

## NanoViricides, Inc.

### (NYSE: NNVC, Target Price: \$7.21)

We initiate coverage on NanoViricides, Inc. ("NanoViricides") with a price target of \$7.21 per share. NanoViricides is a development stage biotechnology company developing nanotechnology-based biomimetic antiviral medicines. NanoViricides' novel nanoviricide® class of drug candidates are designed to specifically attack virus particles and to dismantle them, and the company is developing drugs against a number of viral diseases including; H5N1 bird flu, seasonal influenza, HIV, Epidemic Kerato-Conjunctivitis, hepatitis C, rabies, dengue fever, and Ebola virus, among others.

## INVESTMENT HIGHLIGHTS

### Breakthrough virus fighting technology

The nanoviricide technology is based on two separate parts that are chemically connected together to make the nanoviricide drug candidate: (a) a linear polymer made from a monomer of PEG connected to a linker containing fatty acid chains, and (b) virus-binding ligands attached to the connector of this polymer. When appropriate ligands are attached to the polymer, the resulting polymer would "look like" a cell surface with a very high density of virus binding points. It is believed that this would cause the virus to bind to the nanoviricide in preference over binding to host cells, and the virus would "enter" into the nanoviricide micelle, and possibly uncoat itself thinking that it has entered a cell. The nanoviricide is thus designed to act like a "Venus fly-trap" for the virus. Current therapies merely suppress the virus whereas the nanoviricide is designed to destroy it.

### Deep product pipeline, significant end market potential

Unlike a typical emerging biotechnology company with one, or maybe two, lead drug candidates with blockbuster market potential, NanoViricides can use their technology to target numerous drug categories. They are initially developing Injectable FluCide™ for hospitalized patients being treated for all influenzas. This represents a \$25bn annual market opportunity. Behind that, NanoViricides is working to develop Oral FluCide, DengueCide™, HIVCide™, EKC-Cide™ and HerpeCide™, and this is merely the beginning of a long list of potential end markets for their drugs. In all, these initial categories represent well in excess of \$50bn in annual sales.

### Large capital raise in early calendar 2014

In January 2014, NanoViricides announced that it had raised approximately \$20mn in a registered direct offering, with roughly \$18.8mn in proceeds after deducting approximately \$1.2mn for broker commissions and attorney fees. NanoViricides anticipates that the additional capital will be sufficient to last through Phase I and II human clinical studies of its injectable FluCide drug candidate, and also through initial human clinical trials of DengueCide. DengueCide has received Orphan Drug designation by the US FDA as well as the European Medical Agency (EMA). These designations entail significant benefits, allowing the Company to prioritize development of DengueCide. At the time of the capital raise, NanoViricides had approximately \$40mn of cash in hand (including non-current cash-based assets), which it believes is sufficient for its planned activities for the next three years and beyond.

### Initiate coverage with a price target of \$7.21

Our analysis indicates a fair value estimate of \$7.21 per share (detailed on page 8), implying an upside of 88.8% from the recent price of \$3.82. We view NanoViricides as a high risk, high reward investment in the biotechnology space, as the company attempts to introduce a revolutionary new virus fighting technology into some of the fastest growing therapeutic categories around the world.

### Stock Details (03/25/2014)

NYSE:	NNVC
Sector / Industry	Healthcare / Biotechnology
<b>Price target</b>	<b>\$7.21</b>
Recent share price	\$3.82
Shares o/s (mn)	53.96
Market cap (in \$mn)	\$206.1
52-week high/low	\$7.59 / 1.89

Source: Bloomberg, SeeThruEquity Research

### Key Financials (\$mn unless specified)

	FY13A	FY14E	FY15E
Revenues	0.0	0.0	0.0
EBITDA	(6.4)	(7.0)	(7.1)
EBIT	(6.6)	(7.3)	(7.4)
Net income	(8.9)	(11.8)	(7.8)
EPS (\$)	(0.19)	(0.23)	(0.14)

Source: SeeThruEquity Research

### Key Ratios

	FY13A	FY14E	FY15E
Gross margin (%)	NM	NM	NM
Operating margin (%)	NM	NM	NM
EBITDA margin (%)	NM	NM	NM
Net margin (%)	NM	NM	NM
P/Revenue (x)	NM	NM	NM
EV/EBITDA (x)	NM	NM	NM
EV/Revenue (x)	NM	NM	NM

Source: SeeThruEquity Research

### Share Price Performance (\$, LTM)



Source: Bloomberg

## SUMMARY TABLE

**Figure 1. Summary Table (As of March 25, 2014)**

Share data		B/S data (As of 2Q14)		Key personnel:	
Recent price:	\$3.82	Total assets:	39.2mn	Chairman & President:	Anil Diwan
Price target:	\$7.21	Total debt:	3.7mn	Chief Executive Officer:	Eugene Seymour MD, MPH
52-week range:	7.59 / 1.89	Equity:	26.5mn	Interim CFO:	Meeta Vyas
Average volume:*	552,838	W/C:	32.5mn		
Market cap:	\$208.3mn	ROE '13:	-111%		
Book value/share:	\$0.49	ROA '13:	-54%		
Cash/share	\$0.61	Current ratio:	25.0		
Dividend yield:	0.00%	Asset turnover:	0.0		
Risk profile:	High / Speculative	Debt/Cap:	0.1		

\* three month average volume (number of shares)

FY June	Estimates				Valuation	
	Rev (\$mn)	EBITDA (\$mn)	EPS (\$)	P/Rev (x)	EV/Rev (x)	P/E (x)
2012A	0.0	(5.9)	(0.15)	N/A	N/A	N/A
2013A	0.0	(6.4)	(0.19)	N/A	N/A	N/A
1Q14A	0.0	(1.8)	(0.13)	N/A	N/A	N/A
2Q14A	0.0	(1.7)	(0.03)	N/A	N/A	N/A
3Q14E	0.0	(1.7)	(0.04)	N/A	N/A	N/A
4Q14E	0.0	(1.7)	(0.04)	N/A	N/A	N/A
2014E	0.0	(7.0)	(0.23)	N/A	N/A	N/A
2015E	0.0	(7.1)	(0.14)	N/A	N/A	N/A
2016E	10.0	2.7	0.04	20.6x	19.3x	105.6x

Source: SeeThruEquity Research

## INVESTMENT THESIS

The drugs in the NanoViricides pipeline are based on several patents, patent applications, provisional patent applications, and other proprietary intellectual property held by TheraCour Pharma, Inc., to which NanoViricides has exclusive licenses in perpetuity for the treatment of the following human viral diseases: Human Immunodeficiency Virus (HIV/AIDS), Influenza including Asian Bird Flu Virus (INF), Herpes Simplex Virus (HSV), Hepatitis C Virus (HCV), Hepatitis B Virus (HBV), Rabies, Dengue viruses (DENV), Japanese Encephalitis (JEV), West Nile Virus (WNV), viruses causing viral Conjunctivitis (a disease of the eye) and Ocular Herpes, and Ebola/Marburg viruses.

NanoViricides' novel nanoviricide® class of drug candidates are designed to specifically attack virus particles and to dismantle them. NanoViricides is developing drugs against a number of the aforementioned viral diseases with leading candidates in seasonal influenza, HIV, Epidemic Kerato-Conjunctivitis (EKC), dengue fever, and Ocular Herpes.

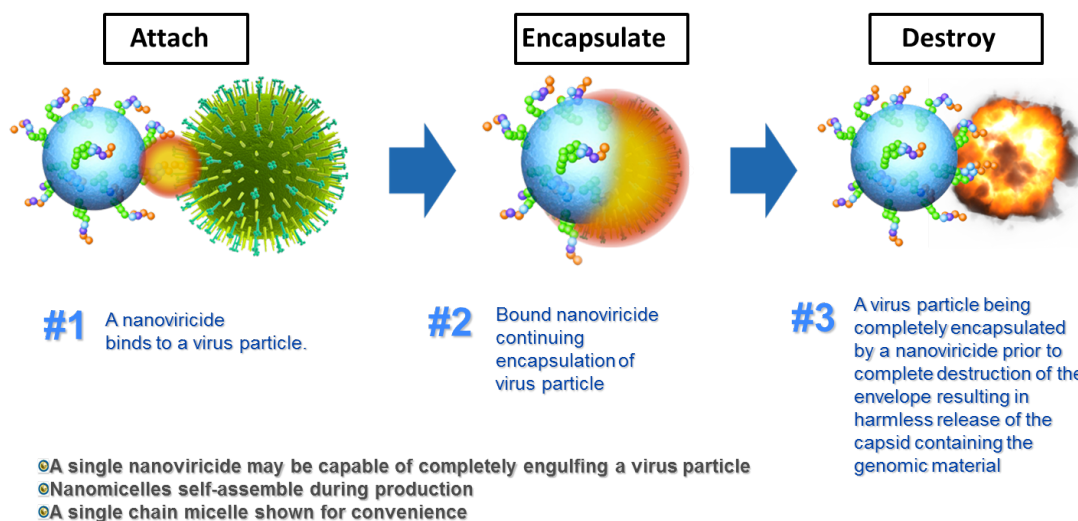
NanoViricides possesses strong patent protection around a handful of potential blockbuster pipeline drugs, with over \$50bn in annual addressable end market sales. With favorable data recorded in pre-clinical animal studies, a cGMP (current Good Manufacturing Practices) manufacturing facility coming online in 1H14E and sufficient capital on hand to conduct initial Phase I and II testing on a handful of pipeline products, we view NanoViricides as a very attractive biotechnology investment with numerous catalysts over the next 12-18 months.

**Disruptive technology designed to destroy, not suppress, viruses**

The nanoviricide technology is based on two separate parts that are chemically connected together to make the nanoviricide drug candidate: (a) a linear polymer made from a monomer of PEG connected to a linker containing fatty acid chains, and (b) virus-binding ligands attached to the connector of this polymer. NanoViricides designs the ligands as mimics of the cell surface receptor(s) to which the virus particle binds, using molecular modeling and other techniques. In the nanoviricide, it is believed that the polymer backbone forms a globular micelle with the fatty acid chains floating in the interior of the micelle, thereby resembling a structure similar to the cell surface. When appropriate ligands are attached to the polymer, the resulting polymer would “look like” a cell surface with a very high density of virus binding points. It is believed that this would cause the virus to bind to the nanoviricide in preference over binding to host cells, and the virus would “enter” into the nanoviricide micelle, and possibly uncoat itself thinking that it has entered a cell. The nanoviricide is thus designed to act like a “Venus fly-trap” for the virus. The virus is thus neutralized and effectively destroyed. Nanoviricides are designed to complete the task of dismantling the virus particle without immune system assistance. To make such a sophisticated nanomachine work, it requires a significant degree of optimization. Each nanoviricide drug is designed as an antiviral agent specifically targeted for a particular type of virus or group of viruses.

Viruses have developed smart strategies to derail immune system function. This results in failure of antibodies and vaccines. The nanoviricide technology attempts to circumvent virus escape that results from natural changes in virus structure. Despite all such changes, the cell receptor to which a virus binds remains the same. Nanoviricides mimic this conserved feature of virus binding to its host cell receptor. If a virus “escapes” a properly designed nanoviricide, it would have a reduced ability to attach to the cell receptor and would have become much less pathogenic in the process.

## A nanoviricide® in action at-a-glance



(illustration not to scale)

**Differentiation from current therapies**

Because they only have a single attachment point, current fusion and entry inhibitors do not completely cover the virus particle, and likely block only a few sites (or receptors) on the virus particle. This means the virus particle may still be capable of infecting cells using its unblocked attachment sites. In contrast, a nanoviricide, because of its larger size and flexible nature, can recognize and bind to more than one type of binding site on the virus. This method of attack is expected to engulf the virus particle completely, thus disabling the virus particle. Nanoviricides also compare favorably to antibody agents which are used to attack viruses. Antibodies, being large, are expected to block relatively greater portions of the virus particle

surface compared to small molecule entry inhibitors. However, antibodies depend upon the human immune system responses for clearing the virus particle. In contrast, nanoviricides are thought to be capable of acting as completely programmed chemical robots that finish their task of destroying the virus particle on their own.

In addition, most current anti-viral agents act inside human cells. It is believed that this intracellular mechanism leads to significant opportunities for unwanted side effects against host cells. Nanoviricides, on the other hand, are designed to work directly against virus particles in bodily fluids. Nanoviricides are thought to be safer because of their unique design to be biodegradable within the body.

**Versatile platform allows technology to be rapidly created/adapted to combat a variety of viruses**

The nanoviricide is created by chemically attaching a virus-binding ligand, derived from the binding site of the virus on its cell surface receptor, to a nanomicelle flexible polymer, the binding site does not change significantly when a virus mutates. The tailor-made design and separate selection of both the virus-binding ligand and the backbone "nanomicelle" allows NanoViricides to rapidly optimize drug candidates against a number of viruses, adjust for desired pharmacokinetic characteristics (e.g. sustained effect), and enables different routes of administration. The technology also allows for the placement of different active pharmaceutical ingredients in the core of the nanoviricide. This versatility is currently unmatched in the Industry.

If NanoViricides has the proper ligand in their library, the time it takes to create a new drug can be quite short. As an example, it took less than three weeks to create a drug candidate against MERS Corona virus (currently circulating in the Middle East with a case fatality rate of 60%), that looks very promising in molecular modeling studies. This drug is currently waiting for in vitro testing, anticipated to be performed by Public Health England, the British government's equivalent of the U.S. Centers for Disease Control.

**ADIF Technology**

Expanding of the versatility of their drug technology platform, NanoViricides has developed Accurate-Drug-In-Field™ ("ADIF™") technologies. ADIF technologies have the potential to show efficacy in treating epidemics like H5N1, SARS or Ebola by developing a targeted therapeutic in the field to prevent the spread of the disease. ADIF technology does not require any knowledge of the molecular biology of the virus, or even its specific identification. An accurate drug, specifically targeted at the virus, can be developed in the field from nanomicelles stockpiled beforehand. This enables a rapid response timeframe as short as 3 weeks for initial drug doses, and potentially less than 3 months for sufficient doses to curb the spread of the virus outside the affected area. Thus ADIF technologies are applicable to novel, or engineered viruses, or emerging infections whether natural or man-made. This technology may have significant applications in the Biodefense area. We believe that this is the only technology that can enable humans to combat novel viruses before they spread disease.

**Significant end market opportunities, multi-blockbuster drug potential**

Unlike a typical emerging biotechnology company with one, or maybe two, lead drug candidates with blockbuster market potential, NanoViricides can use their technology to target numerous drug categories. They are initially developing Injectable FluCide™ for hospitalized patients being treated for all influenzas. This represents a \$25bn annual market opportunity. Behind that, NanoViricides is working to develop Oral FluCide, DengueCide™, HIVCide™, EKC-Cide™ and HerpeCide™, and this

**Product Pipeline**

Disease & Indication	Drug Candidate	In Vitro Development	Efficacy-Animals	IND-Enabling Studies	Human Clinical Trials
<b>Primary Programs</b>					
Hospitalized Patients; All Influenzas	Injectable FluCide™	→	→	→	Pandemic, Epidemic, Seasonal, Bird Flu
Out-Patients; All Influenzas	Oral FluCide™	→	→	→	Pandemic, Epidemic, Seasonal, Bird Flu
All Dengue Viruses Dengue Hemorrhagic Fever	DengueCide™	→	→	→	Type I, II, III, IV
HIV-1, HIV/AIDS	HIVCide™	→	→	→	
Eye Viral Diseases EKC & Ocular Herpes	EKC-Cide™ HerpeCide™	→	→	→	
Herpes genital lesions, cold sores	HerpeCide™	→	→	→	HSV-1, HSV-II, Zoster/ Shingles?
<b>Biodefense &amp; Neglected Diseases</b>					
Rabies		→	→	→	
Ebola/Marburg		→	→	→	

is merely the beginning of a long list of potential end markets for their drugs. In all, these initial categories represent well in excess of \$50bn in annual sales.

*Source: Company filings and investor materials, SeeThruEquity Research*

### **Initial market opportunity: FluCide for hospitalized influenza**

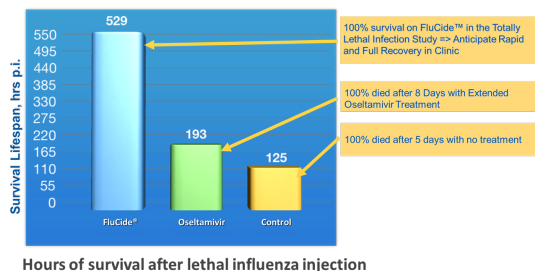
NanoViricides is initially targeting the influenza market with the development of injectable FluCide. According to flu.gov, between 5 percent and 20 percent of people living in the U.S. get the flu each year. Symptoms range from mild (fever, cough, aches, etc.) to severe (bacterial pneumonia, ear or sinus infections, etc.) and the virus causes thousands of deaths in the country every year. FluCide will target hospitalized patients with "Influenza-like-illness" prior to knowing whether it is indeed influenza or not. According to the Center for Disease Control ("CDC"), this pool is approximately 500k patients per year in the USA alone. Out of this pool, approximately 250-350k patients in U.S. are identified as having Influenza later in non-pandemic years. The EU and UK represents a similar market opportunity. While the patient numbers are relatively small (assuming 20% market penetration, or roughly 100K patients in the US, or 200K including EU+UK), the benefit here is estimated on cost savings on days of hospitalization. According to the International Federation of Health Plans 2012 Comparative Price Report, an average day in a U.S. hospital has been estimated to cost over \$4k, with higher priced facilities charging \$10k and above. A typical stay for a patient with influenza averages 14 days. If FluCide could shorten the stay to 3 days, that would represent a saving per patient of \$40-50k.

*Source: Company filings and investor materials, [www.flu.gov](http://www.flu.gov), [www.cdc.gov](http://www.cdc.gov), [www.hushp.harvard.edu](http://www.hushp.harvard.edu), SeeThruEquity Research*

### **Initial preclinical results of FluCide**

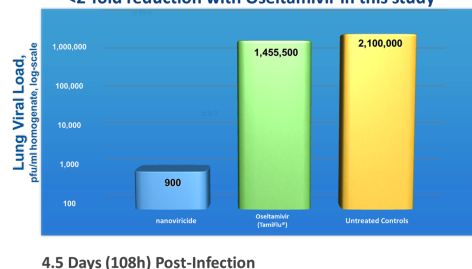
In 2H12, NanoViricides released data from a study of its oral administration FluCide product in a lethal animal model of influenza infection. The FluCide candidates were superior to oral oseltamivir, marketed as Tamiflu® by Roche Holding AG (XETRA: RHO.DE), a current standard of care for influenza, in all parameters evaluated. As compared to oseltamivir, the results clearly demonstrated that oral administration of two different FluCide drug candidates produced significantly greater reduction in the levels of influenza virus in the lungs of the infected mice. This reduction was accompanied by significant protection from the lung tissue inflammation and destruction that is believed to be important in the lethal pathogenesis in this highly lethal model of H1N1 Influenza virus infection. As a result of the reduction in lung viral load and protection against virus destruction of lung tissue, the oral FluCide drug candidates produced significant improvement in survival as compared to oseltamivir. The study was performed by KARD Scientific Inc. One of the FluCide drug candidates, when administered orally, enabled the animals to survive as long as 347.4±4.6 hrs (14.5 days), and when given as an injectable, it allowed the animals to combat the lethal influenza infection for 376.8±7.5 hrs (15.7 days). Another drug candidate (with a different anti-viral ligand), when given orally, resulted in the animals surviving for as long as 301.3±5.2 hrs (12.6 days), and when given as a tail-vein injection, for 349.0±3.9 hrs (14.5 days). For comparison, untreated control animals died in 119.5±1 hrs (5 days), and oseltamivir treated animals died within just 181.7±4.6 hrs (7.6 days). Four days after virus infection, the infectious viral load in lungs of infected animals treated with the best oral FluCide nanoviricide drug candidate was reduced greater than 30-fold as compared to the infected, untreated control animals, at day 4. In contrast, animals treated with oseltamivir showed only an approximate 3-fold reduction in lung viral load at day 4. At 7 days, the viral load in the lungs of oseltamivir-treated animals was increased to the same level as that found in the infected, untreated control animals shortly before their death, while the lung viral load at 7 days in the FluCide-treated animals remained at the same 30-fold reduction. Thus, this oral FluCide appeared to be at least 10x more effective than oral oseltamivir. Of clinical significance, the reduction in lung viral load achieved by oral FluCide treatment with this drug candidate was accompanied by a correspondingly dramatic protection of the lungs from damage. Lung damage pathology is caused by both (i) influenza virus infection and expansion, and (ii) the body's immune response to fight the infection. Microscopic evaluation of the lung tissues from FluCide-treated animals at day 4 showed an approximate 100-fold reduction in virus-induced inflammation and necrosis as compared to infected, untreated control animals. In contrast, at day 4, the lungs of oseltamivir-treated animals showed only a 2-fold reduction. NanoViricides had previously reported that the same oral FluCide nanoviricide drug candidate achieved significantly increased survival of 15-16 days while animals treated with oral oseltamivir survived only 9-10 days.

### FluCide™ Preclinical Results – Survival



### FluCide™ Preclinical Results – Viral Load

>1,000-fold Lung Viral Load Reduction in IV FluCide™ Treated Animals  
<2-fold reduction with Oseltamivir in this study



Source: Company filings and investor materials, SeeThruEquity Research

### Manufacturing capability

On January 27, 2014, NanoViricides announced that construction of the modern R&D Lab and cGMP Clinical Production facility in Shelton, CT, is nearing completion on schedule. The R&D lab section of the facility is nearing completion, slightly ahead of schedule. In addition, construction of the cGMP Clean Room Production Suite is expected to be completed in May, 2014, and shortly thereafter, the project will enter facility testing and validation phase. After construction is complete, the facility, and particularly the cGMP Clean Room Suites will undergo facility testing and validation to ascertain that the facility satisfies the requirements. After validation, NanoViricides plans to occupy the new facility while keeping the current facility active to minimize impact on the multiple nanoviricides drug development projects. NanoViricides intends to first start production of FluCide in the cGMP section, set up appropriate cGMP operation for this production, produce multiple batches of FluCide under cGMP conditions, and demonstrate equivalence of the batches produced, in preparation for human clinical trials. The highly customizable cGMP facility can process injectables, oral liquids, skin creams and lotions, optical solutions, etc. in an aseptic fashion for bulk drug manufacture. NanoViricides has stated that the final fill and finish of the bulk drug process will be subcontracted out for the initial human clinical trials.

### Capital raise

In January 2014, NanoViricides announced that it had raised approximately \$20mn in a registered direct offering, with roughly \$18.8mn in proceeds after deducting approximately \$1.2mn for broker commissions and attorney fees. NanoViricides anticipates that the additional capital will be sufficient to last through Phase I and II human clinical studies of its injectable FluCide drug candidate, and also through initial human clinical trials of DengueCide. DengueCide has received Orphan Drug designation by the US FDA as well as the European Medical Agency (EMA). These designations entail significant benefits, allowing the Company to prioritize development of DengueCide. At the time of the capital raise, NanoViricides had approximately \$40mn of cash in hand (including non-current cash-based assets), which it believes is sufficient for its planned activities for the next three years and beyond. With these funds, in addition to certain clinical trials for FluCide and DengueCide, NanoViricides anticipates that it will also be able to expedite development of its four other drug candidates, namely, Oral FluCide, HerpeCide™, HIVCide™, and EKCCide™ into the FDA approval process.

Source: Company filings and investor materials, SeeThruEquity Research

## COMPETITIVE LANDSCAPE

The US is the largest market for biotechnology products with more than 1,300 firms in the biotechnology industry. According to Jain PharmaBiotech research, the global antiviral drug market was approximately \$20.6bn in 2013 and is expected to grow to \$65.5bn by 2023E. NanoViricides is initially applying its technology to creating therapeutics to treat influenza. The global influenza market alone was estimated to be \$4bn in 2013, growing to \$11.7bn by 2023E. Future treatments for HIV/AIDS, ocular herpes and other viruses are further down the pipeline.

The leading current influenza therapies are Tamiflu (Roche), which had reported sales of \$2.8bn in 2013, and Zanamivir (GlaxoSmithKline), with \$800mn in 2013. Peramivir (BioCryst Pharmaceuticals) was approved in Japan and this year BioCryst recently filed an NDA with the FDA on the product. While the market for influenza therapies is quite competitive, we note that there is certainly no “gold standard” product. Despite being the market leader, there are still questions around Tamiflu’s efficacy and side effect profile. There is significant opportunity for a demonstrably superior influenza therapeutic in the global marketplace.

NanoViricides’ technology and products are based on exclusive licenses that include more than seventy-five patents issued to date in 25 countries, including the U.S., Australia, Japan, China, Canada, and all of Africa. All patents to date have been issued as “first-in-class” with no existing prior art, showcasing the NanoViricides leadership position in this field and highly differentiated product. The drugs in the NanoViricides pipeline are also separately patentable, and the company plans file these patents in the future to maximize the patent life of each product. We also note that the U.S. FDA and the European Medicines Agency recently granted “orphan drug” designation to DengueCide, the NanoViricides drug for Dengue Fever and Dengue Hemorrhagic Fever. There are currently no approved vaccines for the dengue virus, which infects between 50-528mn people annually.

*Source: Company filings and investor materials, SeeThruEquity Research*

## FINANCIALS AND FUTURE OUTLOOK

### Revenue/Drivers

We do not expect NanoViricides to begin generating product revenue until the FY2018E timeframe. We have modeled in a \$10mn licensing payment in FY2016, as we believe the technology will attract interest once FluCide (injectable and oral) and DengueCide have progressed into further clinical trial phases. We have modeled in \$50mn in revenues for FY2018E, assuming 50k treatments of injectable FluCide at \$10k per treatment regimen and by applying a 10% success probability as the product has not yet completed a Phase I trial. We base our pricing off of the substantial savings we believe FluCide can provide to a hospital by dramatically reducing the average duration of an inpatient hospital stay. We have modeled initial sales of oral FluCide (\$120 per treatment, on par with current Tamiflu pricing) and DengueCide (at \$1500 per cost of treatment) in FY2019E, and have total company revenues of \$187mn in FY2020E.

We believe DengueCide presents a very unique market opportunity. Contrary to general assumptions and the socialistic background of medicine in developing world, the upper middle class of developing world economies outnumbers the total populations of U.S. and Europe combined. Additionally, this class is accustomed to paying for drugs up to \$2,000 per treatment course in life threatening situations. There are currently no available treatments for dengue fever and, as previously discussed, there are 50-528mn annual infections around the globe. While we acknowledge that NanoViricides will need significant additional capital to supply enough product to meet demand if the development of DengueCide is successful, we would anticipate that governments and interested authorities, NGOs, and charitable foundations would get involved in the financing of both the drug development and the manufacturing expansion. This would allow NanoViricides to utilize non-dilutive funds and minimize the use of current investor funds.

While the market for influenza therapies is expected to become increasingly competitive, as we anticipate more future players in the space, making the opportunity in that space more difficult, the approval and validation of the product would set the stage for significant future revenue opportunities in treating the dengue virus or even HIV. Our model only takes into account U.S. revenues for FluCide as well, and does not include any indications or approvals beyond FluCide and DengueCide. While NanoViricides is investing in a cGMP manufacturing facility, we would not anticipate that they would bring its products to market alone.

More likely, we envision a strategic partnership for NanoViricides, either to provide capital for additional manufacturing capacity or some form of distribution license, both in the U.S. and internationally.

**Margins/Expenses**

In their 2Q14 10Q, for the period ended December 31, 2013, NanoViricides estimated funding needs of \$10mn to \$15mn to take one of its drug candidates through certain phases of human clinical trials. Over the next 24 months, NanoViricides also anticipated needing \$5mn for R&D expenses, \$1.5mn for corporate overhead, \$1.5mn to hire additional staff and \$1.5mn for capital costs for equipment and laboratory improvements. We have modeled in \$2.3mn and \$4.6mn in R&D spending for 2H14E and FY2014E, respectively. We have also modeled in \$1.4mn and \$2.7mn in SG&A spending for 2H14E and FY2014E, respectively.

We believe that NanoViricides should have attractive gross margins for its therapeutic products, given its low cost, scalable model and fast manufacturing cycle. We have forecast our cost of goods to be 20% in FY2018E moving to 10% in FY2020E as NanoViricides achieves greater scale. At a full commercial scale, we would anticipate COGS in the 5-7% range, but we would anticipate that NanoViricides would form some form of a partnership agreement with a major pharmaceutical company before they achieve that scale.

We have modeled in CAPEX spending of \$2.8mn for FY2014 dropping to the \$1.5-1.75mn range for FY2015-2018E. The bulk of this will go to equipment and lab upgrades at their Shelton, CT facility. We would assume that NanoViricides will need to raise additional capital in the FY2016-2017 timeframe if they cannot secure some form of milestone payment.

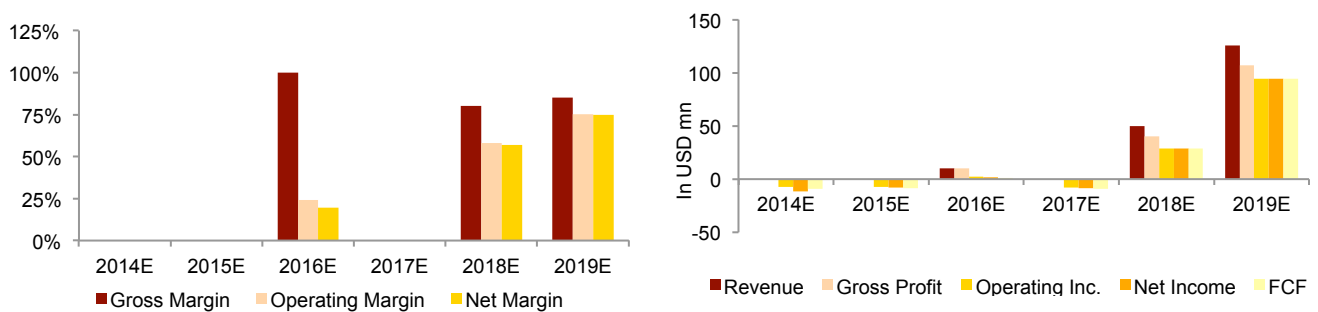
**Balance Sheet & Financial Liquidity**

NanoViricides ended 2Q14 with \$16.9mn of cash and equivalents on their balance sheet and raised an additional \$18.2mn in 3Q14. NanoViricides had \$2.7mn in PP&E among its \$22.9mn in total assets as of 2Q14.

NanoViricides had \$3.7mn in long term debt outstanding as of 2Q14. We do not anticipate NanoViricides having to raise additional capital in FY2014E or FY2015E.

NanoViricides had 53.9mn shares outstanding as their most recent filings in calendar 2014. NanoViricides also has 2mn preferred Series A shares outstanding which have a preferred voting preference at the rate of nine votes per share. The Series A shares are convertible, only upon sale or merger of NanoViricides, or the sale of or license of substantially all of its intellectual property, into shares of NanoViricides' common stock at the rate of 3.5 shares of common stock for each share of Series A preferred stock. NanoViricides also had 6.9mn warrants outstanding as of the end of 2Q14.

Figure 2. Key Performance Indicators of NanoViricides, FY14E–19E



Source: Company filings, SeeThruEquity Research



## VALUATION

Given that we do not expect NanoViricides to have revenues until FY2018E at the earliest, we have valued the company using a discounted cash flow ("DCF"). Our DCF yields a fair value of \$7.21 per share, representing an upside of 88.8% from the recent price of \$3.82 as of March 25, 2014.

### DCF

We expect very significant revenue growth for NanoViricides beginning in FY2018. We project free cash flow to move from (\$9.3mn) in FY2014E to \$111.1mn in FY2020E. We discounted cash flows at a weighted average cost of capital of 20.4% and assumed a terminal growth rate of 7% at the end of 2020E to arrive at an enterprise value of \$368.3mn. Adjusting for the cash balance of \$16.9mn and debt of \$3.7mn as of December 31, 2013, we arrived at a fair value of \$7.21 per share.

Figure 3. Discounted Cash Flow Analysis

\$' 000	FY14E	FY15E	FY16E	FY17E	FY18E	FY19E	FY20E
EBIT	(6,590)	(7,250)	2,413	(7,872)	29,000	94,600	154,300
Less: Tax	0	0	0	0	0	0	43,077
<b>NOPLAT</b>	<b>(6,590)</b>	<b>(7,250)</b>	<b>2,413</b>	<b>(7,872)</b>	<b>29,000</b>	<b>94,600</b>	<b>111,223</b>
Changes in working capital	(30)	16	17	17	18	19	19
Depreciation & Amortization	222	250	260	280	300	320	340
Capex	(2,858)	(1,500)	(1,750)	(1,750)	(500)	(500)	(500)
<b>FCFF</b>	<b>(9,256)</b>	<b>(8,484)</b>	<b>940</b>	<b>(9,324)</b>	<b>28,818</b>	<b>94,439</b>	<b>111,082</b>
Discount factor	0.87	0.85	0.71	0.59	0.49	0.41	0.34
PV of FCFE	(8,024)	(7,221)	665	(5,475)	14,057	38,262	37,383
Sum of PV of FCFE							69,646
Terminal cash flow							887,572
PV of terminal cash flow							298,698
<b>Enterprise value</b>							<b>368,344</b>
Less: Debt							3,744
Add: Cash							16,949
<b>Equity value</b>							<b>389,037</b>
Outstanding shares (mn)							54.0
<b>Fair value per share (\$)</b>							<b>7.21</b>
<b>Summary conclusions</b>				<b>Key assumptions</b>			
DCF FV (\$ per share)	7.21			Beta		2.0	
Recent price (\$ per share)	3.82			Cost of equity		20.7%	
Upside (downside)	88.8%			Cost of debt (post tax)		6.0%	
WACC	20.4%			Terminal Growth Rate		7.0%	

Source: SeeThruEquity Research

**Figure 4. Sensitivity of Valuation – WACC vs. Terminal Growth Rate**

		WACC (%)				
		19.4%	19.9%	20.4%	20.9%	21.4%
Terminal growth rate (%)	6.00%	7.49	7.13	6.78	6.46	6.16
	6.50%	7.75	7.36	6.99	6.65	6.33
	7.00%	8.02	7.60	<b>7.21</b>	6.85	6.52
	7.50%	8.31	7.87	7.45	7.07	6.72
	8.00%	8.63	8.16	7.71	7.31	6.93
	8.50%	8.98	8.47	8.00	7.56	7.17

Source: SeeThruEquity Research

### Peer Group Valuation

For the sake of comparison, we have included a peer group of biotechnology companies, many of which are also focused on anti-viral products and have a similar market capitalization as NanoViricides.

**Figure 5. Comparable Valuation (Data as of 03/25/14)**

Company	Mkt cap (\$ mn)	EV/Revenue(x)		Price/Revenue(x)	
		FY14E	FY15E	FY14E	FY15E
Achillion Pharmaceuticals, Inc.	358	NA	NA	NA	NA
BIND Therapeutics, Inc.	198	7.6x	2.1x	11.0x	3.1x
Biota Pharmaceuticals, Inc.	209	3.6x	3.7x	4.5x	4.7x
GENOCEA BIOSCIENCE	292	NA	NA	NA	NA
Idera Pharmaceuticals, Inc.	372	NA	NA	NA	NA
Ligand Pharmaceuticals Incorporated	1,412	24.6x	18.5x	22.4x	16.8x
Novavax, Inc.	937	23.6x	23.6x	22.3x	22.3x
SIGA Technologies Inc.	166	0.8x	0.7x	1.6x	1.5x
Sarepta Therapeutics, Inc.	905	59.2x	54.9x	69.6x	64.6x
Sinovac Biotech, Ltd.	409	4.4x	2.6x	5.8x	3.3x
Tapimmune Inc.	7	NA	NA	NA	NA
<b>Average</b>		<b>17.7x</b>	<b>15.2x</b>	<b>19.6x</b>	<b>16.6x</b>
NanoViricides, Inc.	206	NA	NA	NA	NA
Premium (discount)		NA	NA	NA	NA

Source: Bloomberg, SeeThruEquity Research

## RISK CONSIDERATIONS

### Regulatory

As a biotechnology company NanoViricides operates in a highly regulated industry. The process for regulatory approval of drug development by the FDA and other regulatory authorities is lengthy, uncertain and expensive. Before it is able to market its FluCide influenza drug in the U.S., NanoViricides must first achieve successful completion of Phase I, Phase II and Phase III clinical trials and FDA approval. Our model projects injectable FluCide revenue to begin in FY2018E. If NanoViricides experiences a regulatory delay or poor clinical trial results before this time it would materially impact our investment thesis.

### Competition

The influenza therapeutics market is becoming increasingly competitive and there are high barriers to entry to this market, given the large capital investment requirements, technical expertise, and strict regulations present. There are currently two major players in the influenza therapeutic space who both possess a strong distribution network and significant production capacity. It may be difficult for NanoViricides to gain market share. NanoViricides claims to have a highly differentiated mechanism of action than existing products, but there is no assurance that other new, differentiated products may be introduced to the market before FluCide and other NanoViricides pipeline products.

### Dependence on TheraCour Pharma, Inc.

NanoViricides' ability to develop, manufacture and sell the products it plans to develop is derived from its "Material Licensing Agreement" with TheraCour Pharma Inc. ("TheraCour"). While NanoViricides holds the license in perpetuity, the Agreement may be terminated by TheraCour as a result of: the insolvency or bankruptcy proceedings by or against NanoViricides, a general assignment by NanoViricides to its creditors, the dissolution of NanoViricides, cessation by NanoViricides of business operations for ninety (90) days or more or the commencement by NanoViricides or an affiliate to challenge or invalidate the issued patents. NanoViricides does not hold the rights to any other patents nor does it conduct its own research and development to develop other products to manufacture and sell. If NanoViricides' Agreement with TheraCour is terminated, it is unlikely it will be able to commence revenue-generating operations or that it could continue operating at all.

### Key personnel

NanoViricides believes that its two executive officers, Eugene Seymour, Chief Executive Officer and Anil Diwan, President and Chairman of Board, are critical to its success. NanoViricides is a limited beneficiary of a certain amount of key man insurance for these two executive officers that it maintains. However there can be no assurances that the amount of the key man insurance coverage would be sufficient to provide replacement of these key officers for continuing NanoViricides' operations in a timely manner, should such an event arise.

### Legal proceedings

On or around January 18, 2012, the Nevada Agency and Transfer Company, as agent for service of process for NanoViricides in Nevada, was served with a Summons and Complaint in the case entitled Yidam, Ltd. v. Eugene Seymour, Anil Diwan, and NanoViricides, Inc. (Case No. A-12-654437-B) answerable in the Eighth Judicial District Court of the State of Nevada – Clark County ("Court"). The Plaintiff demands an order to inspect NanoViricides' records, an order revoking Messrs. Diwan and Seymour from the Board of Directors, equitable relief, and consequential and punitive damages. NanoViricides believes these claims have no merit and it intends to defend this action vigorously. NanoViricides has moved the District Court to dismiss the action in its entirety. Though consequential and punitive damages are claimed, no facts have been submitted to support such claim. Management has determined that such claims are specious and not relevant to NanoViricides and no accrual has been made in relation to this litigation. Please review NanoViricides' latest SEC filings for full discussion of the proceedings.

## Management Team

### **Anil R. Diwan, PhD, Chairman and President**

Dr. Diwan invented novel polymeric micelle-based nanomedicine technologies as early as 1991. Dr. Diwan is a prolific inventor and a serial entrepreneur. Prior to co-founding NanoViricides, Inc., he has founded TheraCour Pharma, Inc., a privately held company focused in nanomedicines and cell-targeted drug delivery, and AllExcel, Inc., a company with diverse portfolios including nanomedicines, small chemicals, device technologies, as well as informatics. He has won several NIH SBIR (small business innovation research) grant awards. Anil holds a Ph.D. from Rice University, TX, a B.Tech. from Indian Institute of Technology, Mumbai (IIT-B), India, and has consistently held high scholastic ranks and honors. Dr. Diwan has over 25 years of Bio-Pharmaceutical R&D experience with over 20 years as an entrepreneur. He has one issued patent, three filed international patent applications (resulting in several national level patents), and several anticipated patent applications in various stages. Under Dr. Diwan's leadership, NanoViricides, Inc. has been able to keep both administrative and R&D costs at extremely low levels while robustly expanding the drug pipeline every year. Dr. Diwan has been instrumental in raising \$45 Million of financing for NanoViricides, Inc.

### **Eugene Seymour MD, MPH, Chief Executive Officer**

Dr. Seymour began practicing medicine in Los Angeles/ Beverly Hills in the late 1960's. In late 1981, he began treating patients with a strange new disease affecting primarily the gay population. In 1986, he was requested by the US government to establish a testing laboratory and run a large-scale surveillance program for HIV prevalence in the Hispanic population in Los Angeles. His laboratory ended up testing over 50,000 people. Because of his belief that prevention, in the absence of a cure, was critical to stem the rising tide of HIV infections, he founded a company, now called Stat-Sure, Inc, in 1989. He raised the capital and oversaw the development of a rapid HIV antibody blood test (Hema-Strip). In 1993, as Chief Executive Officer, he took the company public as a NASDAQ company. Under his direction, the company conducted research studies in Africa, Asia, South and North America. The Hema-Strip was approved in a number of countries including Canada, Great Britain and Vietnam. Dr. Seymour left the company in 1996 to run a non-profit foundation, which funded both testing and training programs for health workers in Asia and Africa. He became a consultant to the UN Global Program on AIDS and was sent to a number of different countries, (Lithuania, Latvia, Estonia and Russia) to interact with local physicians and assist them in setting up testing programs. Two years later, he became Director of Strategic Alliances at a medical education startup called medschool.com that was later acquired by a group of investors. Dr. Seymour is the holder of 8 issued patents. Originally trained as a chemist, he decided to attend medical school in preparation for a career as a clinical investigator. Following postgraduate medical training, he obtained a Master's degree in the Epidemiology of Infectious Diseases at UCLA. He began clinical practice in Internal Medicine and joined the UCLA Medical School faculty. He left UCLA after two years and joined USC faculty as Associate Professor. He served in the Medical Corps of US Army Reserve during the Vietnam era and attained the rank of Major.

### **Ms. Meeta R. Vyas, Interim Chief Financial Officer**

Ms. Vyas is known as a strong leader with board level experience and successful achievements as a Senior Executive in a broad range of entities including publicly listed corporations, non-revenue generating entities, and medium to large size companies. Meeta has over twenty-five years of experience in performance and process improvement of both publicly listed companies and non-revenue producing entities, in areas ranging from Finance and Operations to Strategy and Management. Meeta holds the distinction of being the first Indian woman to be named CEO of a publicly listed US corporation, Signature Brands, Inc., best known for Mr. Coffee and Health-O-Meter brand products. As CEO, acting COO and Vice Chairman of the Board of Signature Brands, Inc., she was responsible for the development and implementation of a turnaround plan, resulting in a return to profitability and growth within a short period of time. Later, as the CEO of the World-Wide Fund for Nature - India (WWF-India) and then as a Vice President of the National Audubon Society (USA), both non-revenue generating entities, Meeta successfully raised unrestricted funding that significantly exceeded annual requirements and also instituted financial processes to measure a variety of

performance metrics. Earlier in her career, she was responsible for designing the strategy and initiating the implementation plan for the highly successful information technology outsourcing program at General Electric (GE). Also at GE, Ms. Vyas ran GE Appliances Range Products business unit having revenues exceeding \$1 Billion where her team doubled operating income in less than two years. Prior to that, as a management consultant with McKinsey and Company, she served publicly listed companies in chemicals, industrial, and technology markets, primarily focusing on growth strategies, valuations, post-merger integrations, and logistics operations. Meeta is married to NanoViricides, Inc. President and Chairman Anil R. Diwan. Ms. Vyas holds a MBA in Finance from Columbia University's Graduate School of Business, and a BS in Chemical Engineering from the Massachusetts Institute of Technology.

### 13F Filers and Key Shareholders

Shareholder Major Holders & Key Insiders	Number of Shares Owned	Percent of Shares Outstanding
TheraCour Pharma, Inc.	9,531,429	21%
Anil Diwan	1,966,286	26%
Eugene Seymour	1,714,286	4%
All Directors and Officers	13,269,144	30%
<b>Total</b>	<b>11,497,715</b>	

*\*based upon 47,454,744 shares of Common Stock outstanding as of June 30, 2013*

## FINANCIAL SUMMARY

**Figure 6. Income Statement**

Figures in \$mn unless specified	FY12A	FY13E	FY14E	FY15E	FY16E	FY17E
<b>Revenue</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>10.0</b>	<b>0.0</b>
YoY growth	N/A	N/A	N/A	N/A	NM	N/A
Cost of sales	0.0	0.0	0.0	0.0	0.0	0.0
<b>Gross Profit</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>10.0</b>	<b>0.0</b>
Margin	N/A	N/A	N/A	N/A	N/A	N/A
Operating expenses	6.1	6.6	7.3	7.4	7.6	7.8
EBIT	(6.1)	(6.6)	(7.3)	(7.4)	2.4	(7.8)
Margin	N/A	N/A	N/A	N/A	N/A	N/A
<b>EBITDA</b>	<b>(5.9)</b>	<b>(6.4)</b>	<b>(7.0)</b>	<b>(7.1)</b>	<b>2.7</b>	<b>(7.5)</b>
Margin	N/A	N/A	N/A	N/A	N/A	N/A
Other income/ (expense)	(0.1)	(2.3)	(4.6)	(0.5)	(0.5)	(0.5)
Profit before tax	(6.2)	(8.9)	(11.8)	(7.8)	2.0	(8.3)
Tax	0.0	0.0	0.0	0.0	0.0	0.0
<b>Net income</b>	<b>(6.2)</b>	<b>(8.9)</b>	<b>(11.8)</b>	<b>(7.8)</b>	<b>2.0</b>	<b>(8.3)</b>
Margin	N/A	N/A	N/A	N/A	N/A	N/A
<b>EPS (per share)</b>	<b>(0.15)</b>	<b>(0.19)</b>	<b>(0.23)</b>	<b>(0.14)</b>	<b>0.04</b>	<b>(0.15)</b>

Source: SeeThruEquity Research

**Figure 7. Balance Sheet**

Figures in \$mn, unless specified	FY12A	FY13E	FY14E	FY15E	FY16E	FY17E
Current assets	14.6	14.5	31.8	22.8	23.3	13.6
Intangibles	0.4	0.4	0.4	0.4	0.4	0.4
Other assets	0.6	1.5	5.1	6.4	7.8	9.3
<b>Total assets</b>	<b>15.6</b>	<b>16.4</b>	<b>37.3</b>	<b>29.5</b>	<b>31.5</b>	<b>23.3</b>
Current liabilities	1.8	1.2	1.4	1.4	1.4	1.5
Other liabilities	0.0	7.2	11.3	11.3	11.3	11.3
Shareholders' equity	13.9	8.0	24.6	16.8	18.8	10.5
<b>Total liab and shareholder equity</b>	<b>15.6</b>	<b>16.4</b>	<b>37.3</b>	<b>29.5</b>	<b>31.5</b>	<b>23.3</b>

Source: SeeThruEquity Research

**Figure 8. Cash Flow Statement**

Figures in \$mn, unless specified	FY12A	FY13E	FY14E	FY15E	FY16E	FY17E
Cash from operating activities	(4.2)	(5.8)	(7.2)	(7.6)	2.2	(8.0)
Cash from investing activities	(0.0)	(1.1)	(2.9)	(1.5)	(1.8)	(1.8)
Cash from financing activities	9.3	6.5	28.1	0.0	0.0	0.0
<b>Net inc/(dec) in cash</b>	<b>5.1</b>	<b>(0.4)</b>	<b>18.1</b>	<b>(9.1)</b>	<b>0.5</b>	<b>(9.7)</b>
Cash at beginning of the year	9.2	14.3	13.9	31.0	21.9	22.4
<b>Cash at the end of the year</b>	<b>14.3</b>	<b>13.9</b>	<b>31.0</b>	<b>21.9</b>	<b>22.4</b>	<b>12.7</b>

Source: SeeThruEquity Research

### **About NanoViricides, Inc.**

NanoViricides is a development stage company that is creating special purpose nanomaterials for viral therapy. The Company's novel nanoviricide® class of drug candidates are designed to specifically attack enveloped virus particles and to dismantle them. The Company is developing drugs against a number of viral diseases including H1N1 swine flu, H5N1 bird flu, seasonal Influenza, HIV, oral and genital Herpes, viral diseases of the eye including EKC and herpes keratitis, Hepatitis C, Rabies, Dengue fever, and Ebola virus, among others.

For more information, please go to [www.NanoViricides.com](http://www.NanoViricides.com)



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