Vaccine Rollout Across the U.S. and Its Implications for the Economic Outlook

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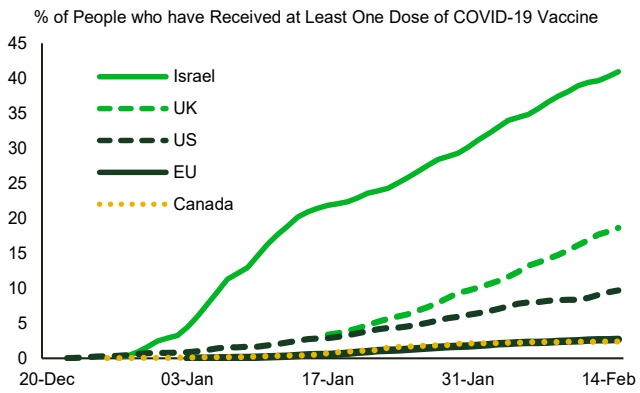
February 12, 2021

Highlights

- Vaccinations may have gotten off to a slow start in the United States, but the pace has picked up, with daily jabs averaging 1.6 million per day recently. Several factors, such as increased federal efforts and funding and the likely approval of new single-dose vaccines, suggest that the rollout should continue to gather speed.
- Roughly 10% of the U.S. population has received at least one vaccine dose to date. While most states are pacing closely in line with the national average, several outliers exist at both ends of the spectrum, with states like Alaska, West Virginia and New Mexico at the high end (12-15%), and states like Missouri, Kansas, Rhode Island and Alabama ranking at the bottom (about 8%). When it comes to full vaccinations, only about 3% of the U.S. population has received both recommended doses, with that tally ranging between 2% and 6% across states.
- Success on the vaccination front is an important element in gauging which states may be able to minimize the pandemic's health impact more quickly and be on their way to a firmer recovery cycle. However, the fact that it's still early in the race, and that protection via vaccinations is not the only element that matters, suggests that we should be careful in drawing conclusions too quickly. When we consider the share of the population that likely has some protection from having recovered from COVID-19 alongside the protection offered from vaccinations, state rankings look much different compared to looking at vaccinations alone.
- Falling infections and a ramp up in vaccinations, point to an improvement in health conditions ahead. Coupled with another likely jolt of fiscal stimulus, these factors bode well for U.S. economy to expand at a solid clip of more than 5% this year. This outlook however, hinges on the assumption that vaccine technology should be largely successful in keeping up with new and potentially more dangerous virus strains, with the latter posing significant downside risk to the outlook.

This year is widely expected to be a big turning point for many economies around the world, with the COVID-19 vaccine rollout being the main catalyst behind the positive outlook. The concept is simple. Reducing the virus' health impact through the use of vaccines will lead to improved confidence and allow for a loosening of restrictions, thereby leading to a firmer economic recovery.

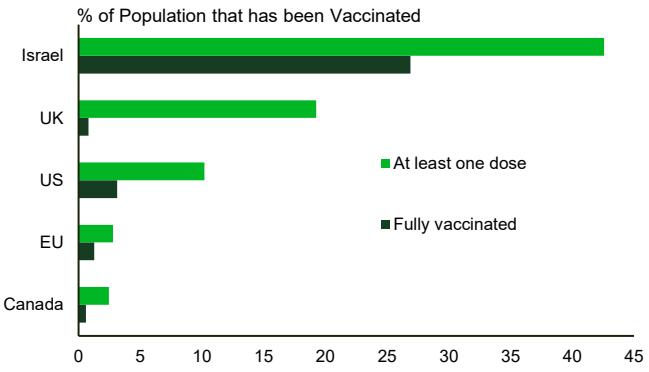
Chart 1: Israel Leads the Charge on Vaccinations



Source: OurWorldInData, TD Economics. Data as of February 10, 2021.

A number of vaccines have been approved for use against COVID-19 throughout the world. In the U.S. this presently includes that of Pfizer-BioNTech and Moderna. Both are highly effective at preventing severe disease soon after patients have received two doses of the vaccine, which are recommended to be spaced out 3-4 weeks apart.[1] When it comes to the spread of the virus, however, while preliminary research appears promising, it is presently unclear if and by how much these vaccines can reduce transmission. Several other vaccines (i.e. Johnson & Johnson, Novavax,

Chart 2: Full Vaccinations Lag Behind



Source: OurWorldInData, TD Economics. Data as of February 10, 2021.

Oxford-AstraZeneca etc.) have the potential to be approved for use in short order, which would help increase vaccine supplies and speed up the vaccination process.

A fast inoculation process is key in bringing the health crisis under control and will be an important factor in determining which economies come back faster. Israel, which has access to the same two vaccines as the U.S., is leading the race internationally. It has already fully vaccinated over a quarter of its population, while the share of the population that has received at least one vaccine dose, is even higher at close to 45% (Chart 1 and 2). Note that due to great efforts to quickly vaccinate populations throughout the world, these tallies are changing rapidly day-by-day. The United Arab Emirates (UAE), which have access to a third vaccine from China's Sinopharm, and the U.K., have also had considerable success in single-doze vaccinations, but both continue to lag on the share of the population that have been fully vaccinated.

At first glance, America's vaccine rollout has not been as successful. To date, only around 10% of the U.S. population has received at least one vaccine dose and only around 3% has been fully vaccinated. While certainly not topping the charts, the U.S. is still doing considerably better than many other advanced economy peers. In Canada and the European Union, the share of the population that has received at least one vaccine dose is still under the 3% mark. What's more, the vaccine rollout in the U.S. has gathered speed in recent weeks, and with states gaining more experience and further streamlining their vaccination processes, the rate of jabs is likely to rise higher.

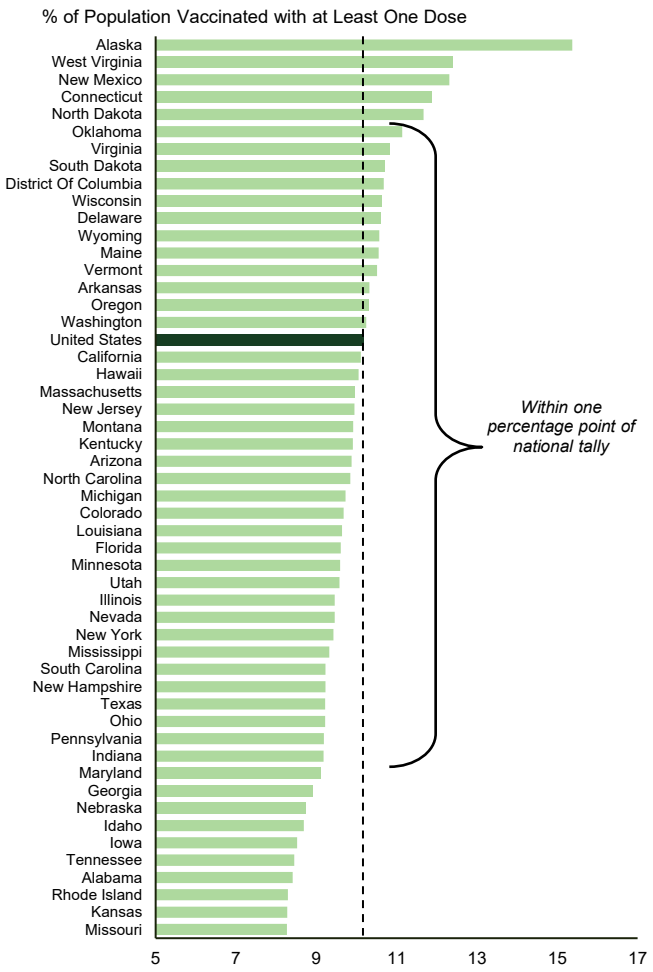
While still early days, improvements on the vaccination front, along with progress on COVID-19 treatments (i.e. drugs), are expected to significantly curb the pandemic's health impacts in the months ahead. Combined with another likely jolt of fiscal stimulus, these elements bode well for U.S. economy to expand at a solid clip of more than 5% this year, and potentially much higher depending on the size of the stimulus package, which could be as large as $1.9 trillion. Given a less pronounced contraction than many of its advanced economy peers in 2020 and expectations for a solid rebound this year, the U.S. is expected to top the G-7 growth charts over the 2020-21 biennium. Nonetheless, considering the volatile nature of the health crisis, the path ahead could still prove a bumpy one, with new and potentially more dangerous strains of the virus posing significant downside risk to the outlook.

U.S. States Moving At Different Speeds On Vaccinations

Studies suggest that the first vaccine dose offers only a limited level of protection against COVID-19. But, since patients are expected to follow through with their second recommended dose, this data can serve as an indicator in gauging where full inoculations are headed in the near future. While most U.S. states are pacing closely in line with the national average when it comes to the share of the population that has received at least one vaccine dose, there are a number of states that lie at the fringes (Chart 3). The group that is further behind in the vaccination process, includes states like Missouri, Kansas, Rhode Island and Alabama, with only about 8% of their respective populations having received at least one vaccine dose. At the other end of the spectrum, are states like Alaska, West Virginia, New Mexico, Connecticut and North Dakota, with their share of the population that has received at least their first jab ranging between 12% and 15%.

Given that vaccines have so far been largely distributed to states on a per capita basis, the delivery of vaccines does not appear to have been a major differentiating factor on inoculations across states, at least in the early stages of the vaccination process. To this end, the tally of delivered doses per capita for most states is still closely grouped just below the 20% mark. Alaska, which has to date received doses that are the equivalent of a third of its population, is the only main outlier to this theme. On the other hand, despite recommendations from the CDC as to which age groups or categories of the population should be prioritized in receiving the vaccine, states make and follow their own vaccination plans. This element is one to more

Chart 3: Vaccine Rollout Varies by State



Source: CDC, TD Economics. Data as of February 10, 2021.

critically affect a state's vaccination trajectory. This narrative is supported by the fact that states vary widely on their ability to administer the doses that have been delivered to them. States like Alabama and Kansas, which are further behind on vaccinations, have administered only about 60% of the doses that they have received so far. Conversely, states like North Dakota, New Mexico and West Virginia, which are further ahead, have administered the vast majority of received doses.

In short, the early vaccination experience suggests the capabilities of each state to administer the allocated doses and the strategies employed by each state in the vaccination process have played an important role in determining success rates. Some states have increased the pace of the rollout by extending vaccine eligibility to larger swathes of the population than what was federally recommended or making greater use of independent pharmacies to speed up the vaccination process. Taking a page out of the latter's playbook, the Biden administration recently announced the launch of the Federal Retail Pharmacy Program which will employ a large network of pharmacies throughout the country to help speed up inoculations by sending vaccine doses directly to these pharmacies.[2]

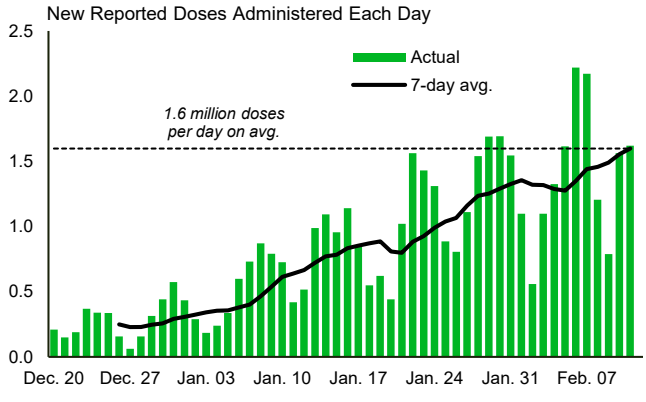
The Rate Of Vaccinations Is Likely To Accelerate Further

Vaccinations may have gotten off to a slow start in the United States, but the good news is that the pace of the rollout has picked up significantly in recent weeks. Over the last several days, vaccinations have averaged 1.6 million per day (Chart 4). This is in tune with the Biden administration's upgraded plan to vaccinate 150 million people (from 100 million originally) in the first 100 days of the presidency.

If vaccinations were to continue at the current pace, half of the U.S. population would be at least partially vaccinated by early July. That said, as states gain further experience and streamline the vaccination processes, the rollout should gather additional speed. Several other factors support this narrative:

- **Adequate vaccine supply:** The lack of an adequate vaccine supply is holding back the pace of vaccinations in many countries throughout the world, especially in emerging market countries, which have little to no access to effective vaccines. But, with large existing contracts in place and commitments from Pfizer and

Chart 4: Rate of Vaccinations has Accelerated



Source: CDC, TD Economics.

Moderna, supply is not expected to be a major obstacle for the United States. The federal government recently boosted the quantity of doses available to states to a minimum of 10.5 million per week. This level of supply is significantly higher than that of the previous month. What's more, the federal government also recently increased its order for Pfizer and Moderna vaccines from a combined 400 million to 600 million, with the additional doses expected to be delivered over the summer. This cache alone, excluding what can be procured from other vaccines that may approved for use in the future, would be enough to fully vaccinate 300 million Americans – the vast majority of the population. Given the importance of having an abundant vaccine flow, the government is taking additional steps to ensure that the ambitious delivery commitments are met. In this vein, the Biden administration recently invoked the Defense Production Act (DPA) to speed up the manufacturing of the Pfizer-BioNTech vaccine.

- **Growing willingness to get vaccinated:** Cooperation from the public is an important ally in the fight against COVID-19. While the share of the U.S. population willing to get vaccinated is not as high as in some advanced economy peers, surveys show that that the vast majority of the U.S. population, about two thirds, are prepared to get inoculated.[3] In addition, this share has improved moderately since the end of last year, which means that attitudes regarding the vaccines continue to move in the right direction.
- **Changes in vaccine allocation to speed up the process:** The way in which vaccine doses are allocated to states changed recently. Instead of using the share of the adult population as a determinant, as it was done initially, the newest formula uses two key ingredients: the share of a state's elderly population (65+) and how quickly a state can administer the shots. The latter is likely to spur competition among states and incentivize a faster vaccine rollout throughout the country.
- **Increased federal funding/efforts:** President Biden's fiscal stimulus package devotes $400 billion to the fight against COVID-19. The plan would, among other things, scale up testing, increase the size of the public health workforce by 100 thousand, but also devote $20 billion to mount a national vaccination program. If passed, the additional funding, would certainly help grease the wheels to a faster rollout. What's more, besides using the Defense Production Act to speed the production of vaccines and personal protective equipment (PPE), the Biden administration is also directly engaging the military to help with the vaccine rollout. More than 1000 active-duty troops will soon be deployed to five vaccination sites, to assist with COVID-19 vaccination efforts. Support from this channel is likely to increase in the coming weeks and months given that the Federal Emergency Management Agency (FEMA) has asked the Pentagon to supply more than 10,000 troops to staff 100 such vaccination centers throughout the country.
- **The approval of new, single-dose vaccines:** The fact that both the Pfizer and Moderna vaccines require two doses means that healthcare capacity must be split between those receiving their first and second doses. The approval of new vaccines, especially single-dose vaccines – such as that of AstraZeneca, which is already being used in the U.K. and was recently approved for use throughout the E.U.; or that of Johnson & Johnson, which recently applied for FDA approval – would boost the supply of vaccines and likely significantly speed up inoculations. The two aforementioned vaccines could come with added benefits, such as easier storage and transportation requirements, given that they can be stores at less extreme temperatures compared to the vaccines that are currently in use.

Vaccinations Only Part Of The Story

Vaccination data gives us a very good idea of which U.S. states have been the fastest off the blocks. At the same time, recent changes in the allocation of vaccines are likely to favor the front runners at the margin (i.e. will supply more doses to those states that have shown they are able to administer vaccines faster, potentially extending their lead in the near-term). While this information can certainly be used to gauge which states are likely to minimize their health impacts more quickly, and thus be on their way to a firmer recovery cycle, there are several reasons to not put too much stock on these rankings just yet.

For one, it's still fairly early in the race. While the share of the population that has received at least one vaccine dose range from 8% to 15% across states, the share of those

that have been fully vaccinated range at an even lower 2% to 6% range. Given the rapidly evolving nature of the vaccination process and the many changes that are taking place, being this early in the game means that states still have plenty of track left to change their rankings.

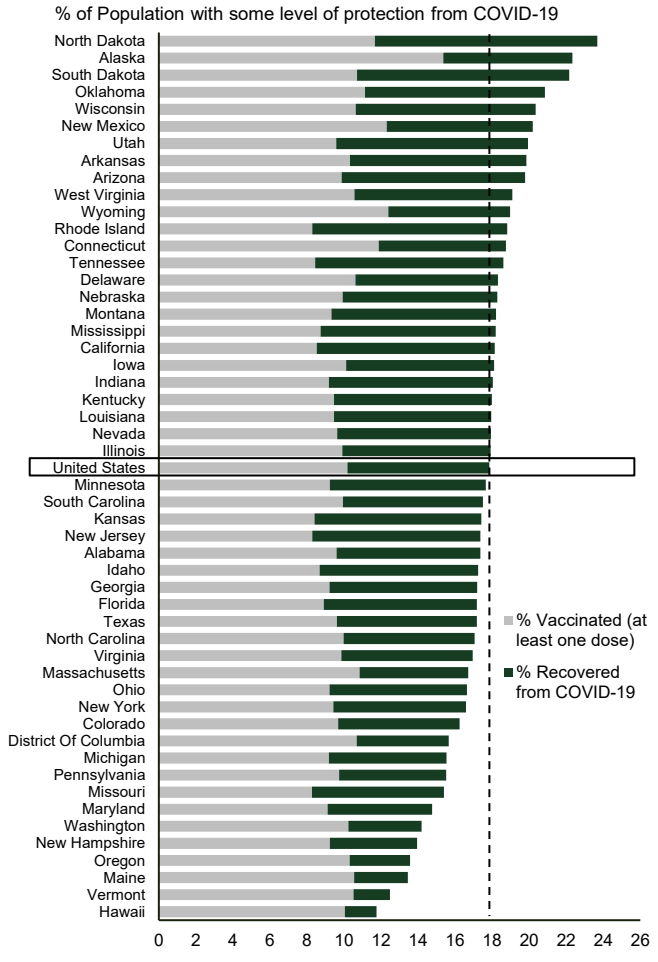
More importantly, however, vaccinations are only part of the story. Studies show that the vast majority of people (95%) that have contracted the virus and recovered from it, develop antibodies that offer a high level of protection from reinfection for up to eight months (see NIH summary here). We estimate the share of populations that are likely to have some level of protection from this channel by parsing through infection and death figures across states.

To date, the share of populations that is estimated to have some level of protection by having recovered from COVID-19 range from a low of around 2% in Hawaii to a high of nearly 13% in North Dakota, with the U.S. as a whole at close to 8%. These shares are similar in magnitude to the proportion of the populations that have some level of protection through vaccinations as discussed in the previous section. This means that, at least for now, this element should not be overlooked.[4]

Protection via the vaccine or having recovered from the disease are not mutually exclusive. The CDC recommends that those that have recovered from COVID-19 still take the vaccine to guard against reinfection.[5] Nonetheless, we have added these two elements in Chart 5 to gauge a more realistic reading on the proportion of the population that likely has some level of protection against COVID-19, irrespective of the source of this protection. The rankings look much different compared to looking at vaccinations alone. Note that middle-of-the-pack performers on vaccinations like Maine and Vermont shift down and rank near the bottom.

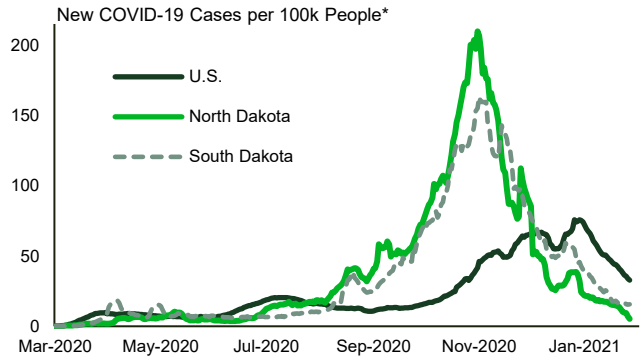
While Alaska's speedy vaccine rollout manages to vault it at the top of the leaderboard on this front too, the improved rankings of North and South Dakota mark an interesting case. The latter is the result of these states having the highest share of infected populations across the country from COVID-19, which eventually serves as a source of protection given that most of those infected recover from the disease and develop antibodies. Remarkably, new infections have plummeted in both of these states in recent weeks, despite having only limited restrictions in place and above-average mobility (Chart 6). With more than a fifth of their populations having some level of protection – among the highest across the nation according

Chart 5: Estimated Share of Population with Some Level of Protection from COVID-19



Source: CDC, TD Economics. Data as of February 10, 2021.

Chart 6: New Covid-19 Cases Have Fallen Sharply in North and South Dakota



*7-day moving average. Data as of February 10, 2021.
Source: Johns Hopkins University, TD Economics.

to this exercise – it is tempting to chalk the rapid decline in infections to the fact that they are getting close to herd immunity. But, given that recent studies peg the herd immunity threshold in the 60-90% range (see here), that case cannot be made with the data at hand. Still, alongside a number of other factors – such as changes in the behavior of the population (i.e. becoming more careful after the virus begins to spread rapidly), or other ad-hoc measures (i.e. North Dakota's mid-November to mid-January mask mandate) – it appears that the virus is indeed finding harder to infect new hosts given that large swathes of the population in these two states already have some protection from COVID-19.

New Infections Are Falling, But Mutations Are A Major Downside Risk

Viruses mutate with time, and the same is happening with SARS-CoV-2, the virus behind the COVID-19 disease. Numerous strains of the virus have been identified worldwide, including three potentially more dangerous strains that emerged in the U.K. (B.1.1.7), South Africa (B.1.351) and Brazil (P.1). These new strains are believed to spread more easily, while the U.K. variant may also be somewhat more deadly. CDC data indicates that all three variants have been detected in the U.S., with the U.K. variant having the largest spread nationally after having been detected in 34 states. Florida has the largest concentration of cases of the U.K. variant nationally, which could be an early sign of a potential pain point down the road.

More studies are needed to determine the specific characteristics of these strains and the effectiveness of vaccines against them. So far, however, preliminary analyses suggest that the two vaccines currently in use still offer some level protection against these variants (although, they may not be as effective against the South African variant, see here). Both companies are working to improve the effectiveness of their vaccines against the new variants, and new booster shots are in development. The good news is that the technology behind the Pfizer and Moderna vaccines (known as mRNA or "messenger RNA"), should allow for a quick tweaking of the original recipe to more easily adapt to the new strains.

Ultimately, if vaccines remain highly effective against new virus variants, the goal of minimizing health impacts and that of the economy getting back to normal would be largely unperturbed. Conversely, in the event that vaccines fail to keep up with mutations, including potentially dangerous mutations that could emerge in the future, additional bouts of volatility are to be expected. In this vein, it is important to keep up a multi-pronged fight against COVID-19 that goes beyond just vaccinations, with preventative measures, increased testing, but also a focus on therapeutic treatments, to ensure a greater degree of success in combatting the virus and limiting the damage from potential new infection waves.[6]

Bottom Line

Vaccines are probably the most effective tool at quickly bringing the virus under control, thus leading the U.S. and world economies to a firmer recovery path. The vaccine rollout in the U.S. got off to a slow start, but has improved noticeably in recent weeks. Several elements, such as an adequate vaccine supply, increased federal efforts and funding, and the likely approval of new vaccines (including single-dose ones), suggest that the pace of vaccinations should climb higher in the weeks and months ahead.

Vaccination data gives us a very good idea of which U.S. states have been the fastest off the blocks. But, while this information can be used to gauge which states are on their way to a firmer recovery cycle, the fact that we are still fairly early in the race, and that protection via vaccinations is not the only element that matters, suggest that we should be careful in drawing conclusions too quickly. When we consider the share of the population that likely has some protection from having recovered from COVID-19 alongside the protection offered from vaccinations, state rankings look much different compared to looking at vaccinations alone. As an example, states like North and South Dakota are vaulted to a higher ranking, while middle-of-the-pack performers on vaccinations like Maine and Vermont shift down and rank near the bottom.

It is important to note that while achieving herd immunity is the ultimate goal, the benefits of a ramp up in vaccinations will continue to trickle in ahead of this milestone. Rising vaccinations, coupled with downward trend in new infections point to an improvement in health conditions

ahead. A multipronged approach to fighting COVID-19 that spans beyond vaccination should also lend a hand. Getting control of the virus, will, in turn, usher in stronger confidence among consumers and firms – an important ingredient for strong economic growth. All these elements, coupled with another likely jolt of fiscal stimulus bode well for U.S. economy to expand at a solid clip of more than 5% this year, and potentially higher depending on the size of the stimulus package. This outlook however, hinges on the assumption that vaccine technology should be largely successful in keeping up with new and potentially more dangerous virus strains, such as through the development of booster shots. In the event that this does not prove to be the case, the path forward would likely continue to prove a choppy one, given the potential for the new COVID-19 variants to fuel new infection waves.

End Notes

1. The recommended interval between doses is 21 days for the Pfizer vaccine and 28 days for the Moderna vaccine, but the CDC has suggested that the interval can be extended up to 42 days (see here).
2. CDC, "Understanding the Federal Retail Pharmacy Program for COVID-19 Vaccination", (see here).
3. Ipsos survey, "Attitudes toward COVID-19 Vaccines", January 2021 (63%, see here); CNN/SSRS survey, January 2021 (66%, see here).
4. The fact that the pace of vaccinations is much higher than the spread of the virus suggests that the role of this element – the protection from having recovered from the disease – will fade with time vis-à-vis the role of vaccines.
5. CDC, Frequently Asked Question, see here.
6. For a comprehensive summary of COVID-19 therapy trials see here.

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