

# focus



## The Three Vaccineers

The last few weeks has seen a flurry of positive news on COVID-19 vaccines. The potential impact of these vaccines (and possibly others) on economies and companies are front of mind for investors.



**...It looks like we'll have multiple COVID-19 vaccines available in less than a year...**

Over the past 2½ weeks three vaccine candidates – BioNTech/Pfizer, Moderna, and, most recently, Oxford University/AstraZeneca – have reported promising (at least interim) phase 3 trial results.

These are impressive scientific achievements. Time to develop vaccines is often measured in decades. It looks like we'll have multiple COVID-19 vaccines available in less than a year.

**Three promising vaccine candidates**

	BIONTECH/PFIZER	MODERNA	OXFORD/ASTRAZENECA
<b>Vaccine technology</b>	mRNA	mRNA	adenovirus
<b>Efficacy</b>	95%	94.5%	70% (up to 90% depending on dosage)
<b>Estimated prices (per dose)</b>	US\$20	US\$25	US\$3/4
<b>Doses required</b>	2	2	2
<b>Storage</b>	-70°C to -80°C	-20°C (can be stored at 2 to 8°C for 30 days)	2 to 8°C
<b>Expected annual dosage capacity</b>	1.3 billion by end of 2021	0.5-1 billion expected by 2021	2 billion by end of 2021
<b>Potential availability</b>	13 December 2020		

Source: Company websites, Forsyth Barr analysis

**High vaccine efficacies have grabbed headlines**

Reports on the vaccines have focussed on efficacy which measures how well a vaccine reduces infections from a disease. (People often use efficacy and effectiveness interchangeably but there is a subtle difference. Efficacy is how well a vaccine performs given ideal conditions, effectiveness is how it actually performs in the community – for example, multi-dose vaccines usually have lower effectiveness because some people don't get all their shots or receive them at the right time.)

In clinical trials half the participants receive the vaccine and half get a placebo. Efficacy measures the reduction in the proportion of people who catch the disease. Using BioNTech/Pfizer as an example, from the more than 43,000 people in the trial 170 people caught COVID-19, of which 162 had received the placebo and only 8 the vaccine. The conclusion is the vaccine reduced the number of infections from 162 to 8, a 95% reduction (or efficacy).

The three vaccine candidates that have reported results have all had strong efficacy. BioNTech/Pfizer and Moderna both around 95%, and Oxford/AstraZeneca up to 90% (depending on dosage). All have far exceeded the US Food and Drug Administration (FDA) approval hurdle of at least 50%. It is important to note these are still preliminary findings. For example, there remains a question as to how many people may catch the virus but are asymptomatic (exhibit no symptoms) and can still spread the disease. A clearer picture should emerge once the trials are subjected to peer review.

### Efficacy is not the only factor needed for vaccine success

A high efficacy is a very good start, but it is not the only quality required for a vaccine to be successful. A number of other questions and factors need to be addressed including:

#### 1. Protection

How long does the vaccine last? How well does it protect vulnerable people, for example the elderly? Does it prevent people from carrying and transmitting the virus?

#### 2. Safety

Are there any longer-term safety issues? The good news is around 80% of a vaccine's side effects typically emerge in the first two months, and to date no concerns have emerged.

For both protection and safety questions we can only learn more with time.

#### 3. Logistics

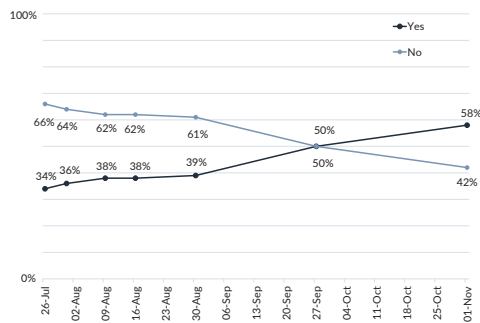
Differing manufacturing and distribution challenges mean multiple vaccines are important. BioNTech/Pfizer's vaccine requires an ultra-cold -70° to -80°C supply chain, which makes distribution difficult, particularly in developing countries. Conversely, Oxford/AstraZeneca's vaccine, which can be stored at normal refrigerator temperature, and will be sold at cost, is likely a better solution for these markets.

#### 4. Vaccine acceptance

Some people may be reluctant to take a new vaccine. To protect the entire population from the virus – achieving herd immunity when enough people are protected that a virus dies out – a certain proportion of people need to be immune. This threshold varies (for measles it's 96% of people, for polio it's only 80%) and is determined by factors including the

vaccine efficacy and virus's infectiousness. For COVID-19, modelling suggests the figure is 60-70%. A recent US survey suggests 58% of people are willing to be vaccinated today, with 26% preferring to wait to make sure it's safe. Hopefully evidence of vaccine success and safety should help promote uptake over time.

### “IF AN FDA-APPROVED VACCINE TO PREVENT COVID-19 WAS AVAILABLE RIGHT NOW, WOULD YOU AGREE TO BE VACCINATED?”



Source: Gallup, Forsyth Barr analysis

### Regulatory approvals the next step

Approval of a vaccine's use is particular to each individual country. Experts suggest it will be around April 2021 before a vaccine is approved for use across the broad population. To speed up the process, emergency use authorisations (EUAs) are available in some countries – allowing higher-risk portions of the population to be vaccinated. BioNTech/Pfizer have already made an EUA application in the US and, if successful, vaccination could begin in mid-December. Both Moderna and Oxford/AstraZeneca are expected to follow in coming weeks.

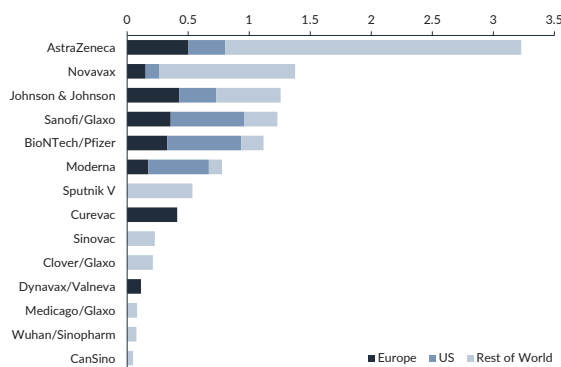
### (Hopefully) more to come

The scientific effort directed into countering COVID-19 remains unprecedented. Three promising vaccines in less than nine months is huge progress. Hopefully there will be more to come. There are currently a further 457 products in various phases of clinical development, including 42 vaccines with eleven in phase 3 trials. A number of Chinese developers, one in Russia, and Johnson & Johnson are expected to communicate results in the next few months. Different solutions have different strengths and weaknesses. And no single company has sufficient production capacity to supply global demand. The more available options, the greater the chance we can defeat COVID-19 through the medium-term.



**...people will start to be able to move more freely within and across borders...**

VACCINE DOSES UNDER CONTRACT



Source: Airfinity, Forsyth Barr analysis

**2020 year of the virus. 2021 year of the vaccine?**

2020 has been the year of virus. The big science question – can we develop a vaccine? – has been answered. 2021 hopefully will be the year of the vaccine. Whilst many questions remain, from next year (or even next month) we will start to see vaccines being rolled out. It still could be years before we reach herd immunity, but people will start to be able to move more freely within and across borders (immunity passports maybe?). The world and economies should start to look a little more normal as we progress through the year ahead.

**Understanding that sudden changes in financial markets can cause concern or indicate opportunity, your Forsyth Barr Investment Adviser is available to provide you with advice and assistance at any time.**



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