EDISON

BiondVax Pharmaceuticals

Company update

Phase III for universal flu vaccine starts in 2018

Pharma & biotech

Over 2017 BiondVax crystallised its late-stage development plans for lead asset M-001, a potentially universal influenza vaccine. Following its discussions with the regulatory authorities and gaining access to new capital (European Investment Bank and share issues), the company confirmed on 27 December 2017 that it will initiate a pivotal Phase III trial on its own for a universal flu vaccine indication (likely to start in Q318). We have revised our assumptions substantially and increased our valuation to $200m (NIS689m) or $32.4/ADS (NIS2.80/share) from $165m previously.

Year end	Revenue (NISm)	PBT* (NISm)	EPS* (NIS)	DPS (NIS)	P/E (x)	Yield (%)
12/15	0.0	(10.2)	(0.10)	0.0	N/A	N/A
12/16	0.0	(9.2)	(0.07)	0.0	N/A	N/A
12/17e	0.0	(24.9)	(0.13)	0.0	N/A	N/A
12/18e	0.0	(18.5)	(0.07)	0.0	N/A	N/A

Note: *PBT and EPS are normalised, excluding amortisation of acquired intangibles, exceptional items and share-based payments.

M-001 as a universal, standalone vaccine

BiondVax now plans to move directly into Phase III with M-001 as a standalone influenza vaccine. The company has explored various paths to the market, including targeting smaller populations such as a pandemic primer for stockpiling or a seasonal primer for populations at risk. After the consultation with the regulatory authorities and gaining access to the €20m loan from the European Investment Bank (EIB), BiondVax attracted new equity investments and now is preparing the Phase III trial for the ultimate goal of developing a standalone universal influenza vaccine.

Focused development strategy to reach the market

The upcoming Phase III study will be conducted in Europe and will involve participants over the age of 50 because BiondVax views this group as the primary target population. The elderly population is typically considered at risk in guidelines, which therefore recommend vaccination. Therefore, this target population could be the fastest route to the market. If the Phase III trial is successful there is the potential to expand to other age groups as well as to other markets, like the US, where vaccination guidelines are the most comprehensive and cover the whole population from six months of age.

Valuation: Increased to $200m (NIS689m)

We have increased our valuation of BiondVax to $200m (NIS689m) or $32.4/ADS (NIS2.80/share) from $165m (NIS577m) or $26.8/ADS (NIS2.34/share) after a substantial revision of our assumptions. We now include a universal, multi-seasonal flu vaccine indication in the US and Europe for the elderly, eventually expanding across all age groups, and for national stockpiling. BiondVax's financial position improved substantially over 2017, which will allow the company to invest more in late-stage development and retain more of M-001's value if a potential licensing deal emerges in the future.

15 January 2018

Price*	**NIS0.47**
Market cap	**NIS123m**

*Priced as at 11 January 2018

	NIS3.45/US$ NIS4.11/€
Cash at end-Q317 and short-term deposits	$22.6m (NIS78.1m)
Shares in issue	261.4m
Free float	75%
Code	BVXV
Primary exchange	TASE
Secondary exchange	NASDAQ

Share price performance

%	1m	3m	12m
Abs	1.7	(28.1)	31.2
Rel (local)	(2.7)	(31.6)	21.7
52-week high/low	NIS0.9	NIS0.4	

Business description

BiondVax Pharmaceuticals is developing a potentially universal influenza vaccine and the lead candidate, M-001, is set to enter a Phase III trial testing it as a standalone influenza vaccine. So far M-001 has been investigated in two Phase I/II and four Phase II trials and consistently demonstrated immunogenicity to multiple virus strains.

Next events

Further details about the Phase III trial	2018
Start of enrolment in Phase II with NIH in the US	H118
Start of enrolment to Phase III trial	Q318

Analysts

Jonas Peciulis +44 (0)20 3077 5728

Alice Nettleton +44 (0)20 3077 5700

healthcare@edisongroup.com

Edison profile page

Phase III likely to start in Q318

The preliminary clinical trial design (Exhibit 1) includes recruitment of around 7,700 participants aged 50+ years who will be stratified into two groups ie those below 65 years and those who are 65+ years of age. M-001 will be administered intramuscularly on day 1 and again on day 21. Participants will be recruited mainly in Eastern European countries, as seasonal vaccine coverage rates in these countries tend to be smaller compared to Western countries, therefore recruitment could be faster and pose less ethical concerns (vaccinating with M-001 instead of conventional seasonal vaccine). At least one season will be allowed for follow-ups, with interim reports likely after each season. Since flu seasons tend to fluctuate in terms of infection prevalence, the trial is designed to have flexible enrolment which will allow recruitment of the additional required participants in season 2 and season 3 if needed.

Regulatory authorities currently evaluate seasonal vaccines based on influenza virus hemagglutinin (HA) antibodies, which correlate with protection, ie seasonal vaccine manufacturers do not need to conduct robust, large-scale clinical trials every year. Since the M-001 vaccine does not induce the production of these antibodies, BiondVax plans to evaluate the clinical efficacy of vaccination with M-001 by measuring the reduction in influenza-like illness (ILI) rate and severity, a robust primary clinical endpoint. The European Medicines Agency (EMA) confirmed that a single pivotal efficacy trial that proves efficacy against laboratory-proven ILI would be sufficient for an approval in the EU.

The trial is planned to start prior to the 2018/19 flu season (late Q318). BiondVax's financial position improved substantially over 2017, but we maintain our scenario that with current funding the company could initiate the study and make substantial progress, although to finish it additional funds will be needed. According to BiondVax, these funds could come from various sources including non-dilutive funds, equity raises or partnering (we assume partnership deal as described in the Valuation section).

Exhibit 1: Potential Phase III trial with M-001 design

Trial	Season 1			Season 2	Season 3 (optional)
	Day 1	Day 21	Day 180 follow-up	Follow-up	Follow-up
Intervention	1mg M-001	1mg M-001	Safety, PCR and culture testing if influenza-like illness is observed in subjects		
Control	Placebo	Placebo			

Source: BiondVax. Note: PCR – polymerase chain reaction.

Market expansion strategy

We note that the upcoming Phase III study will involve participants who are over the age of 50, which BiondVax views as the primary target population. Typically, guidelines consider the elderly population to be most at risk and therefore recommend vaccination, so this target population could be the fastest route to the market. If the Phase III trial is successful there is potential for it to be expanded to other age groups, although for the time being it is not clear whether a bridging study will be needed. In terms of geographies, the EMA agreed that the upcoming study, if successful, would be sufficient for registration in Europe. To register M-001 in the US, BiondVax expects the FDA to use the data from the European study.

The use of M-001 as a multi-seasonal flu vaccine is the primary indication, although national stockpiling is a distinctive opportunity as well. If approved, M-001 could become a preferred vaccine for national stockpiles, in our view.

Clinical testing to date: Encouraging immunogenicity

To date, BiondVax has conducted two Phase I/II trials and four Phase II trials involving 698 participants across different age groups. Phase IIb BVX-007 was the latest trial to report the data in July 2017, which further confirmed the findings from previous studies. M-001 has been shown to have a good safety profile, elicit immunogenicity to multiple flu virus strains and activate both humoral and cellular immune responses (cell-mediated immunity), as opposed to the mainly strain-specific humoral arm stimulation elicited with conventional seasonal flu vaccines. Exhibit 2 summarises M-001's clinical trial results to date.

Exhibit 2: Summary of completed trials with M-001

Trial	Age group	Year and Phase	Size (n)	Comments
BVX-002	18-49 years	2009, Phase I/II	63	The study demonstrated safety and immunogenicity of two doses of M-001 intramuscular injection with or without an adjuvant.
BVX-003	55-75 years	2010, Phase I/II	60	Safety and immunogenicity of two doses of M-001 intramuscular injection with or without an adjuvant was demonstrated in elderly patients.
BVX-004	18-49 years	2011, Phase II	200	In addition to more safety data (primary endpoint), the double-blind, placebo-control trial tested the idea of **seasonal vaccine priming** with M-001. The results demonstrated that increased humoral and cellular responses were detected after co-administration of adjuvanted M-001 with seasonal vaccine as compared to after co-administration of placebo with seasonal vaccine.
BVX-005	65 years+	2012, Phase II	120	In addition to more safety data (primary endpoint), the trial tested different **priming regimes** (one or two doses of 0.5mg of M-001; adjuvanted with aluminium phosphate or not) of vaccination with M-001 followed by seasonal vaccine in elderly population with the secondary endpoints being humoral (hemagglutination inhibition assay, HAI) and cell mediated (CD4+ and CD8+ lymphocytes producing IFN-gamma) immune responses. Results echoed previous trials showing safety and activation of both humoral and cellular responses. BiondVax revisited the study later on, when it exposed the blood plasma from the BVX-005 trial to H3N2 epidemic strain (2014/15) that did not exist in 2012. The immunogenicity was measured using HAI, which worked because M-001 was used as a primer to seasonal vaccine. The results showed that the level of protective antibodies against H31N2 was significantly higher in the M-001 primer group than in the control (seasonal vaccine only in 2012 study). Around of 50% of the participants in the M-001 group showed immunogenicity against the new strain versus only 10% in the control group (statistically significant).
BVX-006	50-64 years	2015, Phase II	36	Further safety and immunogenicity data from more intensive regimens: with regular 0.5mg (established in previous trials) and higher 1.0mg doses and three-dose regimen followed by seasonal vaccine. Results were consistent with the previous data and no significant side effects were noticed in the higher dose group. M-001 primed broader immune response than those strains included in the seasonal vaccine.
BVX-007	18-60 years	2017, Phase IIb	219	This was a randomised, double-blind, controlled trial that enrolled 219 adults into three arms: M-001 doses of 0.5mg and 1.0mg, and placebo. The total monitoring period was 180 days. The primary endpoints of safety and cellular immune response were both achieved echoing positive data from the previous trials.

Source: BiondVax

In November 2017, BiondVax announced that it had signed a clinical trial agreement for a Phase II clinical trial with the National Institute of Allergy and Infectious Diseases (NIAID) of the US National Institutes of Health (NIH). As guided before, the trial will be funded by the NIH and, according to plans this will be the last Phase II study. The US study (n=120) is designed to test M-001's priming effect before the administration of seasonal vaccine (the other group will receive placebo and seasonal vaccine). The study is expected to start after the end of the 2017/18 flu season.

EIB loan and share issues pave way for Phase III

In addition to successful share issues in January and September 2017, the €20m loan from the European Investment Bank (EIB) was a game changing event for BiondVax, in our view, as it allowed it to proceed to Phase III trial with M-001. The agreement was signed on 19 June 2017 and over the next three years the company will be able to draw down all the money presuming the development milestones related to the lead universal flu vaccine candidate M-001 are met. The new funds are available via Horizon 2020, the EU Research and Innovation Framework Programme for 2014-20, managed by the European Commission and the European Investment Bank Group.

We believe that before the loan was agreed, BiondVax underwent a substantial due diligence process to demonstrate the potential of its universal flu vaccine's potential. We therefore take it as an external validation of BiondVax technology, which could also raise the company's profile when approaching potential partners.

The loan is interest-free; remuneration will vary depending on royalties from net sales of M-001 once approved. BiondVax retains an option to repay the loan and repurchase the royalties at any time. The company can draw down in three tranches within 12, 24 and 36 months, which will also depend on certain agreed milestones eg manufacturing of first clinical batch for the Phase III clinical trials. The tranches are repayable five years after each drawdown. The funds from EIB cannot exceed 50% of the total financing requirement for the M-001 development and related activities.

M-001 multi epitope-based vaccine vs conventional

Innate and acquired immune system roles combating flu virus

There are two immune system types: innate and acquired. Innate is the in-born, non-specific ability to defend against infections, while acquired immunity is specific to a pathogen and is responsible for a long-lasting effect eg vaccination. Most vaccines in use today work by inducing antibody based immunity (acquired), but animal models and early-stage clinical trials have suggested that generating cellular immunity via T-cell responses (innate) may induce broad protection that current vaccines lack. Furthermore, humoral immunity (antibodies) is effective against extra-cellular antigens, while a virus's life cycle is mainly inside the cells and therefore not exposed to antibodies. Cell-mediated immunity is more effective against intra-cellular infections including the influenza virus. The role of cellular immunity (innate) among others includes the direct clearance of virally infected cells, the indirect recruitment of other immune cells and also B cell stimulation (humoral response) leading to specific antigen antibody production.

Exhibit 3: Basics of influenza virus and seasonal vaccination

Influenza virus classification	Types: A, B and C. Influenza A viruses are subtyped according to their surface antigens (glycoproteins): hemagglutinin (HA, 18 serotypes) and neuraminidase (NA, 11 serotypes), eg H1N1. Influenza B viruses are separated into two lineages (Yamagata and Victoria), but are not subtyped.[1] Virus A has been the cause of all flu pandemics in humans, while virus A and B cause seasonal epidemics[2]. Influenza C infections cause mild respiratory illnesses.
Virus mutation	The viral RNA genome spontaneously mutates, resulting in gradual changes in the seasonal viruses known as antigenic *drift*. Since the new serotype is still somewhat similar to the prior one a large percentage of the people will still be immune. Larger genetic changes, called antigenic *shift*, is caused by re-assortment of the genome segments and occurs particularly in the hemagglutinin protein of influenza A viruses. This can create a pandemic with uncontrolled spreading throughout the population.
Pandemics are the result of antigenic shift	Only type A viruses cause pandemics as they have a reservoir in animals (birds, swine, bats). Genetic mixing between viruses of human and animal origin occasionally leads to a viable influenza A virus strain to which humans have little or no immunity. A recent example was the 2009 outbreak of H1N1 of swine origin ('swine flu'). Type A H5N1 and H7N9 (avian) is currently causing the greatest pandemic concern. Highly pathogenic H5N6 and H5N8 are other two avian flu type A viruses that are spreading across Europe and Asia through multiple bird species with the latest H5N6 outbreak in poultry farms reported in South Korea this month.
Seasonal flu	At any one time there is a mix of influenza viruses circulating in the human population. For the 2016-17 season vaccines are recommended to contain influenza strains A(H3N2), A(H1N1)pdm09 (2009 swine flu pandemic) and one or two B virus lineages (depending on whether the vaccine is trivalent or quadrivalent).
Vaccine strain selection	It takes around six months to produce the most widely used, egg-based influenza vaccines. Therefore, based on circulating virus samples, the World Health Organisation (WHO) annually predicts which seasonal A and B strains will likely dominate the next season. Vaccine manufacturers produce a new three-strain (trivalent, TIV) or four-strain (quadrivalent, QIV) influenza vaccine accordingly. However, antigenic drift/shift during the months between selection (in March) and vaccine distribution (September-November) can result in a mismatch between the strains in the vaccine and those circulating in the population. In this case the vaccine may not provide adequate protection.

Source: Edison Investment Research

[1] Prevention and Control of Seasonal Influenza with Vaccines. CDC, Recommendations and Reports / August 26, 2016 / 65(5); 1–54.

[2] Q. M. Sheikh. Towards the knowledge-based design of universal influenza epitope ensemble vaccines. Bioinformatics, 32(21), 2016, 3233–3239.

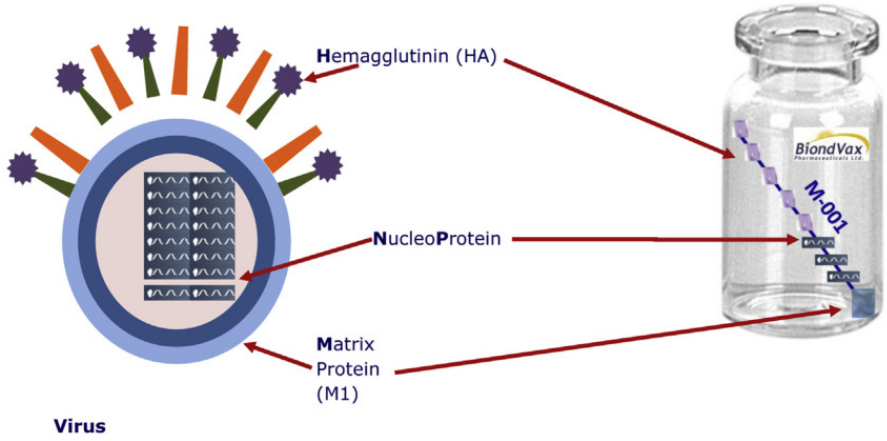
Conventional seasonal vaccines and 'multimeric' M-001

Most current flu vaccines are subunit vaccines. The virus is grown, then inactivated and its surface antigens (eg HA) are used for immunisation. Other existing types of vaccines are live attenuated typically delivered as nasal sprays or injections.[3] These vaccines rely on triggering humoral (acquired) response to the common variable surface regions of the influenza virus, therefore are highly strain specific. BiondVax's technology, in-licensed from Yeda Research and Development (Weizmann Institute of Science), is based on peptide technology, which uses a combination of conserved and common epitopes from influenza virus proteins.

The conserved epitope-based approach focuses on the minimal component of a viral protein that activates the lymphocyte. Typically this corresponds to short peptides from 8-10 amino acids for the activation of T-cells and longer regions of up to 20 amino acids for activating B-cells. Based on technology developed by Professor Ruth Arnon at the Weizmann Institute (Professor Arnon is also known as the co-developer of Copaxone, the blockbuster multiple sclerosis drug), BiondVax has designed a vaccine specifically to activate both the cellular (T-cells destroy virus infected cells) and the humoral (B-cells produce specific antibodies against the virus) arms of the immune system, both of which are now recognised to play an important role in controlling influenza infection. A number of targets for influenza vaccine have been investigated by BiondVax and other researchers that would activate both T-cell and B-cell responses. These include conserved 'stalk' domain of hemagglutinin antigen, nucleoprotein (NP), Matrix 1 (M1) and Matrix protein 2 (M2e) among others.

The engineered 'multimeric' vaccine M-001 contains nine conserved and common epitopes (short peptides) from HA, M1 and NP viral antigens (Exhibit 4). The epitopes are combined into a single recombinant protein easily manufactured in *E. coli* bacteria. These specific epitopes activate both arms of the immune system.

Exhibit 4: In total nine conserved epitopes from HA, M1 and NP antigens comprise M-001



Source: BiondVax; T. Gottlieb and T. Ben-Yedidia. Epitope-based approaches to a universal influenza vaccine. Journal of Autoimmunity 2014, 1-6.

[3] T. Gottlieb and T. Ben-Yedidia. Epitope-based approaches to a universal influenza vaccine. Journal of Autoimmunity 2014, 1-6.

Exhibit 5: Comparison of M-001 and conventional flu vaccines

BiondVax M-001	Conventional flu vaccine
Broader immune system activation: designed to activate antibodies (humoral response) and specific T and B lymphocytes (cellular response); evidence of cross-protection to other strains.	Often limited to anti-HA antibody induction. No cross immunity conferred to non-vaccine strains.
Broad coverage of strains: covers different type A and B seasonal and pandemic influenza strains, both current and future.	Limited to 2 A strains and 1-2 B strains. Requires new vaccine each season and separate stockpiles for each pandemic with a limited possibility that the correct strain was stockpiled.
Shorter production time: 6-8 weeks. Invaluable in a pandemic outbreak.	Long production time: 16-24 weeks lead-time. Requires forward planning.
Year round production, ability to stockpile: M-001's conserved peptide components eliminate the need to reformulate the vaccine every season; enables year-round, flexible production and stockpiling according to demand.	Inflexible: the WHO selects three to four strains in Q1 each year; these are produced and distributed in the Northern Hemisphere during September to November.
Egg-free production method in bacterial system.	Egg-based manufacture: lengthy, costly and can cause allergic reactions.

Source: Edison Investment Research, BiondVax

High disease burden and low flu vaccine effectiveness

In the US, seasonal flu causes around 23,000 deaths a year, mainly in the elderly, and 200,000 hospitalisations (CDC). Worldwide there are estimated to be 3-5 million severe cases annually resulting in 250,000-500,000 deaths (WHO). Children under two years, those aged 65 and over and the chronically ill are most at risk. For example, around 90% of seasonal flu related deaths occur in elderly people, as influenza worsens outcomes or existing chronic conditions (CDC). Molinari et al estimated that in the US the economic impact of seasonal influenza was $10.4bn in direct medical costs alone, with a significantly larger burden due to lost lives, earnings and productivity of $87.1bn.[4] According to EvaluatePharma, the worldwide influenza vaccine market was $4.3bn, with Fluzone (Sanofi, quadrivalent) reaching top $1.5bn in sales in 2015.

Seasonal vaccines often fail to protect from flu infection due to the mismatch of the forecasted and prevailing virus strains, but also because of possible low efficacy even if there is a match. According to the CDC, the average overall adjusted vaccine effectiveness for influenza seasons in the general population has been approximately 40% over 2004-2016, partly due to the antigenic drift of influenza virus strains ('strain mismatch'), while the variation was significant over the same 2004-2016 from as low as 10% (2004) to as high as 60% (2010). Despite increasing vaccination rates, effectiveness is even lower in the elderly due to immunosenescence. There is a need for a more reliable vaccine that is both more immunoprotective and with coverage against a wider range of flu strains for the entire population and in particular for the elderly.

Consensus view on universal flu vaccine

On 10 August 2016, BiondVax participated in the 'Eighth WHO meeting on development of influenza vaccines that induce broadly protective and long-lasting immune responses' held in Chicago, US. The WHO's Global Vaccine Plan calls for at least one licensed universal influenza vaccine by 2020 in response to poor effectiveness rates with conventional seasonal vaccines. The WHO monitors the progress and conducts periodic meetings with experts, who provide thought leadership about the development of innovative influenza vaccines. In our view, the clinical data so far and the positioning of M-001 are broadly in line with the consensus view about the universal vaccine.

[4] N. Molinari. The annual impact of seasonal influenza in the US: Measuring disease burden and costs. Volume 25, Issue 27, 28 June 2007, Pages 5086–5096.

Valuation

Our valuation of BiondVax is increased to $200m (NIS689m) or $32.4/ADS (NIS2.80/share) from $165m (NIS577m) or $26.8/ADS (NIS2.34/share) after substantial revision of our assumptions. We note that there are c 86m out-of-the money options and warrants outstanding (weighted average exercise price of $6.4/ADS). We value BiondVax based on a risk-adjusted NPV analysis using a 12.5% discount rate and including net cash of $22.6m (NIS78.1m), which takes into account cash at end-Q317 and short-term deposits.

Exhibit 6: Sum-of-the parts summary of BiondVax valuation

Product	Launch	Peak sales ($m)	Full rNPV ($m)	Technology probability	Licensing deal probability	BiondVax's rNPV ($m)	rNPV/ ADS ($)	rNPV/ share (NIS)	Comments
Standalone universal vaccine	2023	1,260	281.3	60%	30%	93.9	15.23	1.31	Full rNPV reflects the valuation as if BiondVax develops and markets M-001 by itself assuming all associated costs. The licensing deal was modelled on the basis of full rNPV split at 50% (BiondVax):50% (partner).
National stockpile	2026	680	166.7	60%	30%	83.4	13.53	1.17	
Net cash ($)			22.6	100%		22.6	3.68	0.32	
Valuation ($)			**470.7**			**199.9**	**32.44**		
Valuation (NIS)			**1,623.1**			**689.2**		**2.80**	

Source: Edison Investment Research. Note: WACC = 12.5% for product valuations.

Revision of valuation assumptions

In our initiation report, we assumed a scenario in which BiondVax would develop M-001 in a stepwise manner, with a pandemic primer and seasonal primer for at-risk populations being the first indications, and then expanding to a universal, standalone influenza indication, which is the ultimate goal, but also the most R&D-intensive. With the new funds from the EIB and the recent share issue and an input from the regulatory authorities, BiondVax is able to initiate the Phase III trial on its own for the ultimate universal vaccine indication. We have therefore revised our valuation and now include the universal flu vaccine indication and national stockpile potential. As discussed on page 2 (market expansion strategy), the upcoming Phase III trial will involve 50-year-olds+, but, if successful, we believe it is likely that the company would pursue expansion into other age groups. In addition, BiondVax expects to use the Phase III data to file for FDA approval. Subsequently, national stockpiling could be a realistic opportunity, which we also include in our valuation. Below we summarise the main changes to our assumptions compared to our previous reports.

- **Indications**. We previously included a seasonal primer indication and pandemic (stockpiled) vaccine primer for M-001 in the US and Europe. We now include a universal flu vaccine indication and national stockpiling (M-001 as a pandemic vaccine) in both the US and Europe.
- To reflect the broader indication – M-001 as a standalone vaccine – we reduce our technology **success probability** from 70% to 60% and maintain our 30% probability for a partnership deal.
- **Phase III costs and funding**. As previously, we assume a study cost of $50m and we maintain our scenario that BiondVax will able to establish a partner, who will co-fund the study. Following successful share issues in 2017, BiondVax reported cash and short-term deposits of $22.1m (NIS78.1m) and also has access to a €20m loan from the EIB. This means that the company's financial position has improved substantially. Previously, we assumed a Phase III cost split of $15m/$35m (BiondVax/partner), but we now assume $35m/$15m.
- **Assumed licensing deal terms**. Due to the lack of benchmark deals to model the out-licensing we have used NPV split between BiondVax and the partner to calculate milestone payments. We described the deal mechanics in our initiation report (see 'Licensing deal assumptions and calculations'). Because of the larger Phase III co-funding, we have increased BiondVax's NPV share from 35% to 50% with the partner getting the remaining half. To justify such a split, we calculate royalty payments up to 13% to BiondVax and total milestone

payments of $2.3bn related to R&D and commercial achievements, which are split between the universal flu vaccine indication and national stockpiling.

- **Market expansion**. We assume launch in Europe for 50-year-olds+ in 2023 and in the US in 2024. While the requirements to expand into a younger age group are not clear, we believe this should be less arduous than the upcoming Phase III study. We include $20m to be spent by the partner and the launch for <50-year-olds in 2025 in both geographies. We assume that the US and European countries will start purchasing M-001 for national stockpiles from 2026 and 2027, respectively. The US BARDA has a goal to stockpile for 20 million of critical workforce. We use this as a market size for the US and half of that in Europe because of the fragmented market. We assume the stockpile will be built over three years, with one-third replaced every year.
- **Vaccination coverage rates (accessible target population).** We assume vaccines effectiveness of four years meaning that individuals vaccinated with M-001 in year 1 will not need to be vaccinated again until year 4. This lag reduces the individuals available for vaccination in year 2 and 3 in the model. Currently, around 45% of people in the US are vaccinated against influenza with this number being relatively stable over the past five to six seasons (CDC). CDC recommends that everyone aged from six months or older should get a flu vaccine, which shows a very proactive stance aiming for full protection, as opposed to European countries where recommendations vary significantly, with the only unanimous recommendation for elderly people. In our view, M-001 market uptake would be substantially affected by what recommendation level M-001 reaches. We assume a more conservative target population when modelling M-001 in European countries. Currently only up to around 25% of the population is vaccinated in western European countries, which we use as an assumption of coverage rate in 14 European countries (Denmark, Finland, Norway, Sweden, United Kingdom, Italy, Spain, Austria, Belgium, France, Germany, Luxembourg, Netherlands and Switzerland).
- We have reduced our market **penetration rate** from 25% to 20% to reflect the inclusion of specific population subgroups in previous indications. A universal flu vaccine indication would mean that M-001 will be accessible to the broader market and will compete with seasonal vaccines.

Our other assumptions remain unchanged as discussed in previous reports (initiation and subsequent revision) with key ones being:

- Premium pricing of $25 per person; the current trivalent vaccine price per dose in the US is around $8-9 and quadrivalent $13-15, indicating that newer quadrivalent vaccines managed to attract a premium, although whether the additional protection against type B virus confers a clinical benefit is still not clear.
- We assume that M-001 will be marketed by the partner with patent protection until around 2035. Commercial assumptions include 10% COGS, 10% sales and marketing expenses for stockpiling and 15% for the universal flu vaccine indication. In addition, we assume a 3% pay away from net sales to the original licence holder, Yeda Research.

Financials

BiondVax's 9M17 operating expenses were $2.5m (NIS8.8m), of which R&D and G&A costs were $1.5m (NIS5.1m) and $1.1m (NIS3.7m) respectively. We revised our total OPEX estimate for 2017 downwards from $4.4m (NIS15.2m) to $3.3m (NIS11.4m) due to better than expected R&D spend. We expect a pick-up in R&D spend (estimate of $5.0m or NIS17.2m for 2018) as the company initiates the Phase III trial.

BiondVax is in a much better financial position than a year ago. The company reported cash and short-term deposits of $22.1m (NIS78.1m) at end-Q317 ($7.1m or NIS 27.4m at end-2016)

following successful share issues in January and September 2017. In addition, the company now has access to €20m from the EIB. We estimate cash of $27.7m (NIS95.5m) at end-2017. Notably, as previously our forecast includes the first drawdown of €6m from the European Investment Bank (EIB) loan (more detailed discussion on page 3). However, according to the agreement the first drawdown could be completed within a 12-month period since the agreement was signed in June 2017, so it may slip into 2018. As previously, we assume that BiondVax will draw down €6m in each of 2017 and 2018 (according to the agreement, the first two drawdowns are between €4-6m), while the last drawdown will include the rest. Cash reach depends mainly on the actual costs of the Phase III trial. Our assumption is $50m, however costs related to such a large-scale trial with estimated 7,700 participants enrolled over two to three years are difficult to estimate. As explained above, our base case scenario is that the company will need additional funding to complete the trial. In addition to the completion of the trial, marketing and expansion into other age groups and geographies will require further funds, therefore, we assume a partnership agreement with a large pharma (in year 2020 in our model).

In our financial forecasts we also reflect plans to build a manufacturing facility. As announced previously, around €4m should be invested in the construction of the manufacturing plant and, as previously, we include capex of €0.5m, €2.25m and €2.25m in 2017, 2018 and 2019, respectively.

Exhibit 7: Financial summary

NIS'000s	2015	2016	2017e	2018e
December	IFRS	IFRS	IFRS	IFRS
PROFIT & LOSS				
Revenue	0	0	0	0
Cost of Sales	0	0	0	0
Gross Profit	0	0	0	0
Research and development	(7,906)	(7,794)	(6,667)	(17,241)
EBITDA	(10,675)	(11,279)	(10,671)	(17,438)
Operating Profit (before amort. and except.)	(11,303)	(11,900)	(11,389)	(18,682)
Intangible Amortisation	0	0	0	0
Exceptionals	0	0	0	0
Other	0	0	0	0
Operating Profit	(11,303)	(11,900)	(11,389)	(18,682)
Net Interest	1,104	2,716	(13,475)	140
Profit Before Tax (norm)	(10,199)	(9,184)	(24,864)	(18,542)
Profit Before Tax (reported)	(10,199)	(9,184)	(24,864)	(18,542)
Tax	0	0	0	0
Profit After Tax (norm)	(10,199)	(9,184)	(24,864)	(18,542)
Profit After Tax (reported)	(10,199)	(9,184)	(24,864)	(18,542)
Average Number of Shares Outstanding (m)	105.5	135.1	198.2	261.4
EPS - normalised (NIS)	(0.10)	(0.07)	(0.13)	(0.07)
EPS - normalised and fully diluted (NIS)	(0.10)	(0.07)	(0.13)	(0.07)
EPS - (reported) (NIS)	(0.10)	(0.07)	(0.13)	(0.07)
Dividend per share (NIS)	0.0	0.0	0.0	0.0
Gross Margin (%)	N/A	N/A	N/A	N/A
EBITDA Margin (%)	N/A	N/A	N/A	N/A
Operating Margin (before GW and except.) (%)	N/A	N/A	N/A	N/A
BALANCE SHEET				
Fixed Assets	4,379	3,971	5,305	11,245
Intangible Assets	0	0	0	0
Tangible Assets	2,044	1,443	2,777	10,767
Investments	2,335	2,528	2,528	478
Current Assets	36,928	26,139	99,355	101,014
Stocks	0	0	0	0
Debtors	1,442	815	3,800	3,800
Cash	33,470	15,705	94,355	97,214
Other*	2,016	9,619	1,200	0
Current Liabilities	(1,699)	(1,375)	(1,963)	(2,901)
Creditors	(1,699)	(1,375)	(1,963)	(2,901)
Short term borrowings	0	0	0	0
Long Term Liabilities	(69)	(76)	(24,016)	(47,956)
Long term borrowings	0	0	(23,940)	(47,880)
Other long term liabilities	(69)	(76)	(76)	(76)
Net Assets	39,539	28,659	78,681	61,401
CASH FLOW				
Operating Cash Flow	(10,262)	(9,688)	(207)	(15,239)
Net Interest	(5)	35	(13,475)	140
Tax	0	0	0	0
Capex	(34)	0	(2,052)	(9,233)
Acquisitions/disposals	0	0	0	0
Financing	33,753	0	62,025	0
Other	406	(8,112)	8,419	3,250
Dividends	0	0	0	0
Net Cash Flow	23,858	(17,765)	54,710	(21,082)
Opening net debt/(cash)	(9,612)	(33,470)	(15,705)	(70,415)
HP finance leases initiated	0	0	0	0
Other	0	0	0	0
Closing net debt/(cash)	(33,470)	(15,705)	(70,415)	(49,334)

Source: Edison Investment Research, BiondVax accounts. Note: *Other = other liquid cash resources.

Edison is an investment research and advisory company, with offices in North America, Europe, the Middle East and AsiaPac. The heart of Edison is our world-renowned equity research platform and deep multi-sector expertise. At Edison Investment Research, our research is widely read by international investors, advisers and stakeholders. Edison Advisors leverages our core research platform to provide differentiated services including investor relations and strategic consulting. Edison is authorised and regulated by the Financial Conduct Authority. Edison Investment Research (NZ) Limited (Edison NZ) is the New Zealand subsidiary of Edison. Edison NZ is registered on the New Zealand Financial Service Providers Register (FSP number 247505) and is registered to provide wholesale and/or generic financial adviser services only. Edison Investment Research Inc (Edison US) is the US subsidiary of Edison and is regulated by the Securities and Exchange Commission. Edison Investment Research Pty Limited (Edison Aus) [46085869] is the Australian subsidiary of Edison. Edison Germany is a branch entity of Edison Investment Research Limited [4794244]. www.edisongroup.com

EDISON ISRAEL DISCLAIMER

Disclosure regarding the scheme to enhance the awareness of investors to public companies in the technology and biomed sectors that are listed on the Tel Aviv Stock Exchange and participate in the scheme (hereinafter respectively "the Scheme", "TASE", "Participant" and/or "Participants"). Edison Investment Research (Israel) Ltd, the Israeli subsidiary of Edison Investment Research Ltd (hereinafter respectively "Edison Israel" and "Edison"), has entered into an agreement with the TASE for the purpose of providing research analysis (hereinafter "the Agreement"), regarding the Participants and according to the Scheme (hereinafter "the Analysis" or "Analyses"). The Analysis will be distributed and published on the TASE website (Maya), Israel Security Authority (hereinafter "the ISA") website (Magna), and through various other distribution channels. The Analysis for each participant will be published at least four times a year, after publication of quarterly or annual financial reports, and shall be updated as necessary after publication of an immediate report with respect to the occurrence of a material event regarding a Participant. As set forth in the Agreement, Edison Israel is entitled to fees for providing its investment research services. The fees shall be paid by the Participants directly to the TASE, and TASE shall pay the fees directly to Edison. Subject to the terms and principals of the Agreement, the Annual fees that Edison Israel shall be entitled to for each Participant shall be in the range of $35,000-50,000. As set forth in the Agreement and subject to its terms, the Analyses shall include a description of the Participant and its business activities, which shall inter alia relate to matters such as: shareholders; management; products; relevant intellectual property; the business environment in which the Participant operates; the Participant's standing in such an environment including current and forecasted trends; a description of past and current financial positions of the Participant; and a forecast regarding future developments in and of such a position and any other matter which in the professional view of the Edison (as defined below) should be addressed in a research report (of the nature published) and which may affect the decision of a reasonable investor contemplating an investment in the Participant's securities. To the extent it is relevant, the Analysis shall include a schedule of scientific analysis of an expert in the field of life sciences. An "equity research abstract" shall accompany each Equity Research Report, describing the main points addressed. The full scope reports and reports where the investment case has materially changed will include a thorough analysis and discussion. Short update notes, where the investment case has not materially changed, will include a summary valuation discussion. The Agreement with TASE regarding the participation of Edison in the scheme for the research analysis of public companies does not and shall not constitute an approval or consent on the part of TASE or the ISA or any other exchange on which securities of the Company are listed, or any other securities' regulatory authority which regulates the issuance of securities by the Company to the content of the Report or to the recommendation contained therein. A summary of this report is also published in the Hebrew language. In the event of any contradiction, inconsistency, discrepancy, ambiguity or variance between the English Report and the Hebrew summary of said Report, the English version shall prevail; and a note to this effect shall appear in any Hebrew summary of a Report. Edison is regulated by the Financial Conduct Authority. According to Article 12.3.2, Chapter 12 of the Conduct of Business Sourcebook, Edison, which produces or disseminates non-independent research, must ensure that it: 1) is clearly identified as a marketing communication; and 2) contains a clear and prominent statement that (or, in the case of an oral recommendation, to the effect that) it: a) has not been prepared in accordance with legal requirements designed to promote the independence of investment research; and b) is not subject to any prohibition on dealing ahead of the dissemination of investment research. The financial promotion rules apply to non-independent research as though it were a marketing communication.

EDISON INVESTMENT RESEARCH DISCLAIMER

 This report has been prepared and issued by Edison for publication globally. All information used in the publication of this report has been compiled from publicly available sources that are believed to be reliable, however we do not guarantee the accuracy or completeness of this report. Opinions contained in this report represent those of the research department of Edison at the time of publication. The securities described in the Investment Research may not be eligible for sale in all jurisdictions or to certain categories of investors. This research is issued in Australia by Edison Investment Research Pty Ltd (Corporate Authorised Representative (1252501) of Myonlineadvisers Pty Ltd (AFSL: 427484)) and any access to it, is intended only for "wholesale clients" within the meaning of the Corporations Act 2001 of Australia. The Investment Research is distributed in the United States by Edison US to major US institutional investors only. Edison US is registered as an investment adviser with the Securities and Exchange Commission. Edison US relies upon the "publishers' exclusion" from the definition of investment adviser under Section 202(a)(11) of the Investment Advisers Act of 1940 and corresponding state securities laws. As such, Edison does not offer or provide personalised advice. We publish information about companies in which we believe our readers may be interested and this information reflects our sincere opinions. The information that we provide or that is derived from our website is not intended to be, and should not be construed in any manner whatsoever as, personalised advice. Also, our website and the information provided by us should not be construed by any subscriber or prospective subscriber as Edison's solicitation to effect, or attempt to effect, any transaction in a security. The research in this document is intended for New Zealand resident professional financial advisers or brokers (for use in their roles as financial advisers or brokers) and habitual investors who are "wholesale clients" for the purpose of the Financial Advisers Act 2008 (FAA) (as described in sections 5(c) (1)(a), (b) and (c) of the FAA). This is not a solicitation or inducement to buy, sell, subscribe, or underwrite any securities mentioned or in the topic of this document. This document is provided for information purposes only and should not be construed as an offer or solicitation for investment in any securities mentioned or in the topic of this document. A marketing communication under FCA Rules, this document has not been prepared in accordance with the legal requirements designed to promote the independence of investment research and is not subject to any prohibition on dealing ahead of the dissemination of investment research. Edison has a restrictive policy relating to personal dealing. Edison Group does not conduct any investment business and, accordingly, does not itself hold any positions in the securities mentioned in this report. However, the respective directors, officers, employees and contractors of Edison may have a position in any or related securities mentioned in this report. Edison or its affiliates may perform services or solicit business from any of the companies mentioned in this report. The value of securities mentioned in this report can fall as well as rise and are subject to large and sudden swings. In addition it may be difficult or not possible to buy, sell or obtain accurate information about the value of securities mentioned in this report. Past performance is not necessarily a guide to future performance. Forward-looking information or statements in this report contain information that is based on assumptions, forecasts of future results, estimates of amounts not yet determinable, and therefore involve known and unknown risks, uncertainties and other factors which may cause the actual results, performance or achievements of their subject matter to be materially different from current expectations. For the purpose of the FAA, the content of this report is of a general nature, is intended as a source of general information only and is not intended to constitute a recommendation or opinion in relation to acquiring or disposing (including refraining from acquiring or disposing) of securities. The distribution of this document is not a "personalised service" and, to the extent that it contains any financial advice, is intended only as a "class service" provided by Edison within the meaning of the FAA (ie without taking into account the particular financial situation or goals of any person). As such, it should not be relied upon in making an investment decision. To the maximum extent permitted by law, Edison, its affiliates and contractors, and their respective directors, officers and employees will not be liable for any loss or damage arising as a result of reliance being placed on any of the information contained in this report and do not guarantee the returns on investments in the products discussed in this publication.

Frankfurt +49 (0)69 78 8076 960
Schumannstrasse 34b
60325 Frankfurt
Germany

London +44 (0)20 3077 5700
280 High Holborn
London, WC1V 7EE
United Kingdom

New York +1 646 653 7026
295 Madison Avenue, 18th Floor
10017, New York
US

Sydney+61 (0)2 8249 8342
Level 12, Office 1205
95 Pitt Street, Sydney
NSW 2000, Australia

Tel Aviv +44 (0)20 3734 1007
Medinat Hayehudim 60
Herzilya Pituach,46766
Israel