Off Wall Street

Consulting Group, Inc.

P.O. Box 382107
Cambridge, MA 02238

tel: 617.868.7880
fax: 617.868.4933
internet: research@offwallstreet.com
www.offwallstreet.com

New Rec: Cepheid **(CPHD: $61.13)** **July 1, 2015**

Position: Sell **Target: $39**

$MM	2Q15e	3Q15e	4Q15e	1Q15e	2015e	2016e
Revs	128.2	124.9	140.6	137.6	526.4	555.2
Y/Y Gr	10%	8%	7%	4%	12%	5%
Cash EPS $	-0.04	-0.05	-0.01	0.07	0.07	0.26
Y/Y Gr	n/m	n/m	n/m	-59%	-66%	271%
PSR	n/a	n/a	n/a	n/a	8.5	8.0
Consens Rev	130.8	136.6	151.6	155.8	551.7	646.8
Consens EPS	-0.05	0.02	0.08	0.15	0.26	0.61

Shares Out: 73M **Market Cap: $4.5B** **FYE: December**

Concept:

1. Hospital laboratories are adopting low complexity molecular diagnostic panels that test for 20+ pathogens at a time, which promise cost savings from shorter hospital stays and more

appropriate antibiotic use. These panels are replacing CPHD's molecular diagnostics, which test for only 1-2 pathogens at a time.
2. The low complexity, 1-2 pathogen molecular diagnostic market pioneered by CPHD is becoming more crowded. Competitors are winning accounts with lower prices or faster turnaround times. Competitive gains are reflected in recent installation trends.
3. CPHD commercial clinical revenue (76% of 2014 revenue) is driven by growth in its installed base, which has increased +20% y-y for five years. During the same period, reagent revenue per installed system has been flat. Slowing installed base growth should mean lower than expected revenue unless CPHD increases reagent revenue per system.

Summary: Cepheid is a molecular diagnostics company selling equipment and disposables for detection of infectious diseases. Its GeneXpert equipment and proprietary assay (test) cartridges automate the complex steps required to amplify the DNA in blood or other samples and identify the presence/absence of targets. Its assays are run one at a time, with most taking about an hour, and require only a moderately skilled operator. As the first company to market with a molecular diagnostics platform that automates all steps from sample preparation to result, CPHD has rapidly grown its installed base to 5,600 commercial clinical systems since 2006.

In 2014, about 65% of revenue was commercial clinical reagents, primarily test cartridges. Most of these are priced at $20-$35 per cartridge. Another 11% of revenue is for commercial clinical systems (GeneXpert equipment), with an average price of about $70K. HBDC (high-burden developing countries) revenue was 18% of total sales in 2014. Non-clinical and other sales were 6% of 2014 revenue. About 58% of 2014 revenue came from North America, 23% came from international, and 18% came from HBDC sales.

While the company does not disclose commercial clinical reagent sales by pathogen target, "street" analysts estimate that 50% of 2014 total revenue (77% of commercial clinical reagent revenue) came from assays for hospital acquired infections (HAIs), primarily methicillin-resistant staph (MRSA) and *C. difficile*. According to the company, HAI revenue grew in the mid-teens y-y for the past few quarters, and represented the largest dollar contributor to growth. Reducing the incidence of HAIs has been a major focus of government-led efforts to lower hospitalization costs and improve quality outcomes. Hospitals have increased efforts to rapidly identify patients with disease in order to isolate them and limit spread to other patients. CPHD benefited both from an increase in overall testing volume, and from a switch away from slower culture-based methods (for MRSA) and less sensitive/less specific rapid enzyme immunoassays (for *C. difficile*) toward assays based on amplification of DNA.

Another important contributor to revenue growth in the past two quarters was the company's Flu and Flu/RSV (respiratory syncytial virus) assays. The

company disclosed that it had "record flu revenue in the double-digit millions of dollars" in 1Q15. We estimate combined 4Q14/1Q15 Flu and Flu/RSV sales were about $22M, or about 12% of commercial clinical reagent sales, up from about $8M (6% of commercial clinical reagent sales) a year ago. Sales growth was driven by a more severe flu season, and also by a shift away from less sensitive/less specific rapid enzyme immunoassays. As we discuss below, hospitals are seeking better and more rapid identification of patients infected with flu viruses and RSV as part of an effort to better utilize antivirals and to reduce unnecessary antibiotic use, since viruses do not respond to antibiotics.

CPHD has dominated the hospital laboratory market for low-complexity molecular tests for infectious diseases. However, its current technology limits it to testing 1-2 pathogens at a time. Over the past few quarters, new platforms from Biomerieux (BioFire FilmArray) and Nanosphere (Verigene) have seen rapid installation and revenue growth. These platforms run low complexity, multiplex panels that identify 17 or more bacterial, viral, and parasitic pathogens from one sample in an hour. Our research, which included telephone interviews with more than a dozen hospital laboratory managers and a survey of 30 hospital pathologists/lab managers making equipment purchases in 2015, suggests that these panels are rapidly becoming the primary method of testing hospital inpatients for respiratory, blood, and GI infections. We think rapid adoption of these panels threatens growth of CPHD's Flu, Flu/RSV, *C. difficile*, and MRSA/SA-blood culture assays.

The shift to multiplex panels is part of a broad effort, supported by the federal government, the WHO, and major medical societies, to reduce HAIs and combat the emergence of antibiotic resistant pathogens. Rapid, precise diagnosis of the source of a patient's respiratory/blood/gastrointestinal infection allows for prompt treatment with the correct medication, and isolation of the patient to prevent spread of the pathogen. Healthcare leaders hope that, by using the correct antibiotic (or no antibiotic, in the case of viral disease), use of broad-spectrum antibiotics will decline. This should slow the development of antibiotic-resistant bacteria. It should also reduce the incidence of *C. difficile* infection that often occurs in patients who receive these antibiotics, which would mean lower *C. difficile* test revenue for CPHD.

In addition to a shift toward multiplex molecular diagnostics, CPHD faces increasing competition in the 1-2 pathogen molecular diagnostics market. In particular, our research suggests competitive gains for systems from Becton Dickinson (BD Max) in *C. difficile* and MRSA testing, and Alere (Alere i) for flu testing (FDA approved June 2014). Another recently approved assay that may impact the 2015 flu testing market is Roche's Liat, which was launched in December 2014. Roche also has Liat assays in development for *C. difficile* and

MRSA. The Alere i and Liat are particularly interesting as competitors to CPHD because they can provide results in 20-30 minutes, faster than the one hour required by CPHD's assay. Other 1-2 pathogen, low complexity systems currently competing with CPHD include Focus' Simplexa, Meridian's illumigene, and Great Basin's Portrait Toxigene. Numerous other platforms are in development.

The rapid adoption of competing platforms may be a reason that CPHD's system installations fell short of "street" expectations in 1Q15 (163 systems vs. 190 expected, down 10% y-y). Growth in CPHD's installed base slowed from 22% y-y in 1Q14 to 20% y-y in 1Q15. This might concern bulls, since CPHD's commercial clinical growth has been driven entirely by growth in its installed base. Reagent revenue per system has remained flat at $77K-$78K per year since 2011, despite an expanding test menu and increased modules/installed system, and utilization per system has been stagnant at only about 10% of capacity. As BioFire and other molecular panel platforms capture more of hospitals' testing revenue and capital equipment budgets, we think CPHD's clinical commercial installed base growth could slow to 19% y-y in 2015 and 14% in 2016, while reagent revenue per system could increase 2% y-y in 2015 and then decline -4% y-y in 2016 due to increasing price competition. We estimate commercial clinical reagent revenue growth could be 21% y-y in 2015 and 10% y-y in 2016, versus bullish "street" expectations of 25% in 2015 and 24% in 2016.

Bulls hope that CPHD can diversify its revenue base and expand utilization per system with tests for sexually transmitted diseases (STD). CPHD launched a test for chlamydia/gonorrhea (CT/NG) in Europe in 2Q12 and in the US in 1Q13, and launched a Trichomonas test in Europe in 4Q14. Share gains thus far have been limited (about 7% market share). As we discuss below, we think further gains will be difficult due to increased price competition from established high throughput competitors such as Roche, Hologic, Abbott, and Becton Dickinson. In addition, low throughput competition is heating up with competing products on the BDMax (approved), and products in development on the Alere i and other platforms.

CPHD's HBDC sales do not generate a profit, but bulls hope that by placing discounted equipment in developing countries, CPHD will be able to sell other diagnostics, such as HIV and Hepatitis C assays, for use on these systems. Recent results have been disappointing, however, and the company guided 2015 HDBC expectations down, to only 6%-9% y-y growth, on its 1Q15 call. Our estimates for HBDC revenue are about in line with the "street." The business does not contribute meaningful operating profit, so it is not an important part of our thesis.

CPHD is spending heavily to expand beyond its current 1-2 target test limitations. It is developing a 10-color/melt curve analysis cartridge (versus its

current 6-color cartridge) that it says will be able to detect 30 targets at a time. This technology was declared "operational" in mid-2014. However, the first (and so far only) assay using this technology, a GI panel, is not expected until 2016/2017, and no information on the number of actual targets has been revealed. CPHD management seems more excited about a new, larger test cartridge called the Honeycomb that it says will be capable of looking for as many as 1,000 gene targets per assay. This technology would allow it to develop assays for oncology, genetic testing, and biodefense applications. We think it a gamble for a company that has made its name in low throughput, low complexity, easy-to-interpret molecular diagnostics to jump into the 1,000 target clinical oncology realm now dominated by ILMN's Mi-Seq. Even if it does succeed in getting such a complex test through the FDA approval process, test interpretation could be a huge barrier to adoption. Small hospitals, which have been CPHD's key market, often do not have the pathology staff available to interpret results, and rely on reference labs or labs at academic hospitals to both run and interpret oncology tests.

The "street" expects $552M in revenue in 2015, and $647M in 2016, and cash EPS (excluding amortization of intangibles and stock compensation expense) of $0.26 in 2015 and $0.60 in 2016. We model $526M in revenue for 2015 and $555M in 2016, and cash EPS of $0.07 in 2015 and $0.26 in 2016. CPHD currently trades at 6.7x EV/2016 sales multiple, near the high end of its EV/forward sales trading range of 4.5x-7.2x from 2012-2015. This multiple is well above peers like HOLX (5.1x), QGEN (4.6x), ALR (3.1x), and Biomerieux (2x). We apply a 5x multiple to our 2016 sales to arrive at our price target of $39.

Borrow information: CPHD

Supply Quantity	Quantity On Loan	Available to Borrow	Date
21.1M	4.2M	17.1M	6.30.15

Source: Markit/Data Explorers

Background:

Cepheid was founded in 1996 and completed an initial public offering in 2000. The company sells equipment and disposables for detection of infectious diseases. Its GeneXpert equipment and proprietary assay (test) cartridges automate the complex steps required to amplify the DNA in blood or other samples and identify the presence/absence of targets. Its assays are run one at a time, with most taking about an hour, and require only a moderately skilled operator. This compares to competing "batch" platforms (e.g., Roche's cobas 4800) that run 24 or more tests at a time and require a more highly skilled operator.

GeneXpert equipment has one to 80 test modules per system, with each module running one test at a time. Equipment prices run from $24,000 for a one module system to $443,000 for an 80 module system. Most US placements have 7-11 modules, while ex-US systems have 4-5 modules, and revenue per equipment installation is about $70K.

CPHD does not disclose its cartridge revenue by disease target, but says that its highest revenue commercial clinical tests are MRSA, *C. difficile*, and CT/NG. "Street" analysts estimate that HAI targets, primarily methicillin-resistant *staph aureus* (MRSA) and *C. difficile*, are about 77% of commercial clinical reagent revenue. Note that MRSA-Surveillance revenue is for tests run on asymptomatic patients upon hospital admission, or periodically during their inpatient stay if they are at high risk of infection (e.g., ICU patients). Other CPHD MRSA tests for blood culture or soft tissue (included in other HAI) are used to diagnose symptomatic patients.

Table 1: Estimated 2014 CPHD Commercial Clinical Revenue by Target

Target	Market Size	CPHD Share	Est 2014 CPHD Revenue	% 2014 Commercial Clinical Reagent Revenue	Price Per Test
MRSA-Surveillance	$175M	77%	$135M	45%	mid $30s
C. difficile	$120M	58%	$70M	23%	High $20s
Other HAI	n/a	n/a	$28M	9%	$40-$75
CT/NG	$450M	6%	$24M	8%	Low $20s
Flu/RSV	$175M	13%	$15M	5%	mid $30s
Other	n/a	n/a	$29M	10%	$30-$60
Total	n/a	n/a	$303M	100%	

Sources: "Street" and OWS research

CPHD sells its products primarily to hospital microbiology laboratories. According to the company, its US installed base of 1,768 systems is in 1,314 hospital sites, suggesting an average of 1.35 systems per site. It is in 75% of US hospitals with over 800 beds, 60% of hospitals with 400-800 beds, and 20% of hospitals with less than 400 beds. As shown below, this suggests that 76% of US equipment is in hospitals with less than 400 beds. These smaller hospitals would tend to be low volume sites for CPHD's tests, which is a likely explanation for equipment capacity utilization rates of only about 10%.

Table 2: GeneXpert Penetration of US Hospitals

	US Hospitals	Penetration	# Hospitals with Xpert Systems	% US Hospital sites
<400 beds	5,000	20%	1,000	76%
400-799 beds	430	60%	248	20%
800+ beds	75	75%	56	4%
Total	5,505	n/a	1,314	100%

Source: CPHD Investor Presentation

The company also sells cartridges and equipment to test for tuberculosis in high-burden developing countries (HBDC) such as China, India, and African countries. These products are sold at a steep discount, and although sales are subsidized by grants from the Gates Foundation and others, they are breakeven at best in terms of profitability.

As we discuss below, significant changes in hospitals' approach to managing HAIs are underway, and new competition is entering the market, which should reduce demand for CPHD's 1-2 pathogen tests. As shown in the table below, we think that should slow growth of CPHD's installed base, and mean less revenue per system. The biggest driver of the difference between our and the "street's" estimates is reagent revenue per system. After no growth in reagent revenue per system since 2009, the "street" expects growth of 5% y-y in 2015 and 7% y-y in 2016. We expect just 2% y-y growth in 2015 (driven primarily by 1Q15's strong flu sales) and a decline of -4% y-y in 2016. We also expect slower growth in the installed base, as hospitals shift spending to other systems.

Table 3: "Street" vs. OWS Estimates, 2015-2016

	2014a	"Street" 2015e	OWS 2015e	"Street" 2016e	OWS 2016e
Avg Commercial Installed Systems	3,924	4,675	4,657	5,434	5,326
Reagent Revenue Per System	$77,403	$81,497	$78,914	$87,044	$75,709
Commercial Reagent Revenue	$304M	$381M	$368M	$473M	$403M
Commercial Equipment Revenue	52	55	49	62	43
Total Commercial Revenue	356	436	417	535	446
HBDC Revenue	85	92	86	93	89
Non-clinical/Other Revenue	29	22	24	19	20
Total Revenue	$470M	$551M	$526M	$647M	$555M

	2014a	"Street" 2015e	OWS 2015e	"Street" 2016e	OWS 2016e
Avg Commercial Installed Base	22%	19%	19%	16%	14%
Reagent Revenue Per System	0%	5%	2%	7%	-4%
Commercial Reagent Revenue	21%	25%	21%	24%	10%
Commercial Equipment Revenue	20%	5%	-6%	13%	-13%
Total Commercial Revenue	21%	22%	17%	23%	7%
HBDC Revenue	30%	8%	0%	1%	4%
Non-clinical/Other Revenue	-30%	-23%	-16%	-15%	-18%
Total Revenue	17%	17%	12%	17%	5%

Discussion:

1. Hospitals are rapidly adopting low complexity multiplex molecular diagnostics for infectious disease.

We spoke with over a dozen pathologists and lab managers about their use of molecular diagnostics for infectious disease. About half of the labs with whom we spoke had BioFire FilmArray, Nanosphere Verigene, or Luminex xTAG equipment already installed, and were ramping up use. The consistent message from those surveyed is that these panels help reduce unnecessary antibiotic use, and help shorten hospital stays. Just testing for flu, RSV, or *C. difficile* leaves the clinician guessing about the cause of disease if the test is negative. Moreover, if it is positive, there is a chance that the patient has more than one pathogen, meaning treatment may not be on target.

We followed up the interviews with a survey of 30 pathologists and lab managers involved in capital spending decisions at their hospitals, and who have purchased or plan to purchase a molecular diagnostic system in 2015. Of the 62 units of equipment those surveyed have/will purchase in 2015, only eight were CPHD GeneXperts. Respondents have/will purchase 12 BioFire systems, two Verigene systems, and three Luminex systems, for a total of 17 panel systems.

Given the small sample and the different throughputs of each system, we are not drawing quantitative conclusions from this data. However, we think it is significant that the momentum in infectious disease testing appears to have shifted meaningfully and rapidly to panel assays.

Recent results from Biomerieux support our survey findings. FilmArray installations reached 1,600 in 1Q15, up from 700 in 4Q13. BioFire revenue, which is nearly all from the US, increased 93% y-y in 1Q15 to $41M (compared to $75M US commercial clinical revenue for CPHD). Nanosphere's Verigene remains a much smaller player, but had 625 installations in 1Q15, up from 468 in 1Q14. 1Q15 revenue was only $4.6M. Rapid adoption of these platforms may be help explain why CPHD's GeneXpert installations missed "street" expectations in 1Q15 and were down -10% y-y.

We note that BioFire's gastrointestinal panel was approved by the FDA in May 2014, and is only beginning to ramp. In addition, the company is expecting approval soon of meningitis/encephalitis (ME) panel that will compete directly with CPHD's enterovirus assay. While meningitis/encephalitis is a rare condition, it can be fatal if not diagnosed quickly and correctly. Some large hospitals have a GeneXpert on hand just to run this test. If this test shifts to the BioFire, CPHD may lose these placements, and with it the opportunity to try to sell other tests on the platform.

Use of panels from FilmArray or Verigene will also impact use of other, smaller revenue CPHD assays like norovirus (on the gastrointestinal panel), and vancomycin-resistant enterococcus, MRSA/SA for blood culture, and carbapenem-resistant Enterobacteriaceae, all on the blood culture panels.

Adoption of panel assays, particularly BioFire's, appears to be happening in both large and small hospitals. In our survey, nine of the 17 panel systems were being placed in hospitals with less than 400 beds, with eight in hospitals over 400 beds. In May 2015, BioFire signed up distributor LABSCO to handle sales to small hospitals. CPHD ended its relationship with this same distributor in October 2014.

BioFire also appears to be seeing strong placements in Veterans Administration hospitals. A VA solicitation order archived March 14, 2015 lists new BioFire installations at VA hospitals in six New England states that will use all three approved panels. We spoke with a lab manager at a 25 bed VA hospital in North Dakota that is getting a BioFire system in October 2015. This adoption by the VA is reminiscent of the manner in which CPHD entered the clinical diagnostics market. Its MRSA assay was first rapidly adopted by the VA hospital system, with other hospitals following suit. BioFire's relationship with the US

government is also enhanced by its May 2014 win of a $240M, eight year biodefense contract from the Department of Defense.

2. CPHD faces increasing competition in the low complexity, 1-2 pathogen diagnostics market

C. difficile

Our discussions with and our survey of pathologists and lab managers suggests test pricing is under pressure in the single pathogen *C. difficile* market. For example, one hospital lab manager with whom we spoke has moved her *C. difficile* testing to the BDMax because the test is priced at $18 versus $25-$30 for CPHD's. Another hospital switched from Meridian's (VIVO) illumigene to Great Basin's (GB) Portrait assay because its test was priced at $20 (including equipment), versus $25-$27 for illumigene (including equipment).

Our survey also identified a 150 bed hospital that plans to purchase a Roche cobas 4800, which it will use to test for *C. difficile*, as well as MRSA and CT/NG. Note that the cobas 4800 received FDA approval for its MRSA assay in January 2015 and for its *C. difficile* assay in May 2015. Separately, industry contacts have told us that Roche is targeting a price of $20-$25 for its *C. difficile* and MRSA tests. However, prices are negotiable depending on volumes. One high volume account with whom we spoke was offered MRSA on the cobas 4800 for $12.

Competition will likely further intensify when *C. difficile* assays under development on Roche's Liat and Alere's Alere i are launched. These assays are low complexity, and run in 20-30 minutes versus 45 minutes for CPHD.

We note that overall *C. difficile* testing volumes may be impacted by new US government reporting requirements that create an incentive to do less testing. Hospitals do not want to find patients colonized with *C. difficile* who do not have active disease, because this will lower their quality scores and impact Medicare payments. Lab managers and pathologists with whom we spoke are actively educating physicians about selecting the right patients to test. For example, physicians are instructed to not send samples of patients taking laxatives (which could have caused the diarrhea), and labs are accepting only diarrheal (unformed) stool samples, since these are the most likely to show clinical *C. difficile* infection.

Flu and Flu/RSV

Our research suggests respiratory panels will be the primary method for testing inpatients and high-risk emergency room patients with respiratory symptoms. However, there is also an opportunity for molecular flu and flu/RSV

tests to replace low sensitivity/specificity rapid immunoassay flu tests in doctors' offices, emergency rooms, and urgent care facilities. Clinicians are being encouraged to use molecular flu tests before prescribing an antiviral like Tamiflu. The hope is that reducing overuse of antivirals will combat the development of resistant flu strains.

These outpatient tests are only useful, however, if they are easy to run and fast. CPHD's test is still deemed moderately complex, and so cannot be run in most doctors' offices or in the emergency department. But, more importantly, it takes 55 minutes to run. This means an infected patient would be sitting in the doctor's office or ED for over an hour, spreading the flu to others.

We think the Alere i and the Roche Liat, both of which have FDA approved flu A/B assays, are much more likely to gain adoption in the doctors' office and ED. The Alere i flu assay runs in 15 minutes, and is CLIA-waived, which means no special certification or training is needed to run the test. According to Alere, 1,000 Alere i units were installed by 1Q15. The Liat flu assay (approved in December 2014) runs in 20 minutes, and is expected to be CLIA-waived before this year's flu season. CPHD has also applied for a CLIA waiver for its flu test, but we think the time-to –result versus the Alere i and the Liat is a huge barrier to its adoption.

<u>CT/NG</u>

Some "street" analysts have expressed disappointment about sales to date for CPHD's CT/NG assay. With about $24M in sales in 2014, the assay has about 6% share of the molecular CT/NG market. However, unlike CPHD's MRSA and *C. difficile* tests, which rapidly took 77% and 58% of the molecular testing markets, respectively, molecular CT/NG was already a very crowded market when CPHD entered. Testing is dominated by high throughput, more complex equipment marketed by Roche, Hologic, Abbott, and Becton Dickinson. Most CT/NG testing is routine, and turnaround time is not critical. Therefore, most of these tests are run by reference or larger hospital labs, which consolidate samples and run them in batches.

Our research suggests some smaller hospitals are adopting CPHD's CT/NG test because the prices charged by reference labs are higher than CPHD's price, meaning the hospital can make more money doing it in house. However, our research suggests companies like Roche are reducing the cost of their tests so that their high volume reference lab/hospital lab customers can in turn reduce their prices to smaller hospitals, making it less attractive to run CPHD's test in house. CPHD is already seeing price competition, and prices the test in the low $20s, below the price of its MRSA and *C. difficile* tests, which run at $28-$34.

As with *C. difficile*, a number of low throughput/low complexity CT/NG systems are on the market or coming soon. For example, Becton Dickinson's BDMax received European approval (CE Mark) for its CT/NG and CT/NG/Trichomonas assay in March 2015, and Alere i has a CT/NG assay in development.

MRSA

MRSA assays must be able to detect the presence of the mecA gene, which allows bacteria to be resistant to penicillin-like antibiotics. This method was discovered and patented by Keiichi Hiramatsu, who licensed his patent to Biomerieux. Biomerieux, in turn, has sublicensed the patent on a non-exclusive basis to several companies, including Cepheid, Becton Dickinson, and Roche. The Hiramatsu patent has limited competition for CPHD's MRSA assay, and allowed the company to price it above tests for *C. difficile* and CT/NG. However, the patent expires in early 2017. This could open the MRSA market up to competition from many other platforms.

A new MRSA strain with a mecC gene that confers resistance to penicillin-like antibiotics has emerged in Europe over the past few years. This strain is not detected by assays looking only for mecA. At present, CPHD's assay does not detect mecC, while the assay on Becton's BDMax does. One of the pathologists with whom we spoke cited the BDMax' ability to detect both mecA and mecC as a reason for his switch from CPHD to the BDMax. We assume CPHD is addressing this shortcoming with its next generation MRSA surveillance assay, expected to be approved in 2015.

3. Installed base growth has been the main driver of CPHD's revenue growth, with little change in reagent use per system

CPHD has seen 20%+ growth in its installed base of GeneXpert commercial systems since it was launched for clinical use in 2006. But despite a growing menu of assays and system installations with a larger number of modules, CPHD's reagent revenue per installed system has remained flat at $77,000-$78,000 since 2009. As shown in the table below, growth in reagent revenue per system was stronger in 4Q14 and 1Q15, at 5% y-y and 12% y-y, respectively. However, if we back out incremental sales from last year's severe flu season (about $4M in 4Q14 and $10M in 1Q15), reagent revenue per system was flat y-y at $19,813 in 4Q14 and $19,572 in 1Q15.

Table 4: CPHD Installed Base Growth, Reagent Revenue Per System 2012-1Q15

	2012	2013	2014	1Q14	2Q14	3Q14	4Q14	1Q15
NA installed base	1,259	1,495	1,724	1,546	1,592	1,638	1,724	1,768
Int'l installed base	1,659	2,042	2,586	2,172	2,284	2,411	2,586	2,705
Total installed base	2,918	3,537	4,310	3,718	3,876	4,049	4,310	4,473
Avg installed base	2,672	3,228	3,924	1,546	1,592	1,638	1,724	1,768
Reagent rev/avg system	$78,447	$77,695	$77,403	$19,559	$18,401	$19,240	$20,728	$21,872

	2012	2013	2014	1Q14	2Q14	3Q14	4Q14	1Q15
NA installed base	n/a	19%	15%	17%	16%	15%	15%	14%
Int'l installed base	n/a	23%	27%	26%	25%	26%	27%	25%
Total installed base	20%	21%	22%	22%	21%	22%	22%	20%
Avg installed base	25%	21%	22%	22%	22%	21%	22%	21%
Reagent rev/avg system	0%	-1%	0%	-3%	-5%	1%	5%	12%

Source: CPHD press releases

Bulls recognize that growth of the installed base is likely to slow going forward, and model growth of 19% y-y in 2015 and 16% y-y in 2016. However, bulls hope that CPHD will increase utilization per system by 5% y-y in 2015 and 7% y-y in 2016, which would keep commercial reagent revenue growth growing at 24%-25% y-y and support the lofty valuation of CPHD's shares.

We think growth in the installed base will slow to 19% y-y in 2015 and 14% y-y in 2016 as hospitals choose to invest in competing platforms for their molecular diagnostic needs. We think reagent revenue per system will grow by just 2% y-y in 2015 and decline -4% y-y in 2016 as assays shift off of the CPHD platform (particularly *C. difficile* and flu), and as CPHD has to cut prices to prevent more customers from shifting off its platform. Revenue per system could become materially worse after 2016, when CPHD will lose the patent protection it has enjoyed for its MRSA assay, which represented about 45% of clinical reagent revenue in 2014. While this threat is not part of our short term thesis, it does dampen the M&A risk to selling CPHD shares, since any potential acquirer would be acutely aware of this risk.

Bulls base their hope for growth in revenue per system on the current low utilization of the installed base. They argue that hospitals will add more tests to leverage their investment in GeneXpert platforms. As shown below, current utilization is only 8%-12% of theoretical maximum utilization, assuming the average test takes 1.5 hours to run, labs run the equipment 24 or 16 hours per day, 350 days per year, and average revenue per test is $30.

Table 5: Capacity Utilization as % of Theoretical Maximum

	24 hour operation	16 hour operation
Modules/system	6	6
Time/test (hours)	1.5	1.5
Lab working hours	24	16
Max tests/module/day	16	11
Max tests/system/day	96	64
Avg rev/test	$30	$30
Rev/Day	$2,880	$1,920
Working days/year	350	350
Theoretical Rev/System	$1,008,000	$672,000
Actual rev/system	$78,000	$ 78,000
Capacity Utilization	8%	12%

Our discussions with hospital pathologists/lab managers suggest utilization of CPHD's system is low because of the niche it occupies in the lab. These contacts tell us that the GeneXpert fits where there is a need for a) rapid results at fairly constant daily demand (e.g., MRSA surveillance, *C. difficile*) and b) rapid results at highly variable demand (e.g., EV, respiratory, MRSA blood culture, norovirus, antibiotic resistant microorganisms). Many modules sit idle most days waiting for these infrequent tests. As we have discussed above, CPHD's *C. difficile* test faces competition from gastrointestinal panels and numerous 1-2 pathogen platforms. The infrequent tests are shifting to respiratory/blood culture/gastrointestinal panels. Finally, MRSA faces new competition now from Roche's newly approved assay on the cobas 4800, the BDMax with its mecC detection capability, and from new assays that will likely come to market when the Hiramatsu mecA patent expires in early 2017.

Our contacts tell us that the GeneXpert is not the right system for tests that do not need an immediate result (e.g., sexually transmitted diseases, HIV, HCV, HBV). These tests cost $7-$10 or even less to run at a reference lab or large hospital with an automated platform like the cobas 4800. We think most small hospital customers will either continue to send these tests out to reference labs/large hospitals, especially since pricing for these tests is falling due to competition in the crowded STD market.

4. HBDC growth disappointing

In 2010, CPHD began selling heavily discounted GeneXpert systems and an assay (MTB/RIF) that detects *Mycobacterium tuberculosis* and the gene that confers resistance to the antibiotic rifampicin, a marker of multi-drug resistance. These products are sold to High Burden Developing Countries (HBDC) identified

by the WHO, and subsidized by grants from the Gates Foundation and others. Bulls hope that sales of GeneXpert platforms to these countries will lead to sales of other types of assays (e.g., HIV, HCV), and that the high volume manufacturing of the MTB/RIF assays would absorb CPHD's excess manufacturing overhead.

CPHD's assay, while easy to run and highly sensitive/specific, is very expensive, requires regular equipment maintenance, and a reliable electric supply. Other companies and foundations are trying to develop lower cost platforms for developing countries so that sales are not reliant on subsidies that could dry up in the future. In June 2015, the Broad Institute (Harvard/MIT) announced a $20M project funded by Seth Klarman, Bill Ackman and others to develop new drugs and to "accelerate the development of a rapid diagnostic test for drug-resistant TB."

While system placements have been strong, assay revenue per system has declined from $29,200 per system in 2013 to $18,536 per system in 2014. On its 1Q15 call, management guided down expectations for this segment to $90M-$93M (versus prior guidance of $95M-$98M), representing y-y growth of 6%-9%. Our estimates for HBDC revenue are in line with the "street," and the business does not contribute meaningful operating profit, so it is not an important part of our thesis.

5. CPHD faces difficult competition in the oncology market

Longer term, bulls hope CPHD can expand away from molecular diagnostics for infectious disease to the rapidly developing market for oncology diagnostics. The company is currently investing significant R&D dollars in the development of a new type of cartridge, called Honeycomb, which can detect 1,000 targets at a time. The first test using the Honeycomb, a breast cancer diagnostic, is expected to launch outside the US in 2016/2017. Management says development of the Honeycomb is part of what keeps R&D spending high, at about 21% of sales in 2014 and an expected 20% of sales in 2015, delaying GAAP profitability.

Oncology diagnostics is a nascent industry, with many technology, regulatory and reimbursement risks. The FDA has, thus far, only approved two oncology diagnostics instruments: ILMN's MiSeq DX and TMO's PGM Dx. Both of these systems are based on next-generation sequencing (NGS). Other NGS-based platforms are in development, including one from GnuBio, which was acquired by Bio-Rad (BIO) in 2014. Honeycomb's technology is PCR-based, rather than NGS. Getting the first PCR system through the FDA process will likely be more difficult and expensive than will be experienced by follow-on systems.

The potential reimbursement for multi-target oncology panels such as the Honeycomb technology is also uncertain. Payors expect proof from clinical trials

that the panel finds mutations that have an actual impact on physician prescribing behavior. These clinical trials will be expensive. Moreover, panels may rapidly become obsolete, as new drugs and treatment protocols lead to new desired test targets. This may be why ILMN is developing its panels, dubbed OncoPanels, with pharmaceutical partners. It already has OncoPanel partnerships in place with Janssen, Sanofi, and AstraZeneca.

It seems quite risky for a company that has made its name in low throughput, low complexity, easy-to-interpret molecular diagnostics to jump into the 1,000 target clinical oncology realm now dominated by specialty laboratories. Even if it does succeed in getting such complex tests through the European and FDA approval processes, test interpretation represents a huge barrier to adoption. Small hospitals, which have been CPHD's key market for infectious disease, often do not have the pathology staff available to interpret oncology results, particularly ones detecting so many targets simultaneously. Oncologists outside of academic hospitals or cancer-focused for-profit hospitals typically send their samples to reference labs (e.g., Foundation Medicine, GE's Clariant, Novartis' Genoptix, esoteric labs like ARUP) or labs at academic hospitals to both run tests and interpret the results.

6. Increasing expenses delay profitability

CPHD is unusual for a diagnostics company in that, despite its growing installed base and recurring revenue stream from reagent cartridges, it generates negative FCF. By 4Q13, its cash and short-term investments had dwindled to just $75M. In February 2014, as it planned to increase R&D and SG&A in line with sales growth, it issued 1.25% senior convertible notes due in 2021 that netted $271M. The notes have an initial conversion price of $65.10, and would convert to 5.3M shares.

The company says its lack of profitability is by design, since it is driven by R&D expense at 21% of sales. The company says it is expanding R&D spending to gain rapid approval for new assays using its 1-2 pathogen technology to maximize the GeneXpert menu, and investing in its new Honeycomb technology to allow multiplexing up to 1,000 targets. It is also expanding its sales force from about 100 representatives world-wide in 2Q14 to 135 in 1Q15, and projects it will have 151 reps by 2Q15. It seems to see itself in the midst of a land grab for placements of 1-2 target molecular diagnostic platforms that it can later convert to its Honeycomb technology. The company may be too late, as the market shifts to panels well before its investment in Honeycomb technology is ready.

The company is promising investors non-GAAP operating profitability (which, by its definition, excludes stock comp expense that is currently about 20%

of sales/marketing/G&A expense) in the mid-20s by 2017. We think this level of profitability is unlikely, as CPHD's slowing top line growth should limit its ability to achieve significant operating leverage.

7. Recent Results and Guidance

CPHD reported 1Q15 revenue of $132.6M, above consensus of $125M, with most of the beat driven by very strong Flu and Flu/RSV assay sales. Non-GAAP EPS (excluding amortization of intangibles and stock comp expense) of $0.17 was above consensus of $0.02. Operating expenses of $66.4M were $5M lower than expected due primarily to slower than expected hiring of new sales reps. The company raised the lower end of its previous 2015 revenue guidance by $4M to $542M-$553M. It kept the top end the same to reflect foreign exchange impacts. The company is guiding to non-GAAP 2015 EPS of $0.25-$0.29 versus previous guidance of $0.19-$0.23.

For 2Q15, the company is guiding to revenue of $128M-$131M, with commercial clinical revenue of $98M-$100M, HBDC revenue of $24M-$25M, and non-clinical/other revenue of $6M. It expects non-GAAP EPS of ($0.23) to ($0.22), with gross margins down sequentially and operating expense up about $7M sequentially on higher R&D and sales/marketing expenses.

CPHD's CFO of nearly seven years unexpectedly announced his resignation in January 2015 to take a position at PTC, a $4.7B market cap company in the software and services industry. He was replaced in April 2015 by the former CFO of semiconductor manufacturer International Rectifier, which was acquired by Infineon in January 2015.

8. Financial Assumptions

Reagent revenue: The "street" assumes CPHD's commercial installed base grows 19% y-y in 2015 and 16% y-y in 2016, versus our 19% y-y and 14% y-y growth estimates. Our lower estimate is based on our expectation that hospitals will shift capital spending to BioFire and other molecular panel platforms, and to competing 1-2 pathogen systems that offer lower per test prices.

The "street" assumes reagent revenue per system increases 5% y-y in 2015 and 7% y-y in 2016 versus our 2% y-y growth in 2015 and -4% y-y decline in 2016. Our lower estimate is based on our expectation that hospitals will move respiratory, gastrointestinal, and blood culture testing to molecular panel platforms, and that CPHD will have to lower prices in the increasingly competitive 1-2 pathogen markets, particularly *C. difficile*, flu, and CT/NG.

The "street's" installed base and reagent revenue per system growth expectations combine to an estimated 25% y-y growth in commercial clinical reagent revenue in 2015 and 24% y-y growth in 2016. We expect commercial clinical reagent revenue growth of 21% y-y in 2015 and 10% y-y in 2016.

Equipment revenue: The "street" expects commercial equipment revenue growth of 5% in 2015 and 13% in 2016, versus our -6% and -13%.

HDBC revenue: The "street" assumes HBDC revenue of $92M in 2015 and $93M in 2016, versus our $86M and $89M. Our lower estimates are driven primarily by our expectation of lower reagent revenue per system.

Other: The "street" expects non-clinical/other revenue of $22M in 2015 and $19M in 2016 versus our $24M and $20M.

Our segment revenue assumptions versus the "street" are laid out in Table 3 above. The table below details the difference between our estimates and those of a representative "street" model for total revenue, adjusted operating margins, and adjusted EPS. Note that in its non-GAAP financials, the company excludes both amortization of purchased intangible assets ($1.8M in 2014) and stock compensation expense ($32M in 2014). Our non-GAAP EPS estimates exclude stock comp in both 2015 and 2016, in keeping with Bloomberg consensus estimates.

"Street" analysts seem more focused on operating margin than on non-GAAP earnings. Like most "street" analysts, we exclude amortization of purchased intangibles expense, but include stock compensation expense in our operating margin estimates.

Table 6: "Street" vs. OWS Revenue, Op Margin, EPS Estimates, 2015-2016

	"Street" 2015e	OWS 2015e	"Street" 2016e	OWS 2016
Total Revenue	$551.7M	$526.4M	$646.8M	$555.2M
Adj Operating Margin	(2.1%)	(2.9%)	6%	(1%)
Adj EPS	$0.26	$0.07	$0.61	$0.26

9. Valuation

CPHD currently trades at 6.6x EV/2016 sales multiple, near the high end of its EV/forward sales trading range of 4.5x-7.2x from 2012-2015. This multiple is well above peers like HOLX (5.1x), QGEN (4.6x), ALR (3.1x), and Biomerieux (2.0x). We apply a 5x multiple to our 2016 sales to arrive at our price target of

$39. This multiple is in line with 5.2x multiple paid by Biomerieux to acquire BioFire in 2014 for $450M.

10. Risks

Risks to achieving our target price include continued higher than expected growth in CPHD's installed base, and increasing reagent revenue per system. Other risks include a severe flu outbreak, or the spread in the developed world of unusual infectious diseases (e.g., Ebola, MERS) that could be detected with CPHD's technology.

Another risk is that enthusiasm for the potential of the Honeycomb technology in oncology keeps bulls invested in CPHD shares despite any underperformance of CPHD's core infectious disease franchise.

We think the M&A risk for CPHD is mitigated by its very high EV/Sales multiple, the rapid development of competing technologies, and the expiration of the MRSA patent in early 2017.

11. Financial Projections

a. Quarterly Projections

Income Statement ($M)	1Q15	2Q15e	3Q15e	4Q15e	1Q16e	2Q16e	3Q16e	4Q16e
Comm Clin Systems	13	10	10	15	10	9	9	14
Comm Clin Reagents	96	85	88	98	102	93	99	110
Total Comm Clinical	109	96	99	113	111	102	109	124
HBDC Clin Systems	3	11	6	6	4	4	4	4
HBDC Clin Reagents	13	14	16	17	18	18	19	20
Total HBDC Clinical	16	26	21	22	21	22	23	23
Total Clinical	125	121	120	136	133	124	131	147
Non-clinical and other	7	7	5	5	5	5	5	5
Total Revenue	133	128	125	141	138	129	136	152
COGS (ex amort intang)	60	63	59	66	63	59	63	70
Collab profit sharing	1	1	1	1	1	1	1	1
R&D (ex amort intang)	24	28	28	30	28	28	28	29
Sales/mktg (ex amort)	26	29	29	32	30	31	31	32
G&A	16	16	16	16	16	16	16	16
Total Op Expense	66	74	74	79	75	76	76	78
Op Income	6	(8)	(8)	(5)	(1)	(7)	(3)	4
Interest income	0	0	0	0	0	0	0	0
Interest expense	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
Amort debt discount	3	3	3	3	3	3	3	3
Forex gain (loss)	(1)	(1)	(2)	(2)	0	0	0	0
Other expenses, net	(2)	(2)	(3)	(3)	(1)	(1)	(1)	(1)
Pretax Income	4	(10)	(11)	(8)	(2)	(7)	(4)	3
Taxes	(1)	1	1	1	1	1	1	(1)
Net Income	5	(11)	(11)	(8)	(2)	(8)	(4)	3
Cash Net Income	12	(3)	(4)	(0)	5	(0)	4	11
Non GAAP EPS	0.17	-0.04	-0.05	-0.01	0.07	-0.00	0.05	0.14
S/O	73	74	74	75	75	76	76	77

Y-Y chng	1Q15	2Q15e	3Q15e	4Q15e	1Q16e	2Q16e	3Q16e	4Q16e
Comm Clin Systems	16%	-8%	-10%	-15%	-25%	-9%	-9%	-8%
Comm Clin Reagents	35%	22%	16%	13%	6%	9%	13%	12%
Total Comm Clinical	33%	18%	12%	8%	2%	7%	10%	9%
HBDC Clin Systems	-45%	-33%	5%	47%	12%	-67%	-33%	-33%
HBDC Clin Reagents	6%	7%	13%	23%	35%	29%	21%	17%
Total HBDC Clinical	-11%	-15%	10%	29%	30%	-14%	6%	4%
Total Clinical	25%	9%	12%	11%	6%	2%	10%	8%
Non-clinical and other	13%	36%	-38%	-46%	-32%	-29%	0%	0%
Total Revenue	24%	10%	8%	7%	4%	1%	9%	8%
COGS (ex amort intang)	14%	6%	4%	13%	5%	-5%	7%	6%
Collab profit sharing	-2%	100%	1%	-32%	2%	0%	0%	0%
R&D (ex amort intang)	11%	15%	19%	9%	17%	2%	0%	-3%
Sales/mktg (ex amort)	11%	26%	23%	21%	18%	7%	7%	0%
G&A	14%	12%	22%	14%	3%	0%	0%	0%
Total Op Expense	11%	19%	21%	13%	13%	3%	3%	-1%
Op Income	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
Interest income	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
Interest expense	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
Amort debt discount	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
Forex gain (loss)	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
Other expenses, net	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
Pretax Income	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
Taxes	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
Net Income	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
Cash Net Income	n/m	n/m	n/m	n/m	n/m	n/m	n/m	n/m
Non GAAP EPS	n/m	n/m	n/m	n/m	-59%	n/m	n/m	n/m
S/O	6%	5%	5%	6%	3%	3%	3%	3%

% Total Sales	1Q15	2Q15e	3Q15e	4Q15e	1Q16e	2Q16e	3Q16e	4Q16e
Comm Clin Systems	10%	8%	8%	11%	7%	7%	7%	9%
Comm Clin Reagents	72%	67%	71%	70%	74%	72%	73%	72%
Total Comm Clinical	82%	75%	79%	81%	81%	79%	80%	81%
HBDC Clin Systems	3%	9%	5%	4%	3%	3%	3%	2%
HBDC Clin Reagents	10%	11%	13%	12%	13%	14%	14%	13%
Total HBDC Clinical	12%	20%	17%	16%	15%	17%	17%	15%
Total Clinical	94%	95%	96%	96%	96%	96%	96%	97%
Non-clinical and other	6%	5%	4%	4%	4%	4%	4%	3%
Total Revenue	100%	100%	100%	100%	100%	100%	100%	100%
COGS (ex amort intang)	45%	49%	47%	47%	46%	46%	46%	46%
Collab profit sharing	1%	1%	1%	1%	1%	1%	1%	1%
R&D (ex amort intang)	18%	21%	22%	21%	20%	22%	21%	19%
Sales/mktg (ex amort)	19%	23%	23%	23%	22%	24%	23%	21%
G&A	12%	12%	13%	11%	12%	12%	12%	11%
Total Op Expense	50%	58%	59%	56%	55%	59%	56%	52%
Op Income	5%	-7%	-6%	-3%	-1%	-5%	-2%	2%
Interest income	0%	0%	0%	0%	0%	0%	0%	0%
Interest expense	-3%	-3%	-3%	-3%	-3%	-3%	-3%	-2%
Amort debt discount	2%	2%	2%	2%	2%	2%	2%	2%
Forex gain (loss)	-1%	-1%	-2%	-1%	0%	0%	0%	0%
Other expenses, net	-1%	-1%	-2%	-2%	-1%	-1%	-1%	-1%
Pretax Income	3%	-8%	-9%	-5%	-1%	-6%	-3%	2%
Taxes	0%	0%	0%	0%	0%	0%	0%	0%
Net Income	4%	-8%	-9%	-6%	-2%	-6%	-3%	2%
Cash Net Income	9%	-2%	-3%	0%	4%	0%	3%	7%

b. Annual Projections

Income Statement ($M)	2014a	2015e	2016e
Commercial Clinical Systems	52.3	49.1	42.7
Commercial Clinical Reagents	303.7	367.5	403.2
Total Commercial Clinical	356.0	416.5	445.9
HBDC Clinical Systems	32.4	26.2	15.2
HBDC Clinical Reagents	52.7	59.3	74.1
Total HBDC Clinical	85.2	85.5	89.3
Total Clinical	441.1	502.1	535.2
Non-clinical and other	29.0	24.3	20.0
Total Revenue	470.1	526.4	555.2
COGS ex amort intang	227.5	247.8	255.4
Collaboration profit sharing	5.2	5.2	5.2
R&D ex amort/restruct	96.8	109.5	113.0
Sales/mktg ex amort/restruct	96.1	115.5	124.0
G&A	55.1	63.6	64.0
Total Op Expense	253.2	293.8	306.2
Op Income	(10.5)	(15.2)	(6.4)
Interest income	1.1	1.3	0.8
Interest expense	(12.6)	(14.4)	(14.4)
Amort of debt disc/trans costs	8.6	10.0	10.0
Forex gain (loss)	(2.0)	(6.0)	0.0
Other expenses, net	(4.9)	(9.1)	(3.6)
Pretax Income	(15.4)	(24.3)	(10.0)
Taxes	2.6	1.0	1.0
Net Income	(18.0)	(25.3)	(11.0)
Cash Net Income	14.2	5.1	19.4
Non GAAP EPS (ex amort/convert/ESO)	0.20	0.07	0.26
S/O	70.1	73.9	75.9

Y-Y change	2014a	2015e	2016e
Commercial Clinical Systems	20%	-6%	-13%
Commercial Clinical Reagents	21%	21%	10%
Total Commercial Clinical	21%	17%	7%
HBDC Clinical Systems	38%	-19%	-42%
HBDC Clinical Reagents	25%	13%	25%
Total HBDC Clinical	30%	0%	4%
Total Clinical	23%	14%	7%
Non-clinical and other	-30%	-16%	-18%
Total Revenue	17%	12%	5%
COGS ex amort intang	12%	9%	3%
Collaboration profit sharing	-32%	0%	1%
R&D ex amort/restruct	23%	13%	3%
Sales/mktg ex amort/restruct	23%	20%	7%
G&A	32%	15%	1%
Total Op Expense	23%	16%	4%
Op Income	38%	45%	-58%
Interest income	n/m	12%	-37%
Interest expense	n/m	n/m	n/m
Amort of debt disc/trans costs	n/m	17%	0%
Forex gain (loss)	n/m	n/m	n/m
Other expenses, net	n/m	n/m	n/m
Pretax Income	n/m	n/m	n/m
Taxes	86%	-62%	0%
Net Income	n/m	n/m	n/m
Cash Net Income	-20%	-64%	281%
Non GAAP EPS (ex amort/convert/ESO)	-23%	-66%	271%
S/O	3%	6%	3%

% of Total Sales	2014a	2015e	2016e
Commercial Clinical Systems	11%	9%	8%
Commercial Clinical Reagents	65%	70%	73%
Total Commercial Clinical	76%	79%	80%
HBDC Clinical Systems	7%	5%	3%
HBDC Clinical Reagents	11%	11%	13%
Total HBDC Clinical	18%	16%	16%
Total Clinical	94%	95%	96%
Non-clinical and other	6%	5%	4%
Total Revenue	100%	100%	100%
COGS ex amort intang	48%	47%	46%
Collaboration profit sharing	1%	1%	1%
R&D ex amort/restruct	21%	21%	20%
Sales/mktg ex amort/restruct	20%	22%	22%
G&A	12%	12%	12%
Total Op Expense	54%	56%	55%
Op Income	-2%	-3%	-1%
Interest income	0%	0%	0%
Interest expense	-3%	-3%	-3%
Amort of debt disc/trans costs	2%	2%	2%
Forex gain (loss)	0%	-1%	0%
Other expenses, net	-1%	-2%	-1%
Pretax Income	-3%	-5%	-2%
Taxes	1%	0%	0%
Net Income	-4%	-5%	-2%
Cash Net Income	3%	1%	3%

12. Financial Metrics

	3/31/15
Debt	281
Equity	376
Tangible book	424
Market value	4,474
Cash	310
EV	4,444

	2014a	2015e	2016e
EBITDA	15.8	17.6	31.2
Capex	47.0	43.0	40.0
Surplus FCF (Net income + depr/amort - capex)	-62.2	-42.1	-20.2
EV/EBITDA	281	253	142