongoing maintenance of the Acuitas Lighthouse data warehouse. OpGen's believes that the Company has sufficient laboratory capacity to perform Acuitas testing for at least the next 24 months.

Competition

OpGen is currently the only company developing a molecular information business focused on leading a transformation in microbiology and infectious disease through precision medicine products and services that combine genomic data and bioinformatics. The Company's approach combines proprietary DNA tests developed in its CLIA laboratory, FDA-cleared and CE-marked rapid diagnostics, and the Acuitas Lighthouse bioinformatics and data warehouse offerings. Competitors include rapid diagnostic testing and traditional microbiology companies, commercial laboratories, information technology companies, and hospital laboratories who may internally develop testing capabilities. Principal competitive factors in this target market include:

- Organizational size, scale, and breadth of product offerings;
- Rapidity of test results;
- Quality and strength of clinical and analytical validation data and confidence in diagnostic results;
- Cost effectiveness;
- Ease of use; and
- Regulatory approval status.

Principal competition comes from traditional methods used by healthcare providers to diagnose and screen for MDROs and from other molecular diagnostic companies creating screening and diagnostic products such as Cepheid (now Danaher), Becton Dickinson, bioMérieux, Accelerate Diagnostics, T2 Biosystems. GenMark and Nanosphere (now Luminex). OpGen is relying on its focus on identifying antibiotic-resistant genes, rather than primarily organisms, the genes and associated diseases included in gene tests, and its Acuitas Lighthouse bioinformatics offerings distinguish us from such competitors. The chart below depicts the current competitive landscape for the Company's advanced diagnostic products:



Source: OpGen

The Company also faces competition from commercial laboratories, such as Bio-Reference Laboratories (now Opko Health), Laboratory Corporation of America Holdings, Quest Diagnostics Incorporated and EuroFins, which have strong infrastructure to support the commercialization of diagnostic services.

Competitors may develop their own versions of product offerings in countries where the Company does not have patents or where its intellectual property rights are not recognized. Many of OpGen's potential competitors have widespread brand recognition and substantially greater financial, technical, research and development and selling and marketing capabilities than does the Company.

Recent Results and Balance Sheet/Cash Flow

OpGen reported financial results for their Q1/17 in April, including revenues of $771,800, as compared to revenues of $1.1 million in the prior year period, and a net loss of $5.0 million or ($0.19) per share, as compared to a net loss of $4.5 million or ($0.36) per share in Q1/16. Revenues declined during the quarter due to a decrease in the sale of Argus products as the Company transitioned from legacy mapping products to the new Acuitas MDRO products, a reduction in the sale of rapid pathogen ID testing products, a decrease in laboratory service revenues due to a decrease in product sales; offset by an increase in collaboration revenues related to Hitachi contracts and the Merck GHI agreement. Operating expenses increased slightly during the quarter due to increases in R&D expenses, general and administrative costs and costs of products sold due to increased payroll and facility costs; offset by a decrease in costs of services as fewer lab testing services were needed, and a decrease in sales and marketing expenses because a number of marketing studies conducted last year were not needed in Q1/17.

Other key events and developments which occurred in the first quarter included:

- Moving the Acuitas Rapid Test into full development with a goal of implementing the technology for external research use in the second half of the year;
- Continuing to build and expand the Acuitas Lighthouse Knowledgebase by completing genotype/phenotype testing for 4,000 clinical isolates from the Merck SMART Surveillance Network and other collaborator clinical sites;
- Presenting rapid Acuitas genetic test data at Advances in Genome Biology and Technology (AGBT) Meeting;
- Presentation of posters highlighting the ability of Acuitas technology to rapidly predict antibiotic resistance and detect outbreaks with drug resistance gene profiles at ECCMID 2017; and
- Raising $2.1 million of net proceeds through the sale of common stock under the at-the-market offering.

Net cash used for operations in Q1/2017 was approximately $4.5 million, up from $3.8 million in the prior year period, due to lower revenues and higher expenses. To help offset the cash burn, OpGen raised approximately $2.1 million from the sale of shares under its existing "at the market" sales agreement with Cowen. At the end of the period, OpGen held $1.7 million in cash and equivalents on its balance sheet, as compared with $4.1 million at the start of the quarter; in addition, the Company has approximately $4.6 million in capacity remaining of the $11.5 million of initial sales limits under the Cowen agreement.

The Company's balance sheets for the periods Q4/16 ending December 2016 and Q1/17 ending March 2017 are shown below:

Balance Sheets
($000s)

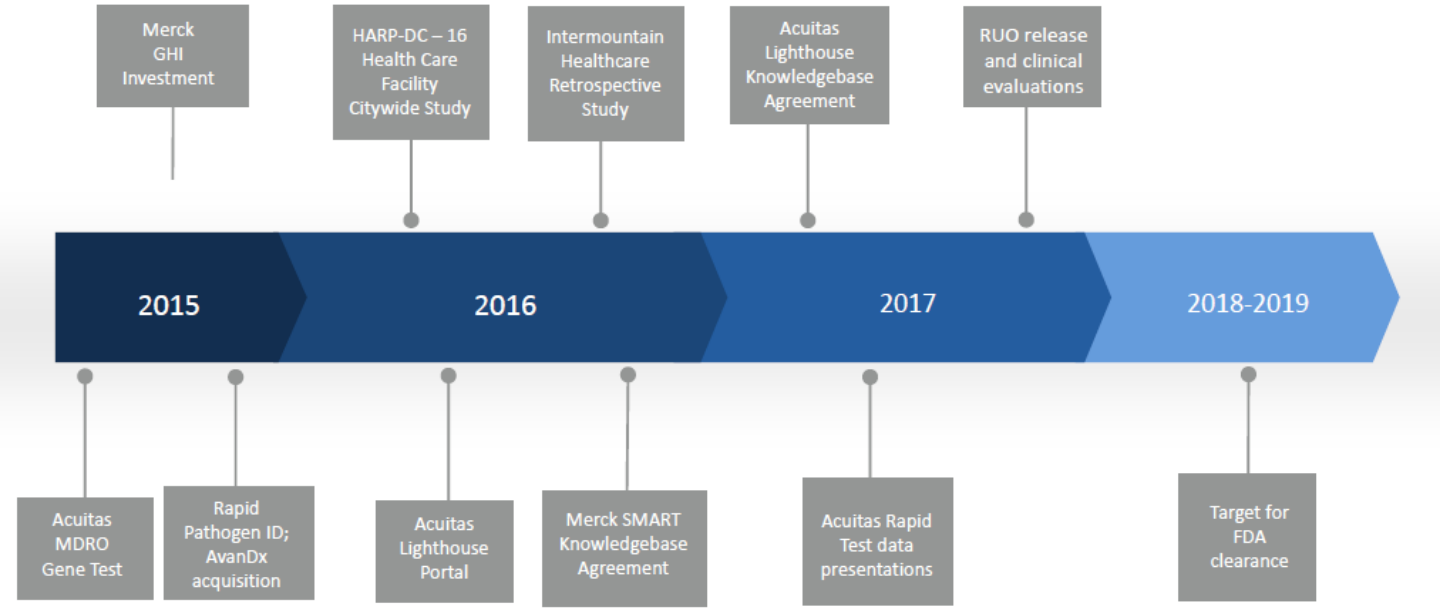
Assets:	12/31/16	3/31/17
Cash and equivalents	$4,117	$1,670
Accounts receivable, net	542	379
Inventory, net	692	643
Prepaid expenses & other	330	268
Total current	5,682	2,960
Property, plant & equip., net	801	744
Goodwill and intangible assets, net	2,222	2,155
Other noncurrent assets	280	298
TOTAL ASSETS	$8,984	$6,157
Liabilities:		
Accounts payable	$2,233	$2,017
Accrued expenses	1,794	1,903
Deferred revenue	37	31
Short-term notes payable	1,024	999
Other	184	170
Total current	5,272	5,121
Deferred rent and other long-term	545	482
Total liabilities	5,817	5,603
Stockholders' equity	3,167	554
TOTAL LIAB & EQ	$8,984	$6,157

Outlook/Growth Drivers

Going forward this fiscal year, OpGen management has stated that they are focusing on advancing development of the Acuitas Rapid Test for complicated UTI infections (cUTI) and infection control alongside the Acuitas Lighthouse Knowledgebase with a goal of implementing the technology for external research use in the second half of the year. OpGen further expects to advance the following business objectives in 2017:

- Genomic and antibiotic resistance testing of 10,000 multidrug resistant organisms to support initial development of the first Acuitas Rapid Test kits and deployment of the Acuitas Lighthouse Knowledgebase;
- Completion of initial Acuitas Rapid Test development and Acuitas Lighthouse genotype/phenotype predictive algorithms and clinical performance verification;
- Announcement of in vitro diagnostic instrument supply and cooperation agreement to support global commercialization of the Acuitas Rapid Test;
- Establishment of distribution and partnering relationships to support commercialization of the Acuitas Rapid Test and the Acuitas Lighthouse Knowledgebase in international markets;
- Establishment of Acuitas Rapid Test early access and performance verification programs to support regulatory approval clinical trials and publications; and
- Presentation of Acuitas Rapid Test and performance data at medical meetings and in peer reviewed journals.

The chart below outlines some of the Company's recent history and upcoming milestones:



Source: OpGen

We estimate that revenues will grow for OpGen in the future, and that the Company will see decreasing net losses and operating cash burn as new products are launched, both in the diagnostic test and Lighthouse knowledgebase information services markets, and corresponding collaborations and laboratory services are needed. The chart below depicts OpGen's recent events and projected near-term milestones:

Q4 16	IHC Health Outcomes Study
Q1 17	Initial Acuitas Rapid Test data
Q1 17	Health system information services
Q2 17	IVD global supply & cooperation agreement
2H 17	Release of RUO and clinical evaluations
2H 17	Third-party development funding
2017	Multiple data presentations throughout the year

Source: OpGen

Management

Evan Jones is the Chairman and CEO of OpGen and also is the Managing Member of jVen Capital, LLC, a life sciences investment company. Prior to forming jVen Capital, he was co-founder, Chairman and CEO of Digene Corporation, a publicly-traded biotechnology company focused on women's health and molecular diagnostic testing. He is also a Board Member of Fluidigm, Foundation Medicine, and Veracyte. He received a BA degree from the University of Colorado and an MBA from The Wharton School, University of Pennsylvania.

Timothy Dec serves as CFO of OpGen. He has served in chief financial officer or other senior financial executive roles at companies in a number of industries, including Corvis Corporation, Clubwidewidesports, LLC, and Fortress International Group. He is an adjunct professor at Mount St. Mary's University in Emmitsburg, Maryland, and holds a BS in accounting from Mount Saint Mary's University, and an MBA from American University in Washington, DC.

Robert Lilley joined OpGen in October 2014 as Chief Commercial Officer. He is also currently non-executive Chairman of the Board of Directors of Immunexpress, a Seattle-based molecular diagnostic company, and prior to joining the company held positions at Digene, Qiagen, TDS Healthcare Information Systems and Alltel. He holds a BA from Yale University.

Other key members of the OpGen management team include **Vadim Sapiro,** Chief Information Officer, and formerly with SAIC and the J. Craig Venter Institute; **Geoffrey A. McKinley,** who joined the Company in 2015 as Senior VP, Research & Development and Business Development and was previously at bioMérieux**; Charles Thornton,** Vice President Quality Assurance and Legal Affairs, and formerly with the US FDA; and **Terry Walker**, Senior VP, R&D, and previously with Pfizer, GlaxoSmithKline, Becton Dickinson and Duke University.

In addition to Evan Jones, OpGen's Board of Directors also includes **Harry J. D'Andrea,** managing general partner of Valhalla Partners**; Dr. Timothy J.R. Harris,** currently a venture partner with SV life sciences**; Dr. Tina Nova,** currently President and CEO of Molecular Stethoscope, Inc.**; Dr. David Rubin, a** Managing Director in Merck's Global Health Innovation fund; and **Dr. Misti Ushio,** currently CEO of TARA Biosystems. OpGen's Clinical Advisory Board includes **Dr. Debra A. Goff** of Ohio State; **Dr. Attila Lorincz** of the Wolfson Institute of Preventive Medicine; **Dr. Stefan Riedel** of Beth Israel Deaconess Medical Center and Harvard; **Dr. James Snyder** of the University of Louisville; and **Dr. Morten Sommer** of the Novo Nordisk Foundation Center for Biosustainability at the Technical University of Denmark.

Stock Valuation/Comparables

We have compiled a seven-stock comparison group for OpGen, comprised of diagnostic companies, including Danaher, (DHR/Not Rated), which recently purchased competitor Cepheid. Our comparison group includes Accelerate Diagnostics (AXDX, Not Rated), Luminex (LMNX, Not Rated), Danaher, CareDx (CDNA, Not Rated), ChemBio Diagnostics (CEMI, Not Rated), GenMark Diagnostics (GNMK, Not Rated), and Veracyte (VCYT, Not Rated). Since OPGN is not forecast to be profitable for 2017E and forecasts for this fiscal year have not yet reflected increased product and laboratory service revenues expected from new products, we are employing our forecasts for next fiscal year, 2018E, specifically revenue forecasts, in order to place a long-term target valuation on OPGN shares. Many of the comparable companies in our group, in particular smaller firms, are also expected to show significant revenue growth next year due to new products or technologies. On average, our comparable stock group shows valuation multiples of 5.4X estimated revenues for fiscal 2018E. OPGN's valuation metrics related to price/revenues estimates for 2018E show a considerable discount to our

comparable group, and thus, employing the price/revenue multiple estimated for next calendar year (2018E) of 5.4X multiplied by our estimated revenues for OPGN of $10 million for 2018E, we have derived a valuation and long-term price target of $2.00 for OPGN shares, thus, we are initiating shares of OPGN with a Buy rating and 12-18 month price target of $2.00 per share.

Risk Factors

In addition to normal economic and market risk factors that impact most equities and the common risks shared by OpGen with other companies in the industry, we believe an investment in OPGN involves the following risks:

- **Reliance on key management** – At present, OPGN relies on several key members of its management team who either founded the Company or have been in key executive positions for an extended period of time. Should one or more of these key executives leave the Company, OPGN could find it difficult to replace their long-standing knowledge of operations and industry expertise.
- **Reliance on partnerships –** To date, OPGN has signed a number of marketing and development partnerships and joint ventures for its diagnostic tests and information services. Thus, in the future certain factors related to product marketing and/or new product development may be determined by third parties and out of the control of Company management.
- **Limited stock liquidity** – Trading volume in OPGN stock is comparatively light and these shares have a relatively limited history of trading compared with other healthcare stocks. As such, news regarding OPGN, its target market, partners and/or competitors could lead to significant volatility in the stock price.
- **Competitive Markets** – The Company and its partners compete in its target diagnostic markets with a number of companies, many of which are considerably larger than the Company. There can be no assurance that the Company and its partners will be able to successfully compete and launch new products into these competitive markets in the future.
- **FDA and regulatory risks** – OPGN and its partners are subject to regulatory review for ongoing diagnostic tests and information products, principally the US Food and Drug Administration's approval and laboratory review processes. In addition, the quality assurance and manufacture of the Company's diagnostic products are subject to ongoing oversight and regulation, and any negative correspondence from the FDA or other regulatory agencies could have an adverse effect on the ongoing operations of the Company.
- **Lack of historic profitability** - OPGN has not achieved operating profitability since its founding, and according to our forecasts may not be expected to do so in the near future. Although the Company maintains adequate cash reserves at the present time, there can be no assurance the Company will not need to raise additional working capital in the future should operating losses continue.
- **Need to defend patents and other intellectual property** – OPGN currently holds approximately over 170 US and International patents on its products and information services, some of which expire in the near future. The Company may be required to defend its patents in the US and overseas in the future, and there can be no assurance these defenses will be successful.

Companies mentioned in this report:

Merck (MRK, Not Rated)
Hitachi (HTHIY, Not Rated)
Danaher (DHR, Not Rated)
Becton Dickinson (BDX/Not Rated)
bioMérieux (BIM, Not Rated)
Accelerate Diagnostics (AXDX, Not Rated)
T2 Biosystems (TTOO, Not Rated)
GenMark (GNMK, Not Rated)
Luminex (LMNX, Not Rated)
Laboratory Corporation (LH, Not Rated)
Quest Diagnostics (DGX, Not Rated)
Opko Health (Bio-Reference Labs, OPK, Not Rated)
CareDx (CRDX, Not Rated)
ChemBio Diagnostics (CEMI, Not Rated)
Veracyte (VCYT, Not Rated)

Robert M. Wasserman

OpGen, Inc.
Consolidated Statements of Income
(In 000s, except per share data)

FYE November	2014	2015	1Q16 March	2Q16 June	3Q16 September	4Q16 December	2016	1Q17 March	2Q17E June	3Q17E September	4Q17E December	2017E	2018E
Revenue													
Product sales	$1,236	$2,701	$947	$1,028	$730	$818	$3,524	$735	$800	$900	$1,000	$3,435	$8,000
Laboratory services	479	121	129	30	23	47	229	16	20	30	40	106	1,000
Collaboration revenue	2,411	336	0	125	6	141	273	21	40	50	60	171	1,000
Total revenue	$4,126	$3,158	$1,077	$1,183	$760	$1,007	$4,026	$772	$860	$950	$1,060	$3,712	$10,000
Expenses													
Cost of products sold	426	1,180	439	431	400	389	1,659	425	360	410	450	1,645	3,200
Cost of services	526	368	316	161	52	103	631	100	50	50	50	250	300
Research and development	4,368	6,003	1,860	2,240	2,179	2,334	8,613	2,123	2,100	2,050	2,000	8,273	8,000
General and administrative	2,313	5,835	1,538	1,777	1,640	1,648	6,603	1,969	1,800	1,820	1,840	7,429	7,000
Sales and marketing	2,058	4,305	1,399	1,589	1,295	1,247	5,529	1,106	1,000	1,020	1,040	4,166	4,000
Total operating expenses	9,691	17,691	5,553	6,197	5,565	5,720	23,035	5,723	5,310	4,890	4,880	21,763	22,500
Income (loss) from operations	(5,565)	(14,533)	(4,476)	(5,015)	(4,806)	(4,713)	(19,009)	(4,951)	(4,450)	(3,940)	(3,820)	(18,051)	(12,500)
Other income (expense)	(734)	(3,065)	(37)	(369)	(41)	(41)	(489)	(31)	(40)	(40)	(40)	(151)	(150)
Income (loss) before tax	(6,299)	(17,598)	(4,513)	(5,384)	(4,847)	(4,754)	(19,499)	(4,982)	(4,490)	(3,980)	(3,860)	(18,202)	(12,650)
Income tax benefit (expense)													
Net income (loss)	(6,299)	(17,598)	(4,513)	(5,384)	(4,847)	(4,754)	(19,499)	(4,982)	(4,490)	(3,980)	(3,860)	(18,202)	(12,650)
Basic income per share	($16.25)	($2.20)	($0.36)	($0.37)	($0.23)	($0.21)	($1.10)	($0.19)	($0.16)	($0.14)	($0.14)	($0.67)	($0.45)
Diluted income per share	($16.25)	($2.20)	($0.36)	($0.37)	($0.23)	($0.21)	($1.10)	($0.19)	($0.16)	($0.14)	($0.14)	($0.67)	($0.45)
Basic shares outstanding	388	7,981	12,569	14,522	20,939	22,550	17,668	26,079	27,400	27,600	27,800	27,220	28,000
Diluted shares outstanding	388	7,981	12,569	14,522	20,939	22,550	17,668	26,079	27,400	27,600	27,800	27,220	28,000
Key ratios:													
Revenue growth		-23.5%	128.0%	215.3%	-22.5%	-24.3%	27.5%	-28.3%	-27.3%	25.1%	5.3%	-7.8%	169.4%
Product gross margin	65.6%	56.3%	53.6%	58.1%	45.2%	52.5%	52.9%	42.1%	55.0%	55.0%	55.0%	52.1%	60.0%
Service gross margin	-9.9%	-205.0%	-143.9%	-443.3%	-124.9%	-119.4%	-175.8%	-522.4%	-150.0%	215.8%	188.7%	-135.8%	80.0%
R&D/revenue	105.9%	190.1%	172.8%	189.4%	286.8%	231.9%	214.0%	275.0%	244.2%	215.8%	188.7%	222.9%	80.0%
G &A/revenue	56.1%	184.8%	142.9%	150.2%	215.9%	163.7%	164.0%	255.2%	209.3%	191.6%	173.6%	200.2%	70.0%
Sales/revenue	49.9%	136.3%	130.0%	134.3%	170.4%	123.9%	137.3%	143.3%	116.3%	107.4%	98.1%	112.2%	40.0%
Tax Rate	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Deprec, amort & non-cash comp.	2,277	4,200	250	600	450	425	1,725	400	400	450	500	1,750	2,500
Cash Flow/share	($10.38)	($1.68)	($0.34)	($0.33)	($0.21)	($0.19)	($1.01)	($0.18)	($0.15)	($0.13)	($0.12)	($0.60)	($0.36)
EBITDA/share	($10.48)	($1.68)	($0.34)	($0.33)	($0.21)	($0.19)	($1.01)	($0.18)	($0.15)	($0.13)	($0.12)	($0.61)	($0.36)

Balance Sheets
($000s)

Assets:	12/31/16	3/31/17
Cash and equivalents	$4,117	$1,670
Accounts receivable, net	542	379
Inventory, net	692	643
Prepaid expenses & other	330	268
Total current	5,682	2,960
Property, plant & equip., net	801	744
Goodwill and intangible assets, net	2,222	2,155
Other noncurrent assets	280	298
TOTAL ASSETS	$8,984	$6,157
Liabilities:		
Accounts payable	$2,233	$2,017
Accrued expenses	1,794	1,903
Deferred revenue	37	31
Short-term notes payable	1,024	999
Other	184	170
Total current	5,272	5,121
Deferred rent and other long-term	545	482
Total liabilities	5,817	5,603
Stockholders' equity	3,167	554
TOTAL LIAB & EQ	$8,984	$6,157

Quarterly Earnings Comparisons

	February	May	August	November	Total
Revenues (in $Mill)					
2014					4,126
2015	472	375	981	1,330	3,158
2016	1,077	1,183	760	1,007	4,026
2017E	772	860	950	1,060	3,712
Earnings per Share (diluted)					
2014					(16.25)
2015	(5.61)	(0.84)	(0.38)	(0.38)	(2.20)
2016	(0.36)	($0.37)	(0.23)	(0.21)	(1.10)
2017E	(0.19)	($0.16)	(0.14)	(0.14)	(0.67)

Source: Dawson James Securities, Inc. estimates; Company documents

Important Disclosures:

Price Chart:

Price target and ratings changes over the past 3 years:
Initiated – Buy - June 19, 2017 – Price Target $2.00

Dawson James Securities, Inc. (the "Firm") is a member of the Financial Industry Regulatory Authority ("FINRA") and the Securities Investor Protection Corporation ("SIPC").

The Firm does not make a market in the securities of the subject company (s). The Firm has NOT engaged in investment banking relationships with OPGN in the prior twelve months, as a manager or co-manager of a public offering and has NOT received compensation resulting from those relationships. The Firm may seek compensation for investment banking services in the future from the subject company(s). The Firm has NOT received any other compensation from the subject company(s) in the last 12 months for services unrelated to managing or co-managing of a public offering.

Neither the research analyst(s) whose name appears on this report nor any member of his (their) household is an officer, director or advisory board member of these companies. The Firm and/or its directors and employees may own securities of the company(s) in this report and may increase or decrease holdings in the future. As of May 31, 2017, the Firm as a whole did not beneficially own 1% or more of any class of common equity securities of the subject company (s) of this report. The Firm, its officers, directors, analysts or employees may effect transactions in and have long or short positions in the securities (or options or warrants related to those securities) of the company(s) subject to this report. The Firm may effect transactions as principal or agent in those securities.

Analysts receive no direct compensation in connection with the Firm's investment banking business. All Firm employees, including the analyst(s) responsible for preparing this report, may be eligible to receive non-product or service specific monetary bonus compensation that is based upon various factors, including total revenues of the Firm and its affiliates as well as a portion of the proceeds from a broad pool of investment vehicles consisting of components of the compensation generated by investment banking activities, including but not limited to shares of stock and/or warrants, which may or may not include the securities referenced in this report.

Although the statements in this report have been obtained from and are based upon recognized statistical services, issuer reports or communications, or other sources that the Firm believes to be reliable, we cannot guarantee their accuracy. All opinions and estimates included in this report constitute the analyst's judgment as of the date of this report and are subject to change without notice.

Information about valuation methods and risks can be found in the "STOCK VALUATION" and "RISK FACTORS" sections of this report.

The securities of the company discussed in this report may be unsuitable for investors depending on their specific investment objectives and financial position. This report is offered for informational purposes only, and does not constitute an offer or solicitation to buy or sell any securities discussed herein in any jurisdiction where such would be prohibited. Additional information is available upon request.

Ratings Definitions:

1) **Buy**: the analyst believes the price of the stock will appreciate and produce a total return of at least 20% over the next 12-18 months;
2) **Neutral**: the analyst believes the price of the stock is fairly valued for the next 12-18 months;
3) **Sell**: the analyst believes the price of the stock will decline by at least 20% over the next 12-18 months and should be sold.

The following chart reflects the range of current research report ratings for all companies followed by the analysts of the Firm. The chart also reflects the research report ratings relating to those companies for which the Firm has performed investment banking services.

	Company Coverage		Investment Banking	
Ratings Distribution	# of Companies	% of Total	# of Companies	% of Totals
Market Outperform (Buy)	5	56%	2	40%
Market Perform (Neutral)	0	0%	0	0%
Market Underperform (Sell)	0	0%	0	0%
Ratings Suspension*	4	44%	4	100%
Total	9	100%	7	78%
*Suspensions are ratings under review for possible change due to unusual market-moving news, and/or analyst departure/change				

Analyst Certification:

The analyst(s) whose name appears on this research report certifies that 1) all of the views expressed in this report accurately reflect his (their) personal views about any and all of the subject securities or issuers discussed; and 2) no part of the research analyst's compensation was, is, or will be directly or indirectly related to the specific recommendations or views expressed by the research analyst in this research report; and 3) all Dawson James employees, including the analyst(s) responsible for preparing this research report, may be eligible to receive non-product or service specific monetary bonus compensation that is based upon various factors, including total revenues of Dawson James and its affiliates as well as a portion of the proceeds from a broad pool of investment vehicles consisting of components of the compensation generated by investment banking activities, including but not limited to shares of stock and/or warrants, which may or may not include the securities referenced in this report.