

VACCINATIONS AND THE ECONOMIC RECOVERY

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BEFORE THE
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VACCINATIONS AND THE ECONOMIC RECOVERY

WEDNESDAY, APRIL 14, 2021

UNITED STATES CONGRESS,
JOINT ECONOMIC COMMITTEE,
Washington, DC.

The WebEx virtual hearing was convened, pursuant to notice, at 2:30 p.m., before the Joint Economic Committee, Hon. Donald S. Beyer Jr., Chairman, presiding.

Representatives present: Beyer, Estes, Schweikert, Pocan, Arrington, Beatty, Peters, and Trone.

Senators present: Lee, Heinrich, Warnock, Cruz, and Klobuchar.

Staff present: Vanessa Brown Calder, Barry Dexter, Colleen J. Healy, Jeremy Johnson, Christina King, Nita Somasundaram, Kyle Treasure, Jackie Varas, Emily Volk, Jim Whitney, and Ismael Cid-Martinez.

OPENING STATEMENT OF HON. DONALD BEYER JR., CHAIRMAN, A U.S. REPRESENTATIVE FROM THE COMMONWEALTH OF VIRGINIA

Chairman Beyer. So this hearing will come to order. I would like to welcome everyone to the first Joint Economic Hearing of the 117th Congress. So welcome back, and welcome to all the new members.

I really look forward to working with Vice Chairman Heinrich, Senate and Ranking Member Mike Lee, who chaired this in the last Congress, House senior Republican David Schweikert, and all of our committee members, as we examine the many economic challenges and opportunities in our country.

I want to thank each of our distinguished witnesses for sharing their expertise today. Now, my brief opening statement.

The end is in sight. The pandemic and its tragic health and economic consequences have dominated our lives for the last year. After more than a year of physical distancing and mask wearing, of fearing for our health and the health of our loved ones, of widespread unequal economic hardship, the potential returning to a sense of normalcy is finally within sight. The pandemic will leave no shortage of tragedy in its wake. More than 560,000 people have died in the United States, many isolated in hospital rooms without their family's last comfort.

Thirty-one million, that we know of, have been infected with the coronavirus, and many of them continue to live with the disease's debilitating symptoms. Communities of color, particularly Black,

Latino, and American Indian communities, have been hit especially hard, experiencing the highest rates of COVID-19 infections, hospitalizations, and deaths.

Economic damage persists, as well. After job gains of more than 900,000 last month, still close to 10 million workers remain unemployed. One-quarter have been jobless for a year or longer. Another four million people have simply left the labor force since the pandemic began.

Thankfully, the economy is beginning to recover. Much of that recovery is due to the remarkable vaccination efforts unfolding in our country and throughout the world right now. Millions of shots are going into arms every single day.

More than 190 million doses have been administered in the United States. More than one in three people in the U.S. have received at least one shot. One in five Americans has been fully vaccinated. At the current rate, we can vaccinate all adults in the United States by the end of the summer.

And then, perhaps our lives will begin to approach a new normal where we can see loved ones, we no longer have to choose between going to work and keeping the family safe, where we can enjoy a meal inside the restaurant, or a trip to the movies.

There is a profound consensus among economists that vaccinations will shape the course of the economic recovery. Forecasts call for economic growth. Goldman Sachs may be the most optimistic, suggesting 8 percent in 2021. In an interview this past weekend, Fed Chair Jay Powell said the economy and job creation are poised for faster growth, and the principal risk is that, quote, “We will reopen too quickly. People will too quickly return to their old practices, and we will see another spike.”

Although the trajectory of the pandemic recovery is headed in the right direction, it remains precarious and can be derailed by hasty reopenings, new variants, anti-vaccine sentiment, and world access to vaccines. This means that our economic recovery is precarious, as well.

Public health experts warn that state efforts to roll back mask mandates and physical distancing requirements can backfire, especially in light of highly transmissible and deadlier variants.

Michigan’s recent experience makes clear that we cannot rely on vaccines alone as our only way out of the pandemic. We have seen recent spikes in cases as the more contagious V117 variant has now become the most common strain of the virus in the United States.

Young adults and children are comprising an ever-larger share of the new infectants, and if we cannot bring the pandemic under control globally, new variants might become resistant to our current treatments of vaccines, creating a need for adjusted vaccine products, further delaying the recovery efforts.

CDC Director Rochelle Walensky has said repeatedly that because of these concerns we cannot let our guard down and must continue to practice mask wearing and physical distancing until we reach herd immunity.

There is also profound inequity in access to vaccines. Vaccination rates for people of color, especially Blacks and Latinos, lag far behind the rates for Whites. As a result, pandemic recovery efforts in

communities of color may fall behind recovery to White communities. The reality is even worse abroad.

While wealthy countries have purchased enough vaccine to cover two and sometimes even three times their populations, low- and middle-income countries, which account for 81 percent of the world's adult population, have collectively purchased only 33 percent of vaccines.

As Treasury Secretary Yellen laid out last week, some low-income countries do not expect to be able to fully vaccinate the population until 2023 or 2024, which should be unacceptable and dangerous to all of us.

To end this pandemic for good, the battle against the coronavirus must be won globally. So while we have made progress in the last few months, we are not out of the woods yet. And I really look forward to hearing from our witnesses about the state of our recovery, where it is going, and what we are going to do to ensure things stay on track.

So let me turn this over to Senator Lee for his opening statement. Senator Lee is with us? Mike?

[The prepared statement of Chairman Beyer appears in the Submissions for the Record on page 40.]

**OPENING STATEMENT OF HON. MIKE LEE, RANKING MEMBER,
A U.S. SENATOR FROM UTAH**

Senator Lee. Yes. Thanks so much, Mr. Chairman. Thanks for convening today's hearing.

After a long COVID winter, one that included some unprecedented strains on our economy and on public health, the Spring has brought some welcome signs of life and of hope. Businesses are beginning to reopen. Schools are starting to reconvene in person, and friends and family members are finally starting to reunite.

Perhaps what is most encouraging, and what has helped support the beginning of our return to normal, has been the development and distribution of vaccines. But there is still a long way to go. Many Americans still have not returned to the in-person experiences of the entertainment and travel industries, for example, and our economy has suffered in order for people to feel safe, to return to in-person interactions that support economic activity.

We must continue to improve vaccine distribution. As we consider how best to move forward, it is worth reflecting on our trajectory so far, both the strategies that have helped, and those that have hindered our progress.

Though vaccine production has had some supply chain setbacks, such as the difficulty in finding vaccine components like reagents and other chemicals that have led to manufacturing bottlenecks, it has overall exceeded expectations.

Operation Warp Speed, an initiative begun by the Trump Administration, sped the development and the production of several vaccines, including Moderna, Pfizer, and Johnson & Johnson, by purchasing vaccines in development and directing resources toward vaccine manufacturing capacity.

In total, through advance purchase agreements and grants, the Trump Administration purchased more than 800 million doses through the end of July 2022. The Council of Economic Advisers

previously estimated that accelerated vaccine development and distribution by OWS could result in as much as \$2.4 trillion in economic benefit, if there was a viable vaccine by January 1st, 2021.

The effort actually outpaced that timeline with first doses of the Pfizer vaccine being made available on December 14th, 2020. And the CEA noted that its own estimate might even underestimate the full economic benefit of accelerated vaccine development.

In terms of vaccine distribution, there are worthwhile policy proposals to increase the number of people with some protection during that time period in which vaccine supplies are still somewhat scarce. We should be open to creative solutions that can help get people protected more quickly by strengthening the limited supply as far as we possibly can, and moving the doses that we have as quickly as possible to as many people as possible.

Our main priority should be to extend at least some protection to as many people as we possibly can. States also have an important role to play in distribution. In some cases, we have seen that restrictive Federal guidelines and rigid, complex eligibility requirements have impeded states' progress, leaving many vaccine doses to being wasted or administered to unintended populations.

Lack of health resources at the final stage of local distribution have also presented some problems for many areas. On the other hand, successful states have implemented simple eligibility criteria, and used technology to accelerate the distribution. Some have developed systems where patients can register online. Others have used online event hosting software to schedule appointments. And they have also partnered with local businesses and pharmacies.

Despite all of the challenges that we have faced, the U.S. has vaccinated more people per capita than most other countries in the world—nearly 190 million doses have been administered as of April 13th. More American citizens have received a COVID-19 vaccine than tested positive for the virus since the beginning of the pandemic. And nearly a third of the adult U.S. population is now fully vaccinated.

There is reason for hope in our economic outlook, as well. Expectations are set for a stronger economic response in the second half of the year. The CBO expects real GDP to return to its pre-pandemic level by 2021, and the labor force is expected to return to its pre-pandemic size by 2022.

But in order to accelerate our economic recovery, we should look for opportunities to improve vaccine distribution policy. The sooner the U.S. reaches herd immunity through vaccinations, the sooner businesses can reopen to full capacity, and students can return fully to schools, and industries can come back to life, and Americans can return to work and social life without fear.

So I look forward to hearing our panelists' contributions today, and their insights into how we can do just that. But before I do, I would like to ask Chairman Beyer for permission to submit five articles, or studies from our witness, Dr. Tabarrok, for the record.

Chairman Beyer. Without objection, they are admitted.

[The five articles referred to by Senator Lee appear in the Submissions for the Record on page 111.]

Senator Lee. Thank you.

[The prepared statement of Senator Lee appears in the Submissions for the Record on page 41.]

Chairman Beyer. Senator Lee, thank you very much for your statement.

I would now like to introduce our four distinguished witnesses.

Dr. Celine Gounder is Clinical Assistant Professor of Medicine and Infectious Diseases at the NYU School of Medicine & Bellevue Hospital. An infectious disease specialist and epidemiologist, Dr. Gounder served on the Biden-Harris COVID-19 Advisory Board. She is also the CEO of Just Human Productions, which works to build awareness around issues of health disparity. Dr. Gounder is a CNN Medical Analyst, and has written several publications.

She holds a B.A. in Molecular Biology from Princeton University, a Master of Science in Epidemiology from Johns Hopkins University of Public Health, and her M.D. from the University of Washington.

Dr. Paul Romer is the University Professor of Economics at NYU. In 2018, he received the Nobel Prize in Economic Sciences for his work integrating technological innovations—for economic analysis.

Dr. Romer is a frequent commentator on the COVID-19 pandemic, and has been a strong proponent of large-scale COVID-19 testing as a means of restarting the economy. In fact, about a year ago, Dr. Romer spent an hour with the Joint Economic Committee team talking about how we can use testing to protect the United States.

In his career at the intersects of economics and invasive technology and urbanization, working to speed up human progress.

Dr. Romer previously served as the Chief Economist for the World Bank, and he earned his B.S. in Mathematics with the University of Chicago, and a Ph.D. also in Economics from the University of Chicago.

Dr. Belinda Archibong is an Assistant Professor of Economics at Barnard College, Columbia University. She has done research on the economics of epidemics and vaccinations, and her broader research areas include developing economics, political economy, economic history, and environmental economics with an African regional focus.

Some of Dr. Archibong's research investigated historical institutions such as environment and unequal access to public services in the development of human capital. This research includes the effects of epidemics on gender gaps in human capital investment. She received her B.A. in Economics, Philosophy, and a Ph.D. in Sustainable Development both from Columbia University. And my mom was a 1948 Barnard graduate.

Then finally, Dr. Alexander Tabarrok, who is the Bartley J. Madden Chair in Economics at the Mercatus Center, and is Professor of Economics at our own George Mason University.

Dr. Tabarrok has advocated for policies to speed up the rate of vaccinations, including delaying second doses and fractional doses. Dr. Tabarrok is the co-author of [FDAREview.Org](https://www.fda.gov/review), which is the website that scrutinizes the FDA's regulatory and authority and performance.

Dr. Tabarrok is a Senior Fellow and former Research Director of the Independent Institute. He was a co-founder of the online edu-

cational platform “Marginal Revolution University,” and co-author of the textbook *Modern Principles of Economics*.

Dr. Tabarrok has a Ph.D. in Economics from George Mason University.

So, Dr. Gounder, I will offer you the floor for your testimony, and then we will continue in the order each of you was introduced. Dr. Gounder, the floor is yours.

STATEMENT OF DR. CELINE GOUNDER, M.D., ScM, FIDSA, CLINICAL ASSISTANT PROFESSOR OF MEDICINE & INFECTIOUS DISEASES, NYU SCHOOL OF MEDICINE & BELLEVUE HOSPITAL, CEO OF JUST HUMAN PRODUCTIONS, NEW YORK, NY

Dr. Gounder. Thank you.

Chairman Beyer, Vice Chair Heinrich, Ranking Member Lee, and Members of the Committee, thank you for the opportunity to discuss with you today the role of vaccination in our pandemic and economic recovery.

It is important to give credit where credit is due. The prior administration helped accelerate vaccine development safely, scientifically, and in record time. The current Administration is helping to scale up manufacturing and speed up distribution of vaccines.

We are currently vaccinating an average of 3 million people per day. And according to the CDC’s latest data, 37 percent of the total population has received at least one dose of vaccine, and 23 percent of the total population has been fully vaccinated.

Despite recent setbacks involving production and safety concerns with the Johnson & Johnson vaccine, we remain on track to have enough vaccine supply for every adult in the United States by the end of May.

Assuming we can continue vaccinating at the same pace of 3 to 3.5 million vaccine doses per day, we could vaccinate all adults well before the end of August. Vaccination rates reflect vaccine supply, access to vaccines, and demand for vaccines. Our supply is solid. We have done a lot of work to improve distribution and access, and yet we still have room to do better. But, importantly, we are about to see a big drop in demand. And this is going to have a big impact on our daily rate of vaccination.

Supply is already outstripping demand in several states. There is a spectrum of vaccine hesitancy, vaccine confidence, and vaccine seeking. The good news is that the share of Americans who want to, quote, “wait and see,” what we call the moveable middle, shrank from 39 percent in December to 17 percent in March. So we made a lot of progress among communities of color, and persons for whom issues of access are the greatest barriers to vaccinations.

The bad news is that 20 percent of Americans say they will only get vaccinated if required or will definitely not get vaccinated. Our daily COVID vaccination rates could drop significantly within the coming months as a result of dropping demand.

With 20 percent of Americans currently unlikely to get vaccinated, and another 25 percent of the population who are children, we will not be reaching herd immunity for quite sometime yet.

It is also important to understand that vaccine rollout is necessary but not sufficient for pandemic recovery. And I think of pan-

demographic recovery in four phases: ending the emergency, relaxing mitigation measures, getting to herd immunity, and long-term control.

To end the emergency, we have to vaccinate the highest risk persons who are most likely to develop severe COVID, most likely to be hospitalized, and most likely to die. That means vaccinating older adults and people with chronic medical conditions, and we must also pay special attention to the hardest hit, most vulnerable communities, including communities of color and front-line essential workers. We cannot end the emergency phase of the pandemic by relying only on vaccination, without risking another surge in cases, hospitalizations, and death.

I think of the pandemic a bit like a speeding car. Lifting mitigation measures too soon is like taking your foot off the brake before putting the car into park. With the emergence of more infectious variants, the virus is hitting the gas at the same time. Vaccination is like a parking brake. It works well once the car is in park, but not nearly as well when you're racing down a highway.

We are likely facing a prolonged interim period when we can safely lift mitigation measures, because the most at-risk have been shielded by vaccinations, but before we have reached herd immunity. And this means that, even once restrictions are lifted, we are unlikely to get back to business as usual right away.

While COVID credentials may not be mandated by the government, the private sector is forging ahead. The purpose of COVID credentials, what some mislabel "COVID passports," is to demonstrate that when individuals engage in certain activities, they pose minimal infectious risk to others. COVID credentials may take the form of COVID test results, as well as COVID vaccination status. COVID credentials are not COVID vaccination mandates.

Finally, our pandemic recovery plans must address chronic underfunding of the CDC and state and local health departments, for building a strong modern public health infrastructure. We need a professional public health corps and 21st Century bioinformatics and laboratory systems. Our financial and political investment in preparedness for epidemics and pandemics should reflect the serious health, economic, and national security triple threat they pose.

We must re-engage on the global health stage, as this pandemic has shown us the emergence of a new virus halfway around the world poses a very real and present danger to us all.

[The prepared statement of Dr. Gounder appears in the Submissions for the Record on page 43.]

Chairman Beyer. Dr. Gounder, thank you very much.
I now recognize Dr. Romer for his testimony.

**STATEMENT OF DR. PAUL ROMER, NOBEL PRIZE WINNING
ECONOMIST AND NYU PROFESSOR, NEW YORK, NY**

Dr. Romer. Yes, Chairman, Vice Chairman, Ranking Member, other Members, thank you for the chance to speak with you today.

As all of the speakers have emphasized so far, we are benefiting from some dramatic successes right now—the success in developing the vaccines, and then the very difficult logistical challenge but one we have successfully met, of getting these vaccines into the arms of the American people. Now in the context of these two dramatic successes, I want to offer two notes of caution.

The first is to remind everyone that the damage to the economy and to livelihoods has been very significant, and we need to have an economic recovery that gets everyone who was working before in 2019 back into some kind of employment opportunity—and, only decide that we have recovered when we reach that point.

But yet we should go even farther. We should not just get back to the employment-to-population ratio we had in 2019. We should aim for the employment-to-population ratio that we had in 1999, 20 years ago, which was one percentage point higher.

We have tolerated over the last 20 years a steady reduction in the employment-to-population ratio, which has not been visible in our unemployment rate because the employment-to-population ratio falls when people become so discouraged they stop even trying to find a job.

So we need a goal for recovery that is not just to get back to the kind of low unemployment rates we saw in 2019, we want to get back to the very hot labor market conditions of 1999 where more people could work, and where wages for the lowest skilled members of the workforce were rising because of the demand for these workers. So we cannot lose track of the right measure of recovery, and we cannot give up on recovery until we get back to full recovery.

The second cautionary note is that we run—even though the vaccines can with certainty end this pandemic by the fall, we run a non-trivial risk of—we face a non-trivial risk of a third wave of infections and deaths in the spring and the spring and summer. This is because we have got a race right now between a new variant, which is spreading rapidly, which is more aggressive. So control measures that worked for the old variant will not work for the new variant. So we have got a new variant, which is spreading rapidly, and then the opposing advantage we are getting is we are vaccinating more and more people.

There is a race between those two effects, and it is complicated because there is also a tendency for people to see deaths are going down, at least for now, vaccinations are going forward, so social distance measures are being withdrawn. And this means that, at least temporarily during the spring and summer, the relaxed social distancing measures and the more aggressive variant could lead to one more wave of infections and deaths.

What we are seeing in Michigan is a kind of an early warning signal of what we could see throughout the economy. If this happens, we need to not panic. We need to understand we will get to the end of this by the fall. We need to not be too obsessed about who to blame, who is at fault. We do need to think about what we can do.

And Dr. Gounder, if you read her recent op ed, makes this very important point, that accelerating vaccinations, which would be good across the country, is not the right spot treatment effect when we do see this new wave emerge.

We need things that act more quickly. And the kind of thing that could act quickly is to get tests into the hands of people who might be infected. And if they can test and find out quickly that they are infected, they will tend to isolate themselves. They will try to protect the people around them.

So my advice on Michigan is the kind of advice I gave a year ago for the country, which is to make these tests available. I would be carpet-bombing Michigan right now with these at-home tests that people could take. Do not worry about whether they get recorded in the data. Do not worry about anything but let people take these tests, find out if they are infected, and isolate themselves right away. And they can go get a confirming test from some official source, but this is the kind of measure that could help us during the spring and summer. And of course social distance will save lives during this period, but we have got to be realistic that it is going to be hard to keep people sticking to these social distance measures when they are seeing, at least for a time, so many signals that look optimistic.

So to conclude, if we work hard enough, we can recover not just to where we were in 2019, or 2009, but—2007, but all the way back to 1999. That is the kind of recovery we should aim for, and we will get through what could be a little bit of a troubling period in the next few months.

Thank you.

[The prepared statement of Dr. Romer appears in the Submissions for the Record on page 80.]

Chairman Beyer. Great. Thank you, Dr. Romer, very much.

Dr. Archibong, the floor is yours.

STATEMENT OF DR. BELINDA ARCHIBONG, ASSISTANT PROFESSOR OF ECONOMICS AT BERNARD COLLEGE, COLUMBIA UNIVERSITY, NEW YORK, NY

Dr. Archibong. Great. Thank you very much, Chairman Beyer, Vice Chairman Heinrich, and Ranking Member Lee, and committee members for the opportunity to testify today.

So I just wanted to highlight three key points around this, being that any effect of economic policy needs to focus on equitable recovery. So as far as highlighting the differential risks and disparities of economic recovery that have been faced by Black communities during the pandemic.

Second, assessing the role of vaccination in economic recovery, especially addressing the disparities that my colleagues have mentioned in access and also in vaccine compliance.

And third, highlighting four main policies for more equitable post-pandemic recovery.

So on this first point, so we knew early on that Black communities, and Black populations were disproportionately being infected, and also the case mortality rates were higher among Black communities, at the start of the pandemic. Part of the reason for this was that Black workers were more highly represented related to their population shares in the kind of essential service sector. And why is this? This has been due to the history of racial discrimination in labor markets in the United States.

So that said, despite the fact that Black communities have been disproportionately negatively affected during the pandemic, we have seen that the kind of pandemic response in the economic recovery has been unequal and uneven.

So we have all seen the unemployment statistics that came out last month, so 6 percent unemployment rates were kind of im-

proved from last year. But if you look at the unemployment rates by race, you will notice that the Black unemployment rate is still twice the rate of White workers. It is still around 9.6 percent compared to 5.4 percent for White workers.

We also know that Black business owners faced much higher employment losses at the start of the pandemic. They lost about 41 percent of employment between February and April of last year, compared to 17 percent loss in employment for White business owners.

Now despite these losses, Black business owners, especially Black women business owners, were less likely to receive loans from the Paycheck Protection Program due to poor targeting and also partly due to discrimination.

Second, on vaccination, we know that vaccination is a key part of the economic recovery, but as has been mentioned earlier, there are disparities in access to vaccines. We need to target the 85 percent vaccination rate to public health experts to get the positive benefits of reduced diseases from the pandemic. We are currently at 22 percent fully vaccinated, but if you look at it again, the kind of Black/White difference in vaccination rates, the vaccination rates among the White population are around 28 percent—so it is about two times higher than vaccination rates for Black and Hispanic populations, which are about 17 and 16 percent currently.

So we definitely need more equitable distribution that focuses on improving access in Black and Hispanic neighborhoods, especially different—and again, these populations are relatively over-represented in these essential service workers, and we know the key sector, the necessary sector, for the economic recovery.

So lastly, just on these four policies for a more equitable post-pandemic recovery, so one definitely we need much better targeting of grants of credit to Black neighborhoods, to industries where you have higher concentrations of Black business owners. More regulation and monitoring is also needed to reduce discrimination.

Second, we need to address the disparities in vaccine access. We all know that people who study the history of vaccine compliance, we know that there is a history of racism in medicine in the United States that has led to the mistrust we have seen among the Black population today when it comes to the vaccine issue. So really working with trusted community partners in Black neighborhoods to disseminate information about vaccines, and improve access through local communities in Black neighborhoods is essential, again, to get—close the disparity in vaccination and get us to this 85 percent coverage.

Thirdly, we know that the pandemic has widened racial and gender disparities in employment, in health and wealth. These effects will last for a long time, except we have real concerted policies, everything around universal health care, and thinking about government-funded savings accounts for low-income families, thinking about, you know, support for and protection for labor in these essential service sectors, as well.

And then lastly, you know, thinking forward. Right? We expect that we might see more of these pandemics in the future. This is what our environmental health policies are predicting. So we need to strengthen environmental regulation around, for example, clean

air quality, to reduce the health and environmental vulnerability faced by the Black populations from these pandemics.

So to conclude, any aspect of pandemic economic recovery needs to focus on an equitable recovery. It needs to be aimed especially at improving the lives of Black communities, or communities of color, and women within these communities that have been disproportionately harmed by the pandemic.

Thank you.

[The prepared statement of Dr. Archibong appears in the Submissions for the Record on page 82.]

Chairman Beyer. Thank you, Dr. Archibong. Thank you, very much.

Finally, we will hear from Dr. Tabarrok. Dr. Tabarrok, the floor is yours.

STATEMENT OF DR. ALEXANDER TABARROK, BARTLEY J. MADDEN CHAIR IN ECONOMICS AT THE MERCATUS CENTER AND PROFESSOR OF ECONOMICS, GEORGE MASON UNIVERSITY, FAIRFAX, VA

Dr. Tabarrok. Thank you, Chairman, Vice Chairman. It is an honor to be here.

About a year ago, a Nobel Prize winner, Michael Kramer, and I were asked by the Domestic Policy Council of the White House to write a report on using incentives to accelerate vaccines. Joined by a number of other top economists, we wrote a report advocating spending on the world scale of approximately \$150 billion to invest in 18 vaccine candidates.

We wrote similar reports for the British Government, and also came to later advise the World Bank and other organizations around the world.

The world did not go as big as we wanted. Operation Warp Speed, however, was by far the best. These fed about \$15 billion and were tremendously successful. In a recent paper in Science, we calculate that if we get 3 billion courses of vaccine this year, which is a conservative estimate, that will be worth \$17.4 trillion—Trillion—to the world economy. And Operation Warp Speed should be credited with the significant fraction—certainly not all—but with a significant fraction of that success.

Moreover, it is not too late to do more. We calculate that if we could get an additional one billion courses of capacity online this year, that will be worth 500 billion to one trillion for the world economy, depending upon how quickly it can be brought online.

Now is it possible to get more doses this year? Yes, it is. The Biden Administration spent \$269 million, giving that to Merck, to increase the capacity to produce the Johnson & Johnson vaccine. That was a smart investment, and continues to be a smart investment.

Another smart investment which we could make is to invest in nasal vaccines. The next big hurdle is going to be vaccine hesitancy. And a significant fraction of vaccine hesitancy is fear of needles. Adults do not like to say that they are afraid of needles, or that they do not want to get a shot because of needle fear, but that is in fact the case.

A needle—excuse me, a nasal vaccine would have advantages, not only in reducing vaccine hesitancy but a nasal vaccine stimulates the mucosal immune system, which is where the virus attacks. So they also have medical benefits, as well.

Moreover, a nasal vaccine or an oral vaccine is going to be important to vaccinate children. And that also is going to help us to get to herd immunity. After we vaccinate the next—after we vaccinate the United States—our next big job is to vaccinate the world. And there are health, economic, and political reasons to do so.

The unvaccinated are the biggest risks that we face for generating new variants and mutations. You have heard, no doubt, about the South African and Brazilian variants. Well, the best way to protect your constituents from South African and Brazilian variants, and others, is to vaccinate South Africans and Brazilians.

Moreover, economics. Even after the United States and other high-income countries are vaccinated, the United States is still going to face economic costs from reduced exports, reduced imports, and supply chain disruptions due to COVID elsewhere in the world. So there are sound economic reasons for vaccinating the world. And an additional \$4 billion donation to COVAX would go a very long way to getting that last mile, getting those last people vaccinated.

Finally, political reasons. We can have an American plan to vaccinate the world, or a Chinese plan. I would prefer that we have an American plan. Next, as we vaccinate the world, we need to think about dose stretching. We know from the clinical trials that both the Moderna and Pfizer vaccines, the first dose is about 80 percent effective. And in my view, it is better to bring more people from zero percent to 80 percent protected, than to bring one person from zero percent to 80 percent and then boost them to 95 percent.

Speaking loosely, the first dose protects you from being killed, from dying. The second dose protects you from getting the sniffles. Related to this, we should investigate fractional dosing. The phase one and phase two clinical trials indicate that half-dosing would be also potentially very, very effective. And if one thinks about this half-dosing, that would be equivalent to doubling the number of Pfizer and Moderna factories. So that would be extremely valuable if we could do that. Great Britain and Canada have moved to delaying the second dose, and other countries will soon follow suit.

So summing up, it is not too late to do more. We should invest in nasal vaccines. We should vaccinate the world. We should stretch doses through fractional dosing and delaying the second dose. And this is going to be important to vaccinate the world quickly.

Thank you, very much.

[The prepared statement of Dr. Tabarrok appears in the Submissions for the Record on page 97.]

Chairman Beyer. Thank you, Dr. Tabarrok. Thank you, very much.

We will now begin the first round of questions. I will lead. So, Dr. Gounder, let me start with you. In your testimony, you wrote that most scientists believe that SARS-CoV-2 is here to stay; that this virus will become endemic and will be around with us for years and years to come.

What are the implications of that understanding?

Dr. Gounder. So first of all, the reason that this is not a virus that we can eradicate is because it does infect other species. There are very few viruses that can be eradicated. Smallpox is one of the few that which we have successfully eradicated, and we are hopefully going to be eradicating polio in the coming years. But I think the fact that we have been working so long at this with polio speaks to the fact that this is a very difficult thing to do, even when it is not a virus that infects other species.

So we do realize that there are going to be pockets of people, whether it is in the United States or overseas, who will choose not to be vaccinated, who cannot be vaccinated, who do not have access, and then others who may be vaccinated but who have for whatever reason either waning immunity or just do not mount an immune response.

And so we are going to see ongoing transmission, and that means we cannot only rely on vaccination. We need to anticipate the needs for testing to make sure that we can assess if somebody is infected so we can triage and isolate as appropriate. We also need much better therapeutics for COVID.

Right now, really the best therapeutic we have is dexamethasone, which is an old steroid. We have monoclonal antibodies, which have a lot of tradeoff in terms of risk, especially as we see the rise of these new mutant variants. And then we have a number of old drugs that we are trying to repurpose and study for their use in COVID. But we really do not have a slam-dunk here. And so that is one area we really do need to be looking at.

I think you are also looking at a lot of people who will be COVID survivors. And how do you even accurately assess who was a COVID survivor, and then be prepared to manage all of the health and disability rehabilitation needs that those people are going to have? So I think we need to be anticipating and preparing on all those fronts, as well.

Chairman Beyer. Thank you very much.

Dr. Romer, when we spoke a year ago you were thinking then about testing the entire population every two weeks. I would love to know why the past tests have not hit the way we had hoped. And also, the one percent higher employment-to-population ratio of 22 years ago. What should we be doing right now, from an economic policy standpoint, to move it back? What are the hurdles like child care affordability?

Dr. Romer. So I think it is an interesting question, why we did not make the same kind of push on testing as we made on vaccines. And I think there are at least two possible contributing factors.

I think one is that, you know, the health care community has been hesitant about testing when there is low prevalence of a condition. And in clinical care, it does not make sense to just test people with no other indication that they are sick.

But screening is a very different use of testing. And I think people have been a little bit slow to appreciate the potential power of screening.

The other factor I think, which you cannot deny, is that we had an administration that had a very explicit policy of trying to reduce

the number of tests, because it did not want more tested confirmed cases as a sign of the seriousness of the pandemic.

So I think both bad administration policy and hesitancy contributed to the failure to use the tests. But just as Dr. Tabarrok said, it is not too late here. We have a really serious question to address about how do we help places like Michigan that are getting hit so hard?

And I think these new at-home tests that are like little cards, we should be giving those out to everybody in Michigan, everybody who is willing to do one of these tests, and just assume and understand that they will isolate themselves if they get a test that the test results signal that they are positive.

Now on how we get back to the kind of labor market conditions of the 1990s, I think the most important thing is we agree on that is the goal, and we agree on this metric of the fraction of adults who are employed.

Once we agree on that, then we can take the stance of trying many different things. Stimulus like we are doing right now, aggressive stimulus, will be part of this. And infrastructure build could be part of this. But there could be other things we could do. We could look at things like targeted subsidies for employment, or for new jobs, or for hiring. You know, there are many things that we could do.

But we have got to get away from unemployment rates as our metric of success, and get to the more important measure of employment rates. And we should remember that by that measure, the employment rate, the United States now lags far behind other nations that it used to do better than—Canada, Great Britain, Germany, Sweden, Australia.

So we really have kind of failed repeatedly to recover and achieve the kind of employment, and the widespread benefits from work, and we really need as a Nation to commit to doing whatever it takes to get back to that point.

Chairman Beyer. Thank you, Doctor, very much.

I recognize Senator Lee for his questions.

Senator Lee. Thanks so much, Mr. Chairman.

Dr. Tabarrok, let's talk about the \$1.9 trillion American rescue plan for a moment. This \$1.9 trillion bill was a massive economic stimulus. And it was sold as a COVID Relief Package, even though less than 7 percent of it was actually allocated to COVID testing and vaccines.

So, Dr. Tabarrok, given that massive economic spending today imposes consequences on future generations, does it make sense to focus spending on activities necessary for recovery? Specifically, those that help us reduce the incidence of COVID?

Dr. Tabarrok. So I think there is no recovery until COVID is defeated. We are close to that. We should have spent more on vaccines. I think that is clearer today. We should still be spending, as I suggested, on nasal vaccines and oral vaccines.

I agree entirely with Dr. Romer that testing was underdeveloped and could still be used today. Denmark is testing 8 percent of their population every single day, about 50 percent a week. So Denmark is getting close to what Paul Romer originally argued for a year

ago. And rapid tests I think would be very useful in Michigan, as Dr. Romer said.

The rest of the stimulus budget I think just has to be evaluated on its own ground, not as a stimulus, not as COVID fighting; you just simply have to ask do we want this particular investment? Does it face a cost/benefit test?

Some of what we spend on vaccines and testing has a tremendous multiplier effect. Everything else is much, much smaller. Much, much smaller. So I think those other investments need to be evaluated on their own grounds.

Senator Lee. You know, that makes sense. And I tend to agree. In looking at that, we have got to remember that one of the strengths of our system of government, which is rooted in federalism, is a system in which sovereignty and decision-making authority are shared. They are divided between Federal and state governments.

But during the COVID-19 pandemic, states were often dependent on the Federal Government for both financial assistance and guidance. So I have a couple of questions related to that.

In what ways do you think states' reliance on Federal support might have inhibited an effective innovative pandemic response?

And what lessons can we learn from state-level experimentation where it did occur? And just show us how we can support a decentralized type of innovation for future crises.

Dr. Tabarrok. I was disappointed by the reactions of many states and local governments. Let me give you a few examples.

The states and local governments were told months and months in advance, the vaccines are coming. The vaccines are coming. The vaccines are coming. And yet when the vaccines arrived on their doorstep, they said, "We do not have enough money. We do not have enough money to set up clinics," which was total nonsense.

The states and the local governments have spent trillions of dollars. You are telling me they could not find a way of reducing their budgets, with this huge, incredible benefit of getting the vaccination clinics available? No.

So that was a very poor response, and it slowed us down in the early weeks.

I do think that a lot of energy has been drained through the Presidential system to the Executive. I would have liked for there to be more experimentation at the state level. As far as I know, for example, a state could have introduced, could have required going with first doses first, delaying the second dose. No state did that.

So I would have liked to have seen more experimentation and a more federalist system. It is one of the United States' great strengths, and I think we are losing it by focusing too much on what is going on with the Federal Government.

Senator Lee. Yeah. You know, and I very much agree. I am also concerned about the fact that with the recent virus mutations that we have seen arising in Spain, the UK, South Africa, and Brazil, we have got mutations that could threaten the efficacy of our domestic vaccination process as these new strains appear in the United States.

Can you talk to us a little bit about the importance of administering more first doses, especially in light of this? And would you

describe some of the economic and societal tradeoffs of not pursuing the first doses first policy.

Dr. Tabarrok. Right. So the first dose appears to have protected about 80 percent. That is very good for the individual. But in addition, when you protect two people at 80 percent, rather than one person at 95 percent, you reduce the transmission rate of the virus. To reduce the transmission, it is much better to protect more people.

It also looks like protecting more people, vaccinating more people, which you can do by delaying the second dose, it looks like that will also reduce mutations. We do not know that for sure, but that is what the epidemiologists are now thinking.

So by protecting more people, we reduce transmission, we reduce mutations, we get more people vaccinated sooner. And then finally, I would just like to reiterate that another way, in addition to this, we need to do this for the entire world. Because the best way to protect against South African, Brazilian variants is to protect South Africans and Brazilians. And so we have an economic, medical, as well as a political and ethical responsibility to vaccinate the entire world. And the United States is only one of the very few countries that can credibly do this. And this is a good opportunity to show our entrepreneurship and our power in the world, and our benefit to the world.

Dr. Romer. Senator Lee, if I could, I would like to reinforce the point that you were pointing to. It is a discussion we need to have.

If you think back to the 19th Century, the way the United States built the best university system in the world was not by saying we are going to have this national university, which is this shining light for the world. We said we are going to have universities in every one of the 50 states. And so the Morrill Act, which created the Land Grant Universities, built this very robust system.

Now fast-forward to the most recent period. When we think about the capacity of the CDC, or the FDA, we have done the opposite. We have said let's build this enormous capacity that is centralized under the control of the Federal Government, and make all of the states dependent on those organizations. And they have sometimes erred and they have left us with what the engineers call a single point of failure.

I think we need to think hard about investing more in public health and regulation, but perhaps going back to the methods of the Land Grant approach and invest in that capacity in the states rather than creating these Federal single points of failure.

Senator Lee. That is fantastic. I am pleased to hear about your enthusiasm for federalism, and let's bring back the Morrill Act.

Chairman Beyer. Thank all of you very much. Let me now recognize the senior Senator from New Mexico, Senator Heinrich.

Senator Heinrich. I thank you, Chairman. And I want to start with Dr. Gounder on an issue that has been very much in the news in just the last couple of days.

Yesterday alone COVID claimed 987 lives in the United States, 9 of those in my home State of New Mexico, that I am proud to say is at the forefront of trying to develop herd immunity.

Meanwhile, out of over 6.8 million doses received of the Johnson & Johnson vaccine nationwide, 6 people have developed a rare and serious form of blood clots.

So from what the CDC and the FDA and Johnson & Johnson have stated publicly, those six individuals also had a very—had a known and defined risk profile with respect to blood clots.

So how can we properly weigh the relative risk of COVID versus the Johnson & Johnson COVID vaccine to ensure that we are saving as many lives as possible?

Dr. Gounder. Thank you for that question. I think it is really important to understand that the FDA has not pulled the Johnson & Johnson vaccine from the market; that the Emergency Use Authorization still stands. This is just a pause, a time-out for the scientists to step back and review the data.

And I think that is really important. Because when you look at what our biggest obstacles are in the coming months, it is really around vaccine demand, or hesitancy, or confidence, whichever word you want to use. And one of the biggest drivers, especially in those who are most recalcitrant, most resistant to getting vaccinated, it really comes down to either a lack of trust in health systems, or a lack of trust in the government.

And so it is absolutely essential that the CDC and the FDA behave in a way that is transparent, honest, above-board, and that they show they are doing their due diligence, because that is really what is going to predict in the longer term whether people feel comfortable getting vaccinated. They need to trust in the government, in the CDC, in the FDA. And by doing this review that is going on—actually, I think as we speak today—I think that is what is going to get us there.

We have seen, as you mentioned, six of these severe side effects. They are all in women who are between the ages of 18 and 48, and they have had other predisposing conditions. And I think there is quite a good possibility that what you will see happen, and we have seen something similar happen with the AstraZenica vaccine in Europe, is that the CDC and FDA will recommend potentially restricting access, or restricting use of this vaccine for certain populations.

We have not seen any of these severe side effects here with J&J among men, for example. We have not seen that side effect with older people. And so it may just be that they step back and say maybe this is not the best option for younger women of reproductive age, but for the rest of the population this continues to be a great option.

You know, I think as physicians we err on the side of doing no harm, and so I think it is really important that we abide by that. And I think it is really important that this message got out there as soon as possible so that doctors and patients know what to look for.

The most common treatment we use for blood clots, heparin, is actually dangerous for this particular kind of blood clot and can be deadly. So it was really essential to get the message out there as soon as possible, so that if me, for example, as a provider, I have had patients who got the J&J vaccine. If I see one of those patients back, I know what to be looking for and what to do.

Senator Heinrich. Thank you, Dr. Gounder. What you outlined there in terms of changing the target population is exactly what I was discussing with the White House just minutes ago. And so I am hopeful that we can be absolutely transparent in this process, look at the data, and then hopefully get this very efficacious vaccine back into the places where it is appropriate. Because it is our best tool in some of the hardest to reach communities.

Fractional dosing, is that something, Dr. Gounder, that you would agree with Dr. Tabarrok on? And should we view looking at vaccinating the entire country with the first dose, for example, and then coming back and prioritizing second doses for the most immune-compromised and having that same sort of phased approach that we have used in New Mexico to really get ahead of most of the rest of the country in terms of developing herd immunity?

Dr. Gounder. I think you need to be very careful in how you interpret the data about 80 percent effectiveness after a first dose, and over 90 percent after a second dose. I think the problem is that immunity is not “on or off.” It is a range or a spectrum.

And so you may be immune after one dose to the most prevalent original strains, but now we have also seen the rise of the B.1.1.7 variant, and also, as you mentioned earlier, as we have mentioned earlier, the variants out of South Africa and Brazil. And we have several studies now that indicate that after one dose you still have break-through infections with both the B.1.351 from South Africa, and the B.1.1.7 from the UK.

So there is a very real risk that you would be creating this prolonged window where you would be selecting for, putting immune pressure for more of these variants to emerge. That said, I think the fractional dosing strategy is something that should be studied. It can be done pretty quickly, and it is something that we should go ahead and evaluate. And if that proves to be as effective in terms of the immune response solicited as the current full dose, that is something we should absolutely be doing.

Senator Heinrich. Thank you very much. Thank you, Chairman.

Chairman Beyer. Thank you, Senator, very much. And I recognize my fellow Ways and Means classmate, the gentleman from Wichita, Mr. Estes.

Representative Estes. Well thank you, Chairman Beyer.

From the beginning of the health crisis, we were told that vaccines and herd immunity were the keys to reopening the economy. Now we have multiple vaccines, and two more in Phase III trials. We are moving forward with that. And having 180 million people, Americans that have already received at least one dose of the vaccine, and a vaccination rate of 78 percent of those over 65.

What I hear in my District in Kansas is, you know, when we get back to life? A lot of businesses have suffered. Children are falling behind in school. And a lot of people have lost their jobs.

We have done a mixed review, or mixed results maybe in terms of vaccinations within the state. Specifically, we have done a good job of vaccinating seniors, and now of vaccinating—reaching out to all adults. But we rate 35 in the country of swiftly administering the vaccinations that have been given to us.

The operational speed, as mentioned earlier, and some smart investments, the United States were able to develop this vaccine in record time. And your Trump Administration purchased over 800 million doses, which just set things up now, at the end of the Trump Administration and with the current Administration, for success.

Although experts repeatedly said we would not have the vaccine by the end of 2020, they were wrong. Tomorrow, 26 states will expand vaccine eligibility to all adults, and by May 1st all states will have open eligibility.

But instead of focusing on COVID relief to help get the economy going, some of the discussions in some of the bills like the Rescue Plan have very little funding for vaccine distribution efforts, and, instead, spend a lot of money bailing out states, again taking away the federalism mindset. Even Politifact, which is not known for a conservative point of view, has admitted that the COVID-19, the American Rescue Plan, is not a COVID-19 package. And I quote that at the end, direct COVID-19 spending is about 8½ percent of the bill's \$1.9 trillion cost.

Instead of backing big government spending initiatives, we should focus on crushing the virus, kick starting the economy, and getting Americans back to work by implementing pro-growth policies to help American businesses such as R&D expensing, which is going to be expiring this year. We need to make it permanent in order to make some of the jobs back in America.

I do want to ask a couple of questions of Dr. Tabarrok. Through Operation Warp Speed, the vaccine testing and production was able to be conducted in tandem and in a more streamlined manner. How can we formalize or codify this process to help make sure that we minimize such severe economic impacts in the future?

Dr. Tabarrok. So I think one of the silver linings to the crisis is that it has shown that FDA delay can also be very, very costly. So people are seeing for the first time that the longer the FDA takes to approve, whether it is a vaccine or a drug or something like that, can have a real consequence in terms of people dying of COVID or some other disease.

This is also true for cancer. This is also true for heart disease. This is true for all of the products that go through the FDA. And it now costs over a billion dollars to get the typical new drug approved.

We need to find some way of reducing that to have more experimentation and more new drugs. Because new drugs absolutely do save lives. So if we can find a way of using our experience from COVID to accelerate FDA approvals across the range, I think that would be tremendously beneficial to American patients.

Representative Estes. Great. That kind of leads into another thought I had around the breakthrough that we and with mRNA technology that really did allow us to develop the vaccine very quickly.

Are there things that we can do, incentives such as improving R&D expensing, or genius prizes, some of those so-called genius prizes that would help us make breakthroughs in the future?

Dr. Tabarrok. Yeah, so two points. Going back to one of the earlier questions which was asked—what about if COVID becomes en-

demic—well, one consequence of that is that every investment we make now is going to have a very long payoff. So that is great. So this increases our incentive to invest in mRNA technology, which is capable of not just producing a vaccine, but is also capable of producing drugs to treat cancer and heart disease, and so forth.

So I think all of these things are a great way to invest. R&D expensing may be certainly a part of that. And, prizes, yeah, I do think that prizes should be looked at more. The pre-market purchases, the advance-market commitments which we made for Pfizer, saying we are going to buy hundreds of millions of these doses, that is very similar to a prize. And that worked very well in incentivizing Pfizer to invest billions of dollars in factories, which is now paying off now.

Representative Estes. Thank you very much. And, Mr. Chairman, I yield back.

Chairman Beyer. Thank you. Thank you, Mr. Estes. I now recognize who I believe is the senior Senator from Georgia, Senator Warnock.

Senator Warnock. Well thank you so very much, Chairman Beyer, for that promotion. Senator Ossoff, who is my colleague and friend, will be glad to know that I am now the senior Senator. He is actually the senior Senator. Let me note this only because “O” comes before “W.” I have been suffering my whole life having my last name Warnock. It is the only reason he is the senior Senator, because he is Ossoff and I am Warnock.

[Laughter.]

Chairman Beyer. There is no fairness. You got more votes than he did.

Senator Warnock. Go figure. Well, I did not say all of that. You said those things. But we both won.

Listen, thank you so much. It is an honor to be here at my first Joint Economic Committee hearing, and I look forward to working under your leadership, and working with all of my colleagues to discuss issues and propose solutions that will allow for a robust economic recovery.

As has already been discussed in this committee hearing, the COVID-19 pandemic, while it has impacted all of us, some communities have experienced a profound disproportionate impact. And I am speaking in this instance about women in general, particularly low-income women, and women of color who are not only experiencing the steepest job declines, but also severely lagging in the overall jobs recovery.

It took until 2018 for the rate of employment among Black women to recover from the last financial crisis, almost a full decade later. And now, almost all of those hard-won gains have been erased due to this economic downturn created by a once-in-a-century pandemic. And so I would like to ask Dr. Archibong, based on your experience studying how pandemics affect economies, what should we expect about our own economic recovery, if past is prologue? Should we expect that economic prospects for women, especially women of color, to continue to lag behind? And what can we do to avoid that from happening?

Dr. Archibong. Thank you very much, Senator Warnock, Rev. Warnock. I do not know if you remember that we met sometime ago, but it is nice to see you again. And it is nice to see you again.

It is a very, very important question. It is something that I have been studying, the effects of the pandemics on gender inequality. We are seeing that women generally, disproportionately are involved in home production. So a lot of women dropped out of the labor force to take care of families, to take care of children. And one of the things that the official statistics might decide on kind of the workforce statistics, the unemployment statistics, by gender, is that we might be missing a lot of women who have just dropped out of the workforce altogether, that are no longer looking for jobs, which would not be reflected in the unemployment statistics.

So that is incredibly worrying. This is something that in other contexts that I have looked at we see that these widening gender gaps are in human capital investment, in the labor market, in educational attainment, and these have existed for a number of years, except we have, again, a policy that is not just a blanket policy about pandemics, but a policy that says we are going to take very seriously the fact that certain populations, as you said, are disproportionately being harmed. Women are disproportionately being harmed by the pandemic. They are dropping out of the labor market almost entirely.

How do we get them back to pre-pandemic levels? And even, I would say, better than pre-pandemic levels especially if we are looking at women of color, Black women who in pre-pandemic times were much, much strained when it comes to unemployment rates.

So what does this mean? This means like thinking about—when we think about stimulus and cash grants, thinking about incentives that are targeted by gender, thinking about incentives that are targeted toward households where women are living and doing a lot of unpaid care work, and really being very deliberate about the kind of policy, and thinking about gender and racial implications of the policies that we are passing.

So I think that is important. And I just wanted to add, just to respond, I have been listening to the very interesting conversations and responding to Dr. Romer's point earlier, I think actually where you really need centralized authority. So the CDC is important. The WHO in my experience is very important in terms of coordinating these efforts. And also coordinating efforts that again to think very carefully about the gender and racial disparities that come about from the effects of these. So thank you very much for the question.

Senator Warnock. Thank you so much. And I have got a few seconds. So we passed the American Rescue Plan, which is, you know, a step in addressing some of the disparities that you talked about exacerbated by the pandemic. We are now focused on infrastructure, the American Jobs Plan. And we think about women, and child care, and a whole range of issues.

What kinds of things should we be thinking about as we put together an infrastructure program to take seriously the need to address these disparities as we think about jobs and the economy?

Dr. Archibong. Right. So one thing that my colleagues have studied and mentioned and thinking about are subsidies for child

care. So that is something that, again, women are disproportionately dropping out of the labor market to take care of children, a lot of women, to take care of household members that were sick. And so thinking about the necessity for child care, and thinking about, you know, whether it is kind of easily accessible work retraining programs to get women back into the workforce, these are the types of policies that I think would be very effective and have worked in other contexts in closing these gender gaps as a result of pandemics.

Senator Warnock. Thank you so very much.

Chairman Beyer. Thank you, Senator, very much. I now recognize the Senator from Texas, Senator Cruz.

Senator Cruz. Well thank you very much, Mr. Chairman, and welcome to each of the witnesses. Thank you for your testimony.

Dr. Tabarrok, I want to start with you and address a topic that is of significant concern to me. And that is the topic of vaccine passports, where there has been a lot of discussion about requiring vaccine passports, either the Federal Government requiring vaccine passports, or individual private companies requiring vaccine passports to be able to utilize transportation, to be able to utilize essential infrastructure.

I have deep concerns about any mandated vaccine passports. My concerns include concerns about protecting patient privacy rights. What personally identifiable information would be shared? Who maintains the information? Whether patients that have provided informed consent on the use of this information, can the information be shared or exploited by governments or businesses? What are the risks of hacking this information by foreign nations and criminals? And also the significant potential for discrimination against individuals who either make the choice not to get the vaccine, or for various medical reasons are not suitable candidates to receive the vaccine, whether they will face discrimination in terms of public carriers, discrimination in terms of being able to stay in a hotel, discrimination in terms of being able to eat at a restaurant. And in my experience, I think a lot of Americans, certainly a lot of Texans, are very concerned about this.

Recently, White House Press Secretary Jen Psaki said, "There will be no Federal vaccinations database and no Federal mandate requiring everyone to obtain a single vaccination credential. America's privacy and rights should be protected so that these systems are not used against people unfairly."

I was encouraged by those comments. I am not sure I believe that is where the administration will end up, but I liked at least that they were saying that. I think that was a step in the right direction.

Dr. Tabarrok, do you agree that the Federal Government should not establish a Federal vaccine mandate?

Dr. Tabarrok. Yes, I agree with that. I do have mixed feelings on so-called vaccine passports. I am not particularly against universities, for example, requiring their students to be vaccinated, as a number of universities already have suggested they will.

So I think private employers should be allowed to say that we want our employees to be vaccinated. I do think the following is maybe some way of finding some compromise, and that is: Look,

this is going to be a very temporary problem. I believe that we will quickly, with more vaccinations we will quickly get back to normality, even as early as the summer, the late summer. I think these issues will begin to fade away at that time, particularly as most people will be vaccinated just because it is the smart thing to do, it is the rational thing to do. And as death rates fall, as the infections fall, I think some of these calls will go away.

Many countries, however, will require a vaccination to get into their country. So literally you will require to be vaccinated if you want to visit a lot of foreign countries. I, myself, am eager to travel again, and many countries already require a yellow fever vaccination. And so I think that is going to become fairly common, whether one wants it or not.

I am against the Federal mandate but, as I said, I think if we can make vaccines easier to get, at low cost, then people are going to be vaccinated, and this problem will fade away very quickly.

Senator Cruz. Well, look, I agree that vaccines should be widely available. I have been vaccinated. My wife has been vaccinated. Both my parents have been vaccinated. That being said, our children, who are 10 and 13, have not been vaccinated. And in terms of the cost/benefit analysis, I think it is quite different for an adult, or for a senior, than it is for the young child.

Are you concerned about the civil rights implications of a vaccine passport? You suggested universities requiring students to be, or faculty members to be vaccinated. Right now, women who are pregnant or trying to get pregnant are not recommended to take the vaccine. Would you be troubled by the discrimination effects of a university that in effect excluded women who were pregnant or trying to get pregnant from attending university? Are you troubled by airlines saying children who have not been vaccinated are not allowed on the plane and cannot travel anywhere? Does that raise concerns that should give us pause?

Dr. Tabarrok. So first of all, I think the recommendation actually is that pregnant women are—should be vaccinated. Second, yes, of course I would be concerned if that were to happen.

However, I think this is a case where there is going to be loss of opt-outs. It is going to be possible to say, you know, children are excluded. You know, if you have a good reason, you do not need the vaccine.

Basically, once we get to herd immunity, these problems are going to fade away. So I do not think—although I would certainly be worried if the things which you describe were to happen, I do not think they are going to happen. And the way to prevent them from happening, ironically enough, is through, look, everyone get vaccinated. Make it cheap, make it easily available. It needs to be rolled out in all kinds of communities.

One of the reasons—one of the good things we have been doing lately is getting the vaccines into the pharmacies. The pharmacies have much greater ability to reach low-income minority communities. They are trusted. And so we need to use the pharmacies even more than we have been. And if we get it out widely so that you can just walk into a pharmacy, which is going to be happening—Texas, by the way, has led the way. So Texas should be applauded for leading the way on making it easy for anybody to get

a vaccine. Texas has done great in that way. We should all be following the Texas model for the entire country.

Senator Cruz. Dr. Gounder, I saw you shaking your head when I was asking the question, and I would welcome your views. You seemed to be disagreeing with the proposition that women who were pregnant or trying to get pregnant should not take the vaccine. So I guess I would ask, what are your views on that? And what are the scientific data that back up those views?

Dr. Gounder. Sure. It is always that great—

Senator Cruz. Dr. Gounder, if you could do that quickly so we can move on?

Dr. Gounder. Sure. Sure. It is always great to speak to another Princetonian alum, Senator. There is data that demonstrates that, one, if a woman gets COVID during pregnancy, similar to what we see with the flu, she can have a much more severe case. It is deadly for the mother. It is deadly for the child. She is much more likely to have a pre-term delivery. And we have also seen that women can be safely vaccinated during pregnancy, when they are trying to get pregnant, and when they are breast feeding. And it is the best way to protect her pregnancy and the unborn child.

Senator Cruz. Are there any data or empirical studies you can point to on that, that it is safe for pregnant women? I know there are a lot of women who are concerned about that.

Dr. Gounder. Yes. And I am happy to share some of those after the hearing.

Senator Cruz. I would ask you to share that with the committee members. I think there would be widespread interest.

Thank you, very much.

Chairman Beyer. Thank you very much. I now recognize the Senator from Minnesota, Senator Klobuchar.

Senator Klobuchar. Thank you very much, Chair Beyer, and congratulations to Senator Lee on his work as well on the committee in his new position. And thank you for taking on this really important topic.

I look at this in terms of the vaccine in a few ways. The first is, I have to start at home. I did a number of events on misinformation, starting with at the Mayo Clinic. I made the point that 95 percent of their doctors got the vaccine. And we still are having issues. I was in a campaign in my neighborhood, and one of the workers there told me that his mother-in-law would not get it because she read on the internet that a microchip would be planted in her if she took the vaccine.

So I wondered if, Dr. Gounder, you could talk about what is going on, and speak to how the misinformation can undermine our efforts, and what we should do about it. I have some strong views about the tech companies, but I am not going to go there today or I will use up all my time. Okay, thank you.

Dr. Gounder. I think it is a really important question. There are really two main groups of people who have hesitancy about getting vaccinated. You have people who we would call them “movable middle” who are just straight-up concerned about safety and effectiveness. And there has certainly been misinformation whether the vaccines are safe and effective—and to be clear, they are.

And then you have people who just do not trust government, do not trust public health officials, do not trust the health system, and that is a much more difficult one to overcome.

What we have seen with respect to disinformation is that there is a lot of incorrect information that is circulating online. This has been looked at and studied, and there are actually—and I have this in the written testimony—some 12 people who are responsible for the vast majority of that. And they have remained on the social media platforms. They have not been deplatformed, and that would be a highly effective way of dramatically reducing the amount of disinformation.

Because essentially what is happening is those are the sources that then get amplified.

Senator Klobuchar. Oh, I know. Well it's rare that someone is so practical in their answer—no, I do not mean that to the other witnesses, but so thank you. Maybe we can try to do something about these 12 people.

Dr. Gounder. Yeah, and it is interesting, having spoken to a number of the social media companies, very often you get this answer: Well, it is a really hard problem. We are trying—but there are some very practical, easy things they could do here. But I think that is one.

Senator Klobuchar. Yes.

Dr. Gounder. I think it is not just social media. It is also the mainstream media, television, other outlets that are responsible for this. For example, any time there has been supposedly a side effect related to vaccination, you will get all of the headlines initially reporting that. And then when you have the follow-up data as to what really happened, that does not get covered. That is not the catchy story, right?

And then finally, the other thing that we are seeing in this relates to what Dr. Tabarrok was saying earlier about, you know, he would rather see this global vaccination effort be led by the Americans, not the Chinese. I think you are also seeing very intentional efforts by the Russians to smear Western vaccines to make their vaccine look better. And, unfortunately, that is permeating what is online, and some of what the mainstream media is even picking up now.

Senator Klobuchar. Exactly. Okay. Well, thank you. That was a very thorough answer.

Dr. Archibong, throughout the pandemic women, especially moms, have been disproportionately affected by job losses. And I came up with this Marshall Plan for Moms to combine a lot of the things that we have learned during the pandemic about child care, and schools, and the help that they need.

It is interesting, because the last downturn disproportionately affected men, and construction jobs, and the like. And this has sent tons of women out of the job market because of the kind of jobs that they lost, but also because they were home with their kids. And now a number of them are starting to come back, but there is not child care.

Your research has shown that epidemics can contribute significantly to worsening gender inequality. Can you talk about the policies that would work to address it?

Dr. Archibong. Thank you, Senator Klobuchar. And just as I mentioned to Senator Warnock, this is something where you need any policy—be it cash grants, stimulus, subsidies to households—to think about the composition of households to say, look, if there are more in the households, maybe you want to direct more of these subsidies for child care toward those households.

So having policies that are very gender conscious in how they are implemented is something that has worked in other contexts to try and include these gender gaps that happen after these pandemics.

So I mentioned, again, households, thinking about how do you get women back into the labor market, right? So in the post-pandemic economy. So this might involve like work retraining programs, investing in outreach and work retraining that is focused on women. And so that is something that, you know, again has worked in other countries and I think it will be very important to do here.

Senator Klobuchar. Alright, thank you. Thank you to all of you.

Chairman Beyer. Thank you, Senator, very much. I now recognize the senior House Republican on the Joint Economic Committee, Congressman Schweikert.

Representative Schweikert. Thank you, Chairman Beyer. And actually a couple of things.

One—and this is more for you—and I would like to submit this one for the record, it is an Atlantic article in regards to mRNA Technology and the fact that we have just leaped almost a decade in our technology for almost the biofoundry that we—actually, you and I talked about a couple of years ago, as being a health care cost disrupter. So I would like to submit that for the record. I think you have to say “yes.”

Chairman Beyer. Without objection, it is accepted.

[The URL for the article referred to appears in the Submissions for the Record on page 110.]

Representative Schweikert. And to Dr. Romer, I would love to try to work with you to encourage Chairman Beyer to do a discussion in regards to labor force participation, where we are in the demographic curve. We actually had a conversation in Joint Economic a couple of years ago in regards to everything from barriers to what was happening out there, to—and it was surprising what we learned from some of the testimony of things we thought were barriers were not, and things we would have never thought of as encouragements to come back into the labor force to get back up to that type of participation.

Mr. Chairman, and this is sort of—I am going to take advantage of having a freaky smart group of witnesses here. We have been looking in our office at some of the health care outcomes, some of the populations that had very uncomfortable mortality statistics, who got sickest, who—these sorts of things. In my part of the country, being from the Phoenix, Scottsdale area, it is Native Americans.

I represent a couple of Tribal communities. One of those Tribal communities may have the second highest diabetes, type 2 diabetes, population in the country. And they had some pretty rough numbers in regards to COVID.

So as we have this discussion of getting a vaccine rolled out, and efficacies in different parts of the country, and different populations, I am wondering if we should actually have a somewhat different conversation as the Joint Economic Committee. Are we ready to maybe discuss a real disruption? And, look, Chairman Beyer knows this, a number of my charts show I have a fixation on charts, and I am not going to show all of them—but health care turns out to be the primary driver of U.S. sovereign debt over the next three decades.

I have a factoid over here that for Medicare—Medicare is the primary driver of U.S. sovereign debt over the next three decades—Medicare beneficiaries with diabetes account for about 30 percent of Medicare spending. Would it be one of the most elementary and very difficult things we could promote as a committee to help minority communities, my Native American communities, that suffer from diabetes, at the same time being able to make an argument that this is one of the most powerful things we could do for future debt and spending, but also differential health care outcomes?

Maybe it is time for an Operation Warp Speed/Diabetes. And could technology such as the mRNA, or other things—and, look, it is tough. Because on one side we have an autoimmune; the other side we have some lifestyle issues. I would love some input from the panel, with what we have experienced this last year on concentrating resources, moving technology, could we now take on one of the most expensive diseases in our society?

And I would love to start with Professor Romer. Give me your thoughts. Am I being a big Utopian?

Dr. Romer. Well, thank you. I think, no, you are not being Utopian at all. I think our consistent failure is that we lack imagination and ambition. Because when we try and do something audacious—let's go to the moon! Let's build an interstate highway system that links the whole country. When we set a big ambition and then go for it, this Nation can do it.

So I think, no, we should be setting that kind of a target. And in terms of how we get there, I understand Professor Archibong's hesitancy about my suggestion about just kind of involving the states. I think this is the conversation that we should have, though, when thinking about a mixed system.

If you think about, for example, like Professor Tabarrok's point that we are not running tests to see if lower doses could actually work with the current vaccine, if we had a system where we really relied on the states as the laboratories of democracy, we could have some states that take the lead in trying to say through the fractionated doses, or a state that could be particularly interested in diabetes and say we are going to make an aggressive push in trying to treat this.

I think what we need is something which is kind of parallel to the universities. We have a wonder system of universities across the United States. But you need these organizations that really focus on the transition from the academic research into the public policy goals. And, you know, the mechanisms that can do like what we did with, you know, the BRDA commitments on mRNA vaccines. I think more competition, more ambition would be great.

Representative Schweikert. I am up against the tyranny of the clock, but it is actually something I would be elated to have input from the panel, but even from my fellow members. Maybe it is time we come together, because this one could be bipartisan, and do an Operation Warp Speed Diabetes, and bring those goods to all of society.

So thank you, and thank you, Don, for your patience.

Chairman Beyer. You gave us the lead. Twenty-five percent of Medicare is just end-stage renal disease right now. So let me recognize my dear friend, the dear Congressman from Madison Wisconsin, Mr. Pocan.

Representative Pocan. Thank you very much, Mr. Chairman, and thank you to the witnesses. I am one of the new Dems on the committee, so very glad to be with everyone today. Also, a 33-year owner of a very small business, under 20 employees. I guess these days people call them micro businesses. I personally hate that term. But, you know, a very small business.

And it seems like, you know, when we had the 2008 economic crisis, there was a little more, from memory, general malaise. This time there are real almost winners and losers, right. There are some deep industry hits—you know, restaurants and bars, travel industry, meeting industry. And I have a few questions related to that.

I would like to get to a few subjects, so I will try to be quick for answers. Dr. Romer, you talked about getting more testing out there. That is one of the solutions.

Let me ask this, because I have had a lot of talks with my state about this. Should we also keep up, or intensify contact tracing as part of that answer, as well?

I think you are on mute.

Dr. Romer. This is a very good question. And I should say that reasonable people will disagree on this one. I think in general people think that when you have got a low level of prevalence, then contact tracing is a very good way to try and respond and keep it low.

The problem is that, once the prevalence gets too high, the tracing system is just overwhelmed. So we need to have a system that works like the kind of screening testing when you get to high prevalence, but also emphasize contact tracing at low levels.

The other thing, just to be completely honest here, public attitudes are changing. And I wish they were not changing, but they are. People are a lot less willing to answer the phone. If they answer the phone, a lot less willing to answer a specific question. Like the yield rate, where you have got somebody who is a known positive, and then you try and trace back and find contacts. The yield rates are very low right now.

So I wish it were not so, but it may be that we have to accept that this is the new world we are dealing with, and then try and find some other mechanisms where we can try and address this. And if I can make like a tip of the hat to Senator Klobuchar, I think part of why people are so suspicious and so mistrusting is they have had their trust abused repeatedly by these big tech firms.

And so, unfortunately, it is the government which is now being distrusted because of repeated abuses of trust in the private sector. So I wish we could do something about that.

Representative Pocan. Thank you. Just to make sure I get my two more questions, I am going to throw them both out there, and whoever wants to take them, because you specifically mentioned testing and I wanted to follow up on contact tracing.

The second one is, it was mentioned that, you know, if you get one shot you might just get the sniffles, with two shots—or, yeah, you will not die with one shot, but you might get the sniffles.

The question of long haulers are now what you call post-acute, whatever the new term we are using. Do we know anything about people, if you still get it now after you have been vaccinated, does it still have the same potential effect around long-haulers? That is the first question.

And then the second question is, what is the realistic expectations around summer? I happen to, in my small business we work very closely with the meeting industry, and it has been devastated. People are completely out of work, because you cannot have the virtual meeting in the normal way, and with the jobs that are there.

Someone is looking at a convention of 1,500 people in late August. Is that realistic? Or is any number like that realistic? What are we honestly looking at, assuming that people keep getting vaccinated and we are keeping the rates down. So sniffles, long-term—long-hauler issues, realistic expectations around things like meetings and conventions.

Dr. Gounder. Yeah, I can comment on some of that. So with respect to sniffles versus severe disease, what you see is you have higher neutralizing antibody levels after a second dose of vaccine versus just a dose of vaccine. So that is going to correlate to some degree with disease severity.

But it also—again, it is important to understand that you may have breakthrough infections, especially with the variants, after just one dose.

With respect to long-haulers, the COVID vaccines may actually function as therapeutic for those groups. There are a couple of different hypotheses as to why long-haulers have the symptoms they do. But by giving them a dose of vaccine, you are priming their immune system to respond to perhaps what may be a latent, ongoing low-level virus infection. Maybe you have remnants of the virus. But it is causing your immune system to respond to that. And a lot of people are reporting improvement in symptoms.

So this is something that is being actively studied right now. If we are able to maintain the same pace of vaccinations, we will be in a much better place by the end of the summer. We could be reaching, at least among the adults, you know, the 80 percent plus range. Of course, you still do not have kids vaccinated. But it really will depend on what happens, whether we can keep up that same pace.

Dr. Romer. Yeah, if I can just weigh in. I think we have got to admit that there is some real uncertainty about what happens this summer. If I were responsible for organizing a meeting, I would set it for September or October.

If it were July, I would cancel it. August, you are just a little bit on the edge. And it could be that things turn out fine, but there is just a lot of uncertainty about how this will play out.

And as I said about Dr. Gounder's point before, it takes about a month after somebody gets their vaccinations to be fully immune. So it is wonderful that we are going to have everybody—essentially everybody vaccinated by August, but, you know, we are still going to be in this kind of vulnerable period until we really get into the fall.

Representative Pocan. Thank you, Mr. Chairman.

Chairman Beyer. Thank you, Mr. Pocan, very much. Now I would like to welcome another of my Ways and Means members to the Joint Economic Committee, the gentleman from Texas, Mr. Arrington, the floor is yours.

Representative Arrington. Chairman Beyer, good to be with you, and great to join the Joint Economic Committee, and this great group of thinkers, and patriots. And as we formulate together advice and counsel economic policies to get our country back to the pre-COVID prosperity. I am looking forward to working with you, sir, and my other colleagues in both chambers, also recognizing Ranking Member Lee for his leadership.

I represent rural—a big swath of rural America in West Texas. We have our unique challenges, and we have some unique benefits to being rural. But I am very proud of what our State has done, Texas, to balance the various factors that are important, like the spread of COVID, obviously, but also the long-term effects of being isolated, and kids being not in school in that very important support system. And whether substance abuse, or deferred screenings and treatments, there are some major consequences to not getting back and reopening our country, going to work and obviously having children in school.

So no doubt having vaccines widely distributed, and the effectiveness and the development of new therapeutics are absolutely key to that. But I have got a question first for Dr. Gounder about the big drop, you said, in demand in terms of taking the vaccines.

Explain to me the reasons for the drop with respect to the hesitancy factor. What are some of the reasons within the different demographics—women, men, rural, urban, older, younger. I would like to understand that whole dynamic of hesitancy as it cuts across the different demographics.

Dr. Gounder. So if you look at the demographics and how that correlates with the type of vaccine hesitancy, what we see among communities of color, and among younger Americans, it is much more questions of access, of not being able to navigate the system, of getting to a vaccination site. Maybe they are not able to take time off work because they are an hourly wage worker.

There are some historic reasons for lack of trust. Everyone always points to that Tuskegee study, but that is actually a drop in the bucket. There is a whole history of this, even ongoing up to the present day.

And I think this is where colleagues of mine, like Rhea Boyd, Uche Blackstock, a lot of Black doctors have really done a tremendous job of reaching out, and we have seen the impacts already in terms of increased trust, increased confidence in the vaccines that

has not been done with younger people yet. But I think those two groups are a bit easier to get to because in general their concerns tend to be pretty practical in terms of access, the costs, and so on.

Then you also have other groups, which include more rural Americans, more conservative Americans, who just do not like to be told by the government what to do. They do not trust the health system, or public health officials, or the government. And so——

Representative Arrington. Some of my constituents?

Dr. Gounder. Excuse me?

Representative Arrington. You must have been talking to my constituents.

[Laughter.]

Dr. Gounder. That is funny. I actually spoke to somebody from Bedias, Texas, which is between College Station and Houston, a different rural area, but also rural in Texas and, sometimes this is also cultural. People want the freedom to do what everybody else like them is doing.

And so if it is not what people in their community are doing, they are just going to be resistant. They are not always going to be able to explain exactly why, but we really need to be reaching out through the people who are credible in those communities, who they trust. And very often that is local health care providers, their primary care provider, who can really get through here.

Representative Arrington. Thank you very much. In my remaining seconds here, Dr. Tabarrok, I know a lot of employers that want to respect the personal freedom to choose whether to take the vaccine or not, notwithstanding the fact that we need to be better communicating the benefits of that to that person and their family in the community. But I think there would be some legal liability issues and concerns if employers mandate that with their employees. There may be major lawsuits to bear.

Talk about legal liability protections as an important factor in all this. And I yield back.

Dr. Tabarrok. I think that is an interesting question. I prefer to leave that to a lawyer to answer the details of that. If I could, I just want to say one thing about if vaccine has not been seen. Some of it actually is people who have already had COVID. And that is less of a concern.

Some people, they do not want to be the first person to get it, but they are okay being the second person to get it. So I think some of it is going away over time.

And let me just say one thing about vaccines. I do not like to be told what to do by the government, either, but I love vaccines. I love vaccines. To me, it is like a super power, right, because a vaccine gives you the super power of immunity. And if we could get the super power of being immune to bullets, who would not want to be immune to bullets? Well viruses have killed a lot more people this year than have bullets.

So I am very, very happy to have the immunity to viruses. It is a great super power to have. Everybody should have it.

Representative Arrington. Thank you very much. Thank you, Chairman.

Chairman Beyer. Thank you very much, Mr. Arrington. I now recognize the chairman of the Congressional Black Caucus, my dear friend from Ohio, Congresswoman Beatty.

Representative Beatty. Thank you so much to Chairman Beyer for this very academic, educational, and healthy dialogue. Let me say to all of our panelists, thank you for your remarks. I have had time to go through your presentations, and I want to thank you for that.

Let me just say to you, Dr. Gounder, being the physician. I have been telling people, you listen to the medical profession, and you listen to our scientists. A lot of good information here. Thank you for telling us to meet people where they are.

To Dr. Archibong, let me just say thank you for looking at the total picture. Now obviously, as the Chairman said, I am the Chair of the Congressional Black Caucus. I represent the largest number of people in Congress in a caucus. It is our 50th anniversary.

And when we look at the disparities which you outlined so eloquently, and I would suggest that everybody on this panel read her presentation, because it is real. It talks about the real issues that many times we skate around in hearings like this.

Black people are dying disproportionately. There is systemic racism in this country that we have underinsured, or not insured. I am so glad that diabetes came up. My colleague is so right. Again, Black Americans have the highest mortality rate in dying from diabetes.

So with that, there are so many disparities, but when I look at—the question is to anyone on the panel who can jump in with this. Do you believe that our economy can get back to normal, or at least to pre-pandemic levels, without getting to herd immunity?

And the second part, if we cannot get to herd immunity because of vaccine—and I am going to add some stuff—not only hesitancy, but the unequal distribution of it, the lack of the vaccine in communities. What kind of effect will that have on our economy?

And to be fair, I asked the same question to the Federal Reserve Chair. Anyone? Do you want me to call you by name?

Dr. Romer. Let me respond. I think we absolutely have to get to the point where this pandemic is not a cloud that is hanging over the economy, if we want the economy to recover.

I think we should remember that incentives matter. Costs matter. A lot of the costs for getting vaccinated is the time to go find a place, and to get there, and to get vaccinated. So I think we should be investing aggressively in things like the suggestion to use the Dollar Stores as an outlet, in parallel with the pharmacies, where it is easier for people to get to one and get vaccinated.

I think accessibility should be a huge focus. We should make it as easy as possible for everybody to get vaccinated. And even if people are a little bit hesitant, if you make it a little bit easier you may be able to get them to go along. So we just need to push as hard as we can on that.

Representative Beatty. Thank you. And I like the analogy of putting it, I am going to say, in community centers. The Dollar Store may work, but in health centers, churches, schools, post offices, et cetera.

To the issue about state government, if we had, somebody used the word “democracy,” well if we had fairness in our democracy at the state level, you know, maybe I would support that fully. But right now, when we look at many of the states across this United States, there was a lot of unfairness with what some of our governors said about things that we know were fair, whether it was the election, whether it was Medicaid expansion. Until we do more work there, I think that is very dangerous, or could be dangerous.

The last question in my time I have, and maybe Dr. Archibong or Dr. Gounder you can answer this. There have already been reports that some states around the country are not able to fill the appointment of Blacks for the vaccine. Some reports are projecting that the supply will outstrip the demand nationwide as early as the end of the month.

What steps should we be taking in the Federal Government, or even in the states, to target populations with lower vaccine rates?

Dr. Archibong. I will just say, very briefly, thank you very much Congresswoman Beatty. One of the things that we mentioned before was saying that, given the disparities by race in vaccination rates, it was very, very important to direct vaccines toward—within Black communities, within Hispanic communities, communities of color. This where I know—let me talk about the federalism—this is where I think a coordinated effort from the Federal Government with the states would be very, very efficient. But I am going to stop there.

Dr. Gounder. Yeah, I think we are out of time but, I think this is what the retail pharmacies, the FEMA vaccination sites, the community health center strategy is really all about, trying to focus the vaccination resources access in communities of color, in the CDC highest social vulnerability index zip code to try to really bring vaccines to where people are.

Representative Beatty. Thank you. And, Mr. Chairman, if I could have ten seconds to say the Congressional Black Caucus—may I have 10 seconds, please, I’m sorry.

Chairman Beyer. Yes. Please proceed.

Representative Beatty. The Congressional Black Caucus announced yesterday at the White House, with the President of the United States, that we are going to have Congressional Black Caucus Vaccination Week, just like in parallel—and Day, like Voting Day, Early Vote, because we are indoctrinated, but that is something our leaders tell us to do, and that we do.

And the last thing is—you do not have to answer, but could someone send me more on this oral vaccination that I hear you talking about at the beginning, if that is an option? Nobody is talking about that in the Congress, or in our communities, that there is an option—all we are hearing is that either Pfizer or Moderna, and that is by injection. So that would be very helpful if that is real and out there.

Thank you, Mr. Chairman, so much for an incredible hearing.

Chairman Beyer. And, Ms. Beatty, we will ask the Joint Economic Committee staff to run down the research on both oral and nasal vaccine.

Representative Beatty. Thank you.

Chairman Beyer. Thank you. I now recognize the policy leader—and much else.

Representative Peters. Thank you, Mr. Chairman.

Dr. Romer, your past statements, I remember you talking about the need for widespread testing—so that people can stay at home and isolate if they test positive.

I even remember what your academic research says. I just know that you are the rapid testing guy. You have been known for that. And I think that in the context of a lack of trust, that empowering people to be their own actors, and their own diagnosers, and their own treaters, if you will, makes a lot of sense. It could be a game changer.

But what about the capabilities? I think only two home tests have been approved by the FDA. You described some of the benefit of this, but does the FDA have the testing capabilities in the pipeline for approval to do the carpet bombing that you described?

Dr. Romer. This is an area where I think one has to take a nuanced approach. I think, for example, it is important for the FDA to be extremely rigorous, and demanding, and cautious about vaccine safety.

So I think jumping in actively when the first signs of the J&J problems emerged was the right thing to do. This is very important for kind of sustaining this broad social consensus that vaccines are something that we should all take.

But on the other extreme, on the process for approving tests, I think the FDA has been a huge bottleneck. And really just a tragic bottleneck, very concerned about small issues, and not attentive to the huge benefits that could come from just trusting people at home with a little bit more information about their own health conditions.

Now there are reasons why the FDA kind of historically came to the position here it is, but they need to be quicker to update and say things have changed and we have got to be able to respond more quickly.

So to be honest, I think, no, the FDA is still going to get in the way if we try to carpet bomb Michigan with these kind of home rapid tests. I think the Governor of Michigan ought to just say, I do not care what the FDA says you can do with these tests. I am going to say we are going to send it to peoples' homes and they can use them, and then the FDA can come after me if they do not like it.

Dr. Gounder. One thing I would add Dr. Romer's comment on the mass testing, I think that works if people are able to stay home. This is something I see all the time, as someone who discharges patients from the hospital who had COVID, and we ask them to isolate afterwards until they are fully out of the infectious window, and they are not able to because they have to get back to work.

And so for this to work, you need to allow—you need to make it so that people can stay home.

Representative Peters. That is two problems, though, is it not? I mean the first problem is still empowering patients to know what they are up to. And then giving them the autonomy to act based on that information.

And I think, you know, the notion that we should be in the way of this really flies in the face of the trend toward patient empowerment and responsibility for your own health, which I think is inevitable and it is coming—

Dr. Romer. If I could just say, if you want to think about how this system could work, you could have people doing these at-home tests. If they test positive, they might then have the option to go and get an official MPCR confirmation. Then, if they get a confirmation, the government could pay them their lost wages to stay home.

Not that many people are positive. It would not be that expensive. We could do this.

Representative Peters. It could be tailored. Let me ask a question about something else, about confidence in the vaccine. There has been a decision made to shelve the J&J vaccine because of very, very few, but admittedly serious consequences.

I was in local government. I know people do not analyze risks the way that you do. I think that is the end of the J&J vaccine in terms of acceptance. I am interested in hearing Dr. Gounder and maybe Dr. Romer, what is your reaction to that? And how do we inspire confidence in the face of what I think may be an over-reaction?

Dr. Gounder. Well, you know, I think it is important that we maintain confidence in our vaccines more generally. The Pfizer and Moderna vaccines are highly effective, highly safe.

The fact is—

Representative Peters. Well that is just J&J, right? I mean, J&J is also highly effective.

Dr. Gounder. Well, it is highly effective, but we are still evaluating as you said, very rare but serious complications. The fact is, our vaccination supply, we have enough vaccine to vaccinate our American adults even without the J&J, number one.

Number two, there have been manufacturing issues, as you are probably aware, at the Emergent BioSolution Manufacturing Plant in Baltimore. And so we were anticipating already that supply of the Johnson & Johnson vaccine would really slow down over the next couple of months.

So I do not think this is going to have a huge impact, frankly, for most of our vaccination efforts. It is really going to have the greatest impact on certain hard-to-reach communities in this country, and on the global vaccine supply.

Representative Peters. Alright. Well thank you, Mr. Chairman, my time has expired. I yield back.

Chairman Beyer. Thank you. Thank you, Mr. Peters, for making the interesting psychological argument about what happens when you challenge the efficacy rebuilding of that trust.

And we wrap up with Congressman David Trone from Maryland, who is one of the most successful business people I have ever known.

David.

Representative Trone. Very generous. Thank you, Mr. Chairman.

Dr. Gounder, as we continue to recover from COVID, one issue on many, many families' minds is their kids returning to school.

Having all adults eligible by April 19th is a great first step, but the reality is many children will not receive a vaccine. Recently I hosted a Q&A live with Dr. Fauci, and my chat box was blown out by constituents asking when will a vaccine be safe for my kids? And when will it be safe for my kids to return to school?

So how difficult is it going to be to reach herd immunity until we get the vaccine approved for children of all ages?

Dr. Gounder. Pfizer has submitted their vaccines to the FDA for Emergency Use Authorization for kids 12 and up. And I anticipate that that will come through pretty quickly here. And so that actually will help us, especially if we start to see the demand for vaccines among adults slow down. Then you might actually see adolescents picking up and taking some of those empty vaccination slots in the coming months. And I do not think that would be a bad thing, if we can expand vaccine coverage that way.

With respect to schools, I think that we have learned a lot in the past year. It has really been a crash course in this virus. And in the beginning we thought this virus was largely transmitted through droplets and through contact—skin-to-skin contact, or contact with contaminated surfaces—and what we have learned over the past year is that aerosol, airborne spread is probably the more significant driver.

And so what that means is that your mitigation measures, your infection control measures in the school may be different. If you are talking about surface contact, you are cleaning surfaces and hand washing. If you are talking about droplets, it is a combination of wearing masks and being six feet apart. But if it is aerosol, airborne, then it is masks and ventilation that become the most critical thing here. And you do not want to have a high density of people in that room, but they can be at closer distances together as long as you do not have high density.

So what we have learned is, you can reopen schools safely as long as you have the masking, the ventilation, reasonable classroom density, testing, as Dr. Romer would advocate for. And the other thing we have learned is, when you see a transmission in schools, it is largely adult to adult. It is not children to adults. And when children transmit, it is usually in the setting of play dates, or sports team activities outside of the classroom, not in the classroom.

So based on what we have learned, we really can reopen schools safely as long as you can continue with those mitigation measures—the masks, ventilation, ideally testing, even if you do not have mass vaccination of the students yet.

Dr. Romer. If I could just weigh in on this, too. Of course I approve testing. But one of the things I wish we had committed to in this new infrastructure bill was a massive upgrade in the quality of the ventilation and the air quality in schools. This could help with the current COVID pandemic, but with future viruses. And even other health issues related to particulates.

So if we made the right investments, we could have much cleaner air and a lot of good would come of that, of much cleaner air in schools.

Representative Trone. I completely agree with you on that 100 percent. I sit on a bunch of school boards and could not agree more.

Dr. Gounder, again quickly, with the J&J problem coming up, the AstraZenica challenges on their vaccine also, I mean we have got to figure how to get the COVID vaccine out to the entire globe. And, you know, with the poorest 19 countries getting unequal access to a safe and effective vaccine. Could you speak a little bit about what efforts we are trying to help these other countries on the poor side acquire a vaccine, and they take issues now with AZ and J&J that this is complicating it.

Dr. Gounder. What is great about both of those vaccines is they are cheap. They do not have the same strict cold-storage requirements that you have with Pfizer and Moderna. And so we were really counting on AstraZenica and Johnson & Johnson for our global vaccine supply. And the Merck-Johnson & Johnson collaboration, Merck assisting Johnson & Johnson, which is really an astounding feat that is happening, but the idea that they would help scale up supply was really intended for the world.

And the other vaccines that are being used, say the Sputnik Vaccine, the CanSino vaccine out of China, these are also adenovirus vector vaccines that may have some of the same complications. We do not yet know. But I think what I am most concerned about with respect to, you know, how this all pans out is what will this mean for vaccinating the world?

Dr. Romer. If I could just weigh in as the former World Bank Chief Economist, the World Bank is saying somebody else needs to go donate a bunch of money to help vaccinate the world.

We have got to remember that that was the job of the World Bank, is to help poor countries. They are spending a lot of money, including their concessionary aid, on things with a very low bang per buck. And as Dr. Tabarrok has shown, the bang per buck on these vaccines is extraordinarily high.

So we should be putting a lot more pressure on the Bank to not just engage in business as usual, but go out and pay for the vaccinations that people need in the developing world.

Dr. Archibong. Can I just add something? I have expertise in African countries. I would highly encourage investment in GAVI, the vaccine alliance. There definitely need to be more funds accorded to them because they are doing really, really good work in African countries, just to highlight that there.

Dr. Tabarrok. And with that, for the rest of the world I think it is important to underline: It is more important to get vaccinated now. Use the AstraZenica, use the Johnson & Johnson when the pause is over. It is much, much more important to get an early vaccination. Do not wait for Moderna and Pfizer. It is going to take too long.

Take the vaccine, whatever you can get now. The Russian vaccine is actually pretty good. Use the vaccines that you can get access to, and start your vaccination early. That is the message to take to the rest of the world.

The U.S. is very fortunate. We have Moderna and Pfizer. The rest of the world: vaccine early and vaccinate often. That is the route to health and to wealth.

Chairman Beyer. And the message I have to give to you guys is that the vote is going to close in three minutes. And since I am carrying proxies for a number of other people, I have to go. But I

want to thank you very, very much. This was a fascinating hearing. You managed to keep Senators and Congressmen here for two-and-a-half hours, which is a wonderful thing. I am very grateful.

This record will be open for three days. This is recorded. I am sure tens of thousands of people across the country will watch what you offer. So thank you very much. We hope to work with you again in the years to come.

And with that, the hearing is concluded. Thank you.

[Whereupon, at 4:32 p.m., Wednesday, April 14, 2021, the hearing was adjourned.]

SUBMISSIONS FOR THE RECORD

PREPARED STATEMENT OF HON. DONALD BEYER JR., CHAIRMAN, JOINT ECONOMIC COMMITTEE

RECOGNITIONS

This hearing will come to order. I would like to welcome everyone to the first Joint Economic Committee hearing of the 117th Congress.

I look forward to working with Vice Chairman Heinrich, Ranking Member Lee, Senior House Republican Schweikert, and all of our Committee members as we examine the many economic challenges and opportunities facing the country.

I want to thank each of our distinguished witnesses for sharing their expertise today. Now, I would like to turn to my opening statement.

THE END IS IN SIGHT

The pandemic and its tragic health and economic consequences have dominated our lives for the past year.

After more than a year of physical distancing and mask wearing, of fearing for our health and the health of our loved ones, of widespread and deeply unequal economic hardship, the potential for returning to a sense of normalcy is finally within sight.

The pandemic will leave no shortage of tragedy in its wake.

More than 560,000 people have died in the United States, many isolated in hospitals rooms and without their family's last comfort.

Thirty-one million have been infected with the coronavirus, and many of them continue to live with the disease's debilitating symptoms.

Communities of color—particularly our Black, Latino, and American Indian communities—have been hit especially hard, experiencing the highest rates of COVID-19 infection, hospitalization and death.

The economic damage persists as well.

After job gains of more than 900,000 last month, close to 10 million workers remained unemployed—one quarter have been jobless for a year or longer.

Another 4 million people have left the labor force since the pandemic began.

Thankfully, the economy is beginning to recover.

VACCINATION PROGRESS TO DATE

Much of that emerging recovery is due to the remarkable vaccination effort unfolding in our country and throughout the world right now, where millions of shots are going into arms every single day.

It's an unprecedented undertaking.

More than 190 million doses have been administered in the United States. More than one in three people in the U.S. has received at least one shot, and one in five Americans has been fully vaccinated.

At the current rate, we could vaccinate all adults in the United States by the end of the summer.

By then, perhaps our lives can begin to approach a new normal where we can see loved ones, where we no longer have to choose between going to work and keeping family safe, and where we can enjoy a meal inside at a restaurant or a trip to the movies.

ECONOMISTS PROJECT A STRONG RECOVERY

There is a consensus among economists that vaccinations will profoundly shape the course of the economic recovery.

Forecasts call for accelerating growth, with Goldman Sachs projecting annual GDP growth in 2021 will reach 8 percent.

In an interview that aired this past weekend, Federal Reserve Chair Jerome Powell said the economy and job creation are poised for faster growth, and the principal risk is that “we will reopen too quickly, people will too quickly return to their old practices, and we’ll see another spike in cases.”

THE PANDEMIC RECOVERY IS PRECARIOUS

Although the trajectory of the pandemic recovery is headed in the right direction, it remains precarious and can be derailed by hasty reopenings, new variants, anti-vaccine sentiment, or lack of access to vaccines.

This means that our economic recovery is precarious as well.

Public health experts warn that state efforts to roll back mask mandates and physical distancing requirements can backfire, especially in light of highly transmissible and deadlier variants.

Michigan’s recent experience makes clear that we cannot rely on vaccines alone as our only way out of the pandemic.

We’ve seen recent spikes in cases as the more contagious B.1.1.7 variant has now become the most common strain of the virus in the United States.

Younger adults and children are comprising a larger share of new infections.

If we cannot bring the pandemic under control, both domestically and globally, new variants might become resistant to our current treatments and vaccines, creating a need for adjusted vaccine products, further delaying recovery efforts.

CDC Director Dr. Rochelle Walensky has said repeatedly that, because of these concerns, we cannot let our guard down and must continue to practice mask wearing and physical distancing until we reach herd immunity.

DEEP INEQUITIES AT HOME AND ABROAD REMAIN

There is also profound inequity in access to vaccines. Vaccination rates for people of color—especially Blacks and Latinos—lag far behind the rates for Whites.

As a result, pandemic and economic recovery efforts in communities of color may fall behind recovery in White communities.

The reality is even worse abroad.

While wealthy countries have purchased enough vaccine to cover two, and sometimes even three times their populations, low- and middle-income countries—which account for 81 percent of the world’s adult population—have collectively purchased only 33 percent of vaccines.

As Treasury Secretary Yellen laid out last week, some low-income countries don’t expect to be able to fully vaccinate their populations until 2023 or 2024, which should be unacceptable to all of us.

To end this pandemic for good, the battle against the coronavirus must be won globally.

So, while we have made extraordinary progress in the past few months, we are not out of the woods yet.

I look forward to hearing from our witnesses about the state of our recovery, where it’s going, and what we can do to ensure things stay on track. And now, I turn it over to Senator Lee for his opening statement.

PREPARED STATEMENT OF HON. MIKE LEE, RANKING MEMBER, JOINT ECONOMIC COMMITTEE

Good afternoon, and thank you to Chairman Beyer for convening today’s hearing.

After a long COVID winter that included unprecedented strains on our economy and public health, the spring has brought welcome signs of life and hope. Businesses are beginning to reopen, schools are reconvening in person, and friends and family members are finally reuniting. Perhaps what is most encouraging—and what has helped support the beginning of our “return to normal”—is the development and distribution of vaccines.

But there is still a long way to go. Many Americans have not returned to in-person experiences in the entertainment and travel industries, for instance; and our economy is still suffering. In order for people to feel safe returning to in-person interactions that support economic activity, we must continue to improve vaccine distribution.

As we consider how to move forward, it is worth reflecting on our trajectory so far—both the strategies that have helped and those that have hindered our progress.

Though vaccine production has had some supply chain setbacks—such as difficulty finding vaccine components like reagents and other chemicals that have led to manufacturing bottlenecks—it has overall exceeded expectations.

Operation Warp Speed, an initiative begun by the Trump administration, sped the development and production of several vaccines—including Moderna, Pfizer, and Johnson & Johnson—by purchasing vaccines in development and directing resources toward vaccine manufacturing capacity. In total, through advance purchase agreements and grants, the Trump administration purchased more than 800 million doses through the end of July 2022.

The Council of Economic Advisers previously estimated that accelerated vaccine development and distribution by OWS could result in as much as \$2.4 trillion in economic benefit if there was a viable vaccine by January 1, 2021. The effort actually outpaced that timeline, with first doses of the Pfizer vaccine available on December 14, 2020; and the CEA noted that their estimate might even underestimate the full economic benefit of accelerated vaccine development.

In terms of vaccine distribution, there are worthwhile policy proposals to increase the number of people with some protection while vaccines are scarce. We should be open to creative solutions that can get people protected more quickly by stretching the limited supply as far as we can, and moving the doses we have as quickly as possible. Our main priority should be to extend at least some protection to as many people as possible.

States also have an important role to play in distribution. In some cases, we've seen that restrictive Federal guidelines and rigid, complex eligibility requirements have impeded states' progress, leading to many vaccine doses being wasted or administered to unintended populations. Lack of health resources at the final stage of local distribution have also presented problems for many areas.

On the other hand, successful states have implemented simple eligibility criteria and used technology to accelerate distribution. Some have built systems where patients can register online; others have used online event hosting software to schedule appointments. They have also partnered with local businesses and pharmacies.

Despite our challenges, the U.S. has vaccinated more people per capita than most other countries in the world. Nearly 190 million doses have been administered as of April 13th; more American citizens have received a COVID-19 vaccine than tested positive for the virus since the beginning of the pandemic; and nearly a third of the adult U.S. population is fully vaccinated.

There is reason for hope in our economic outlook, as well. Expectations are set for a stronger economic response in the second half of the year—the CBO expects real GDP to return to its pre-pandemic level by 2021, and the labor force is expected to return to its pre-pandemic size by 2022.

But in order to accelerate our economic recovery, we should look for opportunities to improve vaccine distribution policy. The sooner the U.S. reaches herd immunity through vaccination, the sooner businesses can reopen to full capacity, students can fully return to schools, industries can come back to life, and Americans can return to work and social life without fear. I look forward to hearing our panelists' contributions today and their insights into how we can do just that.

Before we do, I would like to ask Chairman Beyer for permission to submit five articles or studies from our witness Dr. Tabarrok for the record.

Thank you, Chairman Beyer.

Testimony before the United States Congress Joint Economic Committee

Hearing Titled:

[Vaccinations and the Economic Recovery](#)

Celine Gounder, MD, ScM, FIDSA

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Written testimony: April 11, 2021

Oral testimony: April 14, 2021

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Chairman Donald S. Beyer Jr., Vice Chair Martin Heinrich, Ranking Member Mike Lee, and Members of the Committee:

Thank you for the opportunity to discuss with you today the role of vaccinations in our pandemic and economic recovery. I am double-boarded in both Internal Medicine and Infectious Diseases. I am also an epidemiologist. I have worked in infectious diseases and public health since the 1990s both in the United States and overseas. I am a Clinical Assistant Professor of Medicine and Infectious Diseases at the New York University Grossman School of Medicine. I care for patients at Bellevue Hospital in New York City. I served as an Assistant Commissioner of Health in New York City. I have studied and worked on public health solutions to the tuberculosis and HIV epidemics in Brazil and throughout sub-Saharan Africa. I was an Ebola aid worker in West Africa. I served on the Biden-Harris Transition COVID Advisory Board. I am the CEO of Just Human Productions, a non-profit public health media organization. I educate the public about the COVID pandemic through various media platforms. I am pleased to be here with you today to discuss the role of vaccines and the broader U.S. public health response to the COVID pandemic.

Summary

It's important to give credit where credit is due. The prior administration helped accelerate vaccine development through parallel processes and rigorous clinical trials—safely, scientifically, and in record time. The current administration is helping to scale up manufacturing and speed up distribution of vaccines.

We are currently vaccinating an average of [3 million people per day](#). As of April 11, 2021, [35% of the total population](#) had received at least one dose of vaccine, and [21% of the total population](#) had been fully vaccinated. Despite recent setbacks involving production of the Johnson and Johnson vaccine, we remain on track to have enough vaccine supply for every adult in the U.S. by the end of May.

Assuming we continue vaccinating at the same pace of 3-3.5 million COVID doses per day, we could vaccinate all adults well before the end of August. If we are able to increase that pace to 4 million doses per day, we could fully vaccinate all adults before the end of July. If our pace of vaccinations slows to 2 million per day starting in May, we could still fully vaccinate all adults before the end of October.

Vaccination rates reflect vaccine supply, access to vaccines, *and* demand for vaccines.

By expanding distribution through retail pharmacies, mass vaccination sites, and federally qualified health centers, we have accelerated our pace of vaccination. FEMA's community

vaccination centers and federally qualified health centers have played an especially important role in administering vaccines to people of color.

But underinsurance and lack of insurance remain significant obstacles to accessing healthcare, including COVID vaccination, because people who don't have insurance are less likely to have a regular primary care provider or to be affiliated with a health system. COVID vaccines are free, but not everyone knows that, and there are other costs to getting vaccinated, like the cost of transportation, parking, time off work, and childcare.

Although vaccination sites have been located, in part, on the basis of the Centers for Disease Control and Prevention's (CDC) Social Vulnerability Index [geography has proven to be essential](#) but not sufficient in ensuring access to vaccination. Vaccines need to be delivered at a time and place that are convenient. Information about vaccines and how to get vaccinated needs to be understandable and in someone's first language. Many immigrants are worried they could jeopardize their [immigration status](#) by seeking vaccination.

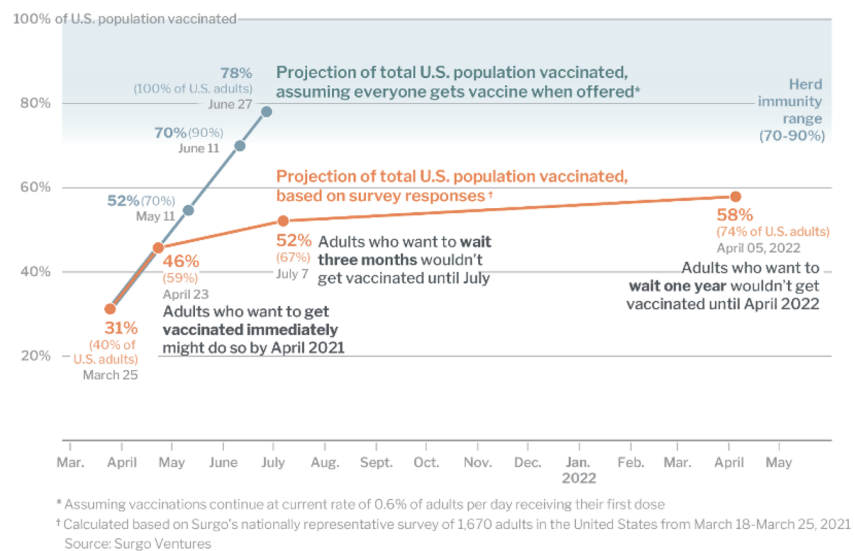
To get vaccinated in this country, you have to be eligible, know that you're eligible, know there's supply in your area, and know who's providing the vaccines. You then need to schedule an appointment for vaccination. The people who've been most adept at navigating these complex systems have higher [levels of education and income](#) and are [younger, whiter, and less rural](#). They have better access to [broadband internet](#) and computers. They may be more computer literate. They have more flexible jobs that might allow them to multitask, working while periodically refreshing that vaccine appointment website. They're also less likely to have a [disability](#), which can pose additional barriers to making and attending an appointment. [40% of people](#) who've gotten COVID vaccine appointments had help.

Efforts to improve access have already made a significant impact on race-related disparities in COVID vaccination, but there's still much we can still do to improve vaccine access. Meanwhile, there are signs that [supply is already outstripping demand](#) in some places.

The good news is that the share of Americans who want to "wait and see" if they will get vaccinated shrank from [39% in December 2020 to 17% in March 2021](#), according to Kaiser Family Foundation surveys. The non-profit think tank Surgo Ventures has seen similar increases in intent to get vaccinated. We are [making progress](#) building vaccine confidence among that "moveable middle," especially among communities of color and persons for whom issues of access (e.g. appointment availability and scheduling, time, and cost) are the greatest barriers to vaccination. Trust and perceived risks of vaccination are the biggest barriers among least persuadable segments of the population, according to Surgo Ventures.

The bad news is that 20% of Americans say they will only get vaccinated if required or will definitely not get vaccinated, including many [Republicans](#), [Evangelical Christians](#), [rural Americans](#), and [essential workers in non-health industries](#), according to Kaiser Family Foundation surveys. With 20% of Americans currently unlikely to get vaccinated and another 25% of the population who are children, we won't be reaching herd immunity for some time yet.

The non-profit think tank Surgo Ventures predicts that COVID vaccination rates could slow as soon as this month. These projections are based on a [nationally representative survey of adults](#) in the U.S. in March 2021. Respondents were asked about their preferred timelines for getting vaccinated:



Source: Surgo Ventures, April 8, 2021.

It's also important to understand that vaccine rollout is necessary but not sufficient for pandemic recovery. I think of pandemic recovery in four phases: ending the emergency, relaxing mitigation measures, getting to herd immunity, and long-term control.

To end the emergency, we have to vaccinate the highest-risk persons who are most likely to develop severe COVID, most likely to be hospitalized, and most likely to die. That means vaccinating older adults and people with chronic medical conditions. We must also pay special

attention to the hardest-hit, most vulnerable communities, including communities of color and frontline essential workers.

We cannot end the emergency phase of the pandemic by [relying only on vaccination](#) without risking another surge in cases, hospitalizations, and deaths. Lifting mitigation measures too soon is like taking your foot off the brake before putting the car into park. With the emergence of more infectious variants, the virus is hitting the gas at the same time. Vaccination is like a parking brake: it works well once a car is in park, but not nearly as well when you're racing down a highway.

Herd immunity is when so many people are immune to the virus, it has no place to go. We don't yet know what proportion of the population we'll need to vaccinate to reach herd immunity because this is highly dependent on how infectious the virus is, and on the emergence of more infectious variants, which is a moving target. The more infectious the virus, the higher the threshold to reach herd immunity. Finally, we don't know how long immunity after vaccination will last. Currently, our best estimate is that we'll reach herd immunity to SARS-CoV-2 when approximately 75-85% of the population is immune.

Most scientists believe that [SARS-CoV-2 is here to stay](#) and that the virus will become endemic, circulating at some level in many countries for years to come.

Thus, we are likely facing a prolonged interim period, when we can safely lift mitigation measures, because the most at-risk have been shielded by vaccination, but before we've reached herd immunity. This means that even once restrictions are lifted, we're unlikely to get back to business-as-usual right away. Businesses have a legal and ethical obligation to ensure a safe environment for their customers and workers. People need to feel safe traveling, going to the gym, or going out to eat. While some may not need that assurance, many do.

While COVID credentials may not be mandated by the government, the private sector is forging ahead. The purpose of COVID credentials, what some mislabel COVID passports, is to demonstrate that when individuals engage in certain activities, they pose minimal infectious risk to others. COVID credentials may take the form of a COVID test result and/or COVID vaccination status.

The current administration has stated that it does not have plans to issue COVID credentials or to require COVID credentials. However, there is a need for the federal government to help coordinate, standardize, and regulate COVID credentialing efforts. COVID credentials protect privacy and should not create or reinforce health disparities.

It is important to distinguish COVID credentials from COVID vaccination mandates. A strict vaccination mandate requires that someone be vaccinated and does not allow for reasonable alternatives. Many of us in the public health community are concerned that vaccination mandates could backfire, especially this early in our COVID vaccine rollout efforts.

Finally, our pandemic recovery plans must address chronic underfunding of the CDC and state and local health departments and build a strong, modern public health infrastructure. We need a professional public health corps and 21st century bioinformatics and laboratory systems. We must acknowledge that new infections are emerging with greater frequency—a trend driven by climate change, environmental degradation, globalization, and overpopulation—in other words anything that brings people in closer contact with wildlife habitats resulting in virus spillover. Our financial and political investment in preparedness for epidemics and pandemics should reflect the serious health, economic, and natural security triple-threat they pose. We must re-engage on the global health stage, beginning with efforts to strengthen surveillance for emerging infectious disease, build local public health capacity, and scale up COVID vaccination in the rest of the world. As long as SARS-CoV-2 continues to spread from person to person anywhere in the world, it will continue to mutate and evolve. New mutant variants may be more infectious, more virulent (causing more severe disease), or could evade our immune responses to natural infection or vaccines. As this pandemic has shown us, the emergence of a new virus halfway around the world poses a very real and present danger to all of us.

I. What is the projected trajectory for vaccinations in the United States?

It's important to give credit where credit is due. The prior administration helped accelerate vaccine development through parallel processes and rigorous clinical trials—safely, scientifically, and in record time. The current administration is helping to scale up manufacturing and speed up distribution of vaccines.

We are currently vaccinating an average of [3 million people per day](#). As of April 11, 2021, [35% of the total population](#) had received at least one dose of vaccine (117,142,879 people) and [21% of the total population](#) had been fully vaccinated (70,692,645 people). The Pfizer and Moderna vaccines are two-dose vaccines, while the Johnson and Johnson vaccine is a one-dose vaccine, so the Pfizer and Moderna vaccines get you to half as many people fully vaccinated per day as the Johnson and Johnson vaccines.

Contract production targets by month for the vaccine manufacturers are as follows:

- Pfizer-BioNTech
 - March 31: 120 million doses
 - May 31: 80 million doses
 - July 31: 100 million doses
- Moderna
 - March 31: 100 million doses
 - May 31: 100 million doses
 - July 31: 100 million doses
- Johnson and Johnson
 - June 30: 100 million doses
 - TBD: 100 million doses

The U.S. government is currently receiving more than 13 million doses of Pfizer vaccine and about 10 million doses of Moderna vaccine per week. Johnson and Johnson delivered 20 million doses of vaccine in March.

This week, the federal government allocated [6,957,000 doses of Moderna vaccine](#) and [9,434,880 doses of Pfizer vaccine](#), and [700,000 doses of Johnson and Johnson vaccine](#) (down from about 5 million last week) to the states. The Pfizer and Moderna vaccine doses are apportioned equally to first and second doses.

Production of the vaccines has sped up as manufacturing kinks have been worked out, and companies were given priority access to raw materials and other manufacturing supplies, and facilities to fill and finish their vaccines. Pfizer also added manufacturing sites, is producing some of its own raw materials (e.g. lipids), doubled its batch sizes, and created its own capacity

to package vials for shipment. The Food and Drug Administration (FDA) has granted Moderna permission to package 15 doses per vial, allowing the company to ship more doses.

Production of the Johnson and Johnson vaccine was dealt a setback with recent news of serious manufacturing problems at the [Emergent BioSolutions](#) plant in Baltimore, which rendered 15 million doses unusable. An additional 62 million doses of the Johnson and Johnson vaccine are on hold while they're assessed for contamination. It takes two months for batches of the Johnson and Johnson vaccine to brew. It takes another five to six weeks to finish formulating, testing, and packaging for release. If Emergent BioSolutions is cleared to restart production, Johnson and Johnson expects they'll be able to produce up to 8 million doses a week. Merck has also agreed to help manufacture and provide "fill-finish" services for the Johnson and Johnson vaccine, but that additional supply won't be available until later this year. It's anticipated that allocations of the Johnson and Johnson vaccine will [drop significantly](#) this week.

Another recent potential setback was a report of [four cases](#) of blood clots and low platelet counts in recipients of the Johnson and Johnson vaccine. It is not yet known whether these adverse events are associated with the Johnson and Johnson vaccine. The company, the FDA, and the CDC are investigating the events. It's important to note that even if a link is established, the risk of such events appears to be exceedingly low. Although we anticipate still having enough supply by the end of May to vaccinate all adults with the Pfizer and Moderna vaccines, the Johnson and Johnson vaccine is uniquely suited to vaccinating migrant workers, homeless persons, college students, rural areas, and other mobile or hard-to-reach populations given its single dose schedule and less stringent cold chain transport requirements. Others simply like the convenience of a one-shot vaccine.

Yet, despite reduced supply of the Johnson and Johnson vaccine over the next couple of months, we remain on track to have enough vaccine supply for every adult in the U.S. by the end of May.

A. How can the trajectory be affected by changes in the rate of vaccinations?

Assuming we continue vaccinating at **the same pace of 3-3.5 million vaccinations per day**, and assuming we utilize all of the remaining Johnson and Johnson 20 million vaccine doses delivered to the U.S. government in March, we would administer another 60-70 million doses between now (April 11, 2021) and the end of April, or fully vaccinate an additional 23-28 million people, getting us to well over 100 million people fully vaccinated by the end of April.

So long as Pfizer and Moderna continue to produce and deliver their vaccines on time, we could reach 150 million fully vaccinated by the end of May, 200 million fully vaccinated by the end of June, 250 million fully vaccinated by the end of July, and **all adults in the U.S. fully vaccinated well before the end of August.**

With additional improvements in distribution our pace of vaccinations could increase to 4 million per day. However, there are signs that [supply is already outstripping demand](#) in some places. If vaccine-seeking drops, the pace of vaccination will drop, at least until the FDA issues an emergency use authorization allowing for vaccination of children ages 12 and up. I anticipate that by August, the Pfizer, Moderna, and possibly also Johnson and Johnson vaccines will have received emergency use authorization for use of their vaccines in children 12 and up.

If our pace of vaccinations increases to 4 million per day starting in May, we could fully vaccinate all adults before the end of July.

If our pace of vaccinations slows to 2 million per day starting in May, we could still fully vaccinate all adults before the end of October.

B. How could the emergence of SARS-CoV-2 variants impact global COVID vaccine supply?

The two vaccines most likely to be affected by SARS-CoV-2 variants in the near term are the Johnson and Johnson and AstraZeneca COVID vaccines. This is significant because these vaccines are inexpensive to produce and don't have stringent cold-chain requirements, making them ideal for global distribution and administration.

The Johnson and Johnson vaccine is highly effective in preventing severe disease, hospitalization, and death from COVID. However, in phase III clinical trials, the Johnson and Johnson vaccine was found to be [less effective](#) in preventing moderate to severe COVID in South Africa and Latin America, where the B.1.351 and P.1 variants are each widespread respectively. Johnson and Johnson is currently evaluating a two-dose regimen to determine if it's more effective, particularly against variants of concern, and more durable than the currently approved single-dose regimen. If recommendations changed and the Johnson and Johnson vaccine were to become a two-dose vaccine like the Pfizer and Moderna vaccines, this would have important implications for the global vaccine supply and distribution. In the U.S., we might consider giving a second dose to people who initially received one dose of Johnson and Johnson vaccine. Alternatively, we might only target certain especially high-risk populations for booster shots. Outside the U.S., many countries may opt to stick with a one-dose schedule given that a single dose should still significantly reduce risk of hospitalization and death, is simpler to distribute, and is less costly. However, continuing with a one-dose strategy could come at the risk of creating immune pressure selecting for more vaccine-resistant variants, which would have consequences for everyone the world over.

AstraZeneca has yet to apply for an emergency use authorization for its vaccine from the FDA. Even if the FDA grants the AstraZeneca vaccine an emergency use authorization, it is unclear whether the AstraZeneca vaccine would ever be used in this country. Furthermore, there are also concerns about decreased effectiveness of the AstraZeneca vaccine against SARS-CoV-2 variants. South Africa is not using the AstraZeneca vaccine due to concerns about [reduced vaccine effectiveness against the B.1.351 variant](#). A recent study also found that the AstraZeneca vaccine elicited [lower neutralization antibody activity against B.1.1.7](#), the variant originally identified in the UK, and now the dominant variant in the U.S.

C. Should we spread out our supply by delaying second doses of the Pfizer and Moderna vaccines?

The more infectious and virulent B.1.1.7 variant that was first identified in the UK has become the dominant strain in the U.S. The B.1.1.7 variant is driving a surge in cases and hospitalizations in [Michigan, Minnesota](#), and other states. In light of this latest surge, [some have argued for delaying second doses](#) of the Pfizer and Moderna vaccines, as the UK, Germany, and Canada are doing, in order to provide first doses to more people. [There are very real risks to this approach](#), and [it's not one I would recommend](#).

Some have argued that the UK's dose-delay strategy helped curb a surge in cases driven by the emergence of the B.1.1.7 variant. The [UK](#) has given first doses to 48% of its population, but only 11% are fully vaccinated. However, they implemented other measures simultaneously, including [strict lockdowns, which they're only now starting to lift](#). We have yet to see if there's a rebound in cases after these restrictions are lifted.

Immunity isn't binary. It's on a continuum. Vaccination may induce full immunity to some strains, partial immunity to variants of concern, and no immunity against vaccine-evading variants. By delaying second doses, we could be creating a several weeks- to months-long window when there are intermediate levels of immunity in the population, putting immune pressure on the virus and selecting for the emergence of variants of concern and vaccine-evading variants. Real world evidence from [Scotland](#) shows that the effectiveness of the Pfizer vaccine [peaks at 28-34 days after a first dose and then drops in subsequent weeks](#). Multiple studies have shown that [one dose of Pfizer or Moderna vaccine elicits weaker antibody neutralization responses](#) against the B.1.1.7 variant, the B.1.351 variant first identified in South Africa, and the P.1 variant first identified in Brazil as compared to early SARS-CoV-2 strains (see also [here](#), [here](#), and [here](#)). The second doses of the [Pfizer](#) and [Moderna](#) vaccine are important for boosting levels of neutralizing antibodies and to widen coverage of variants of concern. Real-world evidence from Israel suggests that [two doses of the Pfizer vaccine](#) are effective against the B.1.1.7 and B.1.351 variants, but breakthrough infections occur after only one dose. This may be

why there was a lag after Israel began vaccinating its citizens and before a drop in COVID cases was observed.

D. What's being done to increase the pace of vaccination in the U.S.?

A quarter of Americans don't have a primary care provider, and many primary care providers don't have the capacity to vaccinate in their offices. While big hospital systems and academic medical centers can manage the logistics of vaccination—including registration, scheduling, patient observation and follow up, supply chain management, and reporting requirements—this may be challenging for many primary care providers. So additional mechanisms for distributing vaccines have proven and will continue to be essential. These alternative mechanisms include retail pharmacies, mass vaccination sites, and federally qualified health centers.

President Biden recently announced that the federal retail pharmacy program will expand from seventeen thousand to a total of forty thousand retail pharmacies across the country, putting 90% of adults in the U.S. within five miles of a vaccination site.

[Mass vaccination sites](#) are also an important tool for getting people vaccinated. An additional twelve FEMA community vaccination centers will be brought online in April, bringing the total to thirty-three. State and local health departments and local partners are also running mass vaccination centers across the country. FEMA, state, and local partners are also supporting smaller vaccination sites as well as mobile vaccination efforts. [Homebound persons](#) are among the highest risk for severe COVID, and while many are already eligible for vaccination, they are unable to travel to vaccination sites. In [Washington, D.C.](#) and [Baltimore](#), for example, local officials and health workers are going door-to-door, reaching out to elderly and high-risk populations. The federal government is also funding transportation for seniors and people with disabilities to travel to vaccination sites.

Thus far, Americans seem to [prefer](#) vaccination at retail pharmacies over mass vaccination sites, and it's proven cheaper and more efficient to distribute vaccines through retail pharmacies than mass vaccination sites. However, FEMA's community vaccination centers are preferentially located in communities of color, and [65%](#) of vaccines administered at these sites go to people of color. And when FEMA vaccination sites have opened up to [walk-ins without appointments](#), they have been able to reach an even more racially and ethnically diverse population. About 70% of people receiving COVID vaccines via federally qualified health centers are people of color. The federal retail pharmacy program has prioritized locations on the basis of the CDC's Social Vulnerability Index, but as the program expands, it will be important to track equity in vaccine distribution. Over the past decade, many pharmacies catering to low-income, uninsured, and publicly insured patients in urban areas have [closed](#). Unless the retail pharmacies can

demonstrate themselves as effective as mass vaccination sites in reaching communities of color, the added cost of mass vaccination sites may be justified.

Although relatively cheap and efficient in administering vaccines, the retail pharmacies have also learned that they won't achieve equitable vaccine distribution without active outreach to communities of color. Some retail pharmacy chains are standing up call centers, collaborating with local community partners, setting up community-based vaccine clinics, and launching texting campaigns at times when appointments are most likely to be scheduled by people of color. Some pharmacies have organized [pop-up clinics](#) at churches, housing complexes, parking lots, and schools.

Both retail pharmacies and mass vaccination sites may leave out of the loop primary care providers, who are often a [patient's most trusted source of health information](#). Primary care providers will be important in educating and counseling the “moveable middle” of people who haven't yet decided to be vaccinated but are persuadable to get the vaccine. Even if they aren't managing vaccination themselves, [primary care](#) providers should be enlisted to counsel their patients on COVID vaccination and help them navigate the registration and appointment scheduling process.

[Federally qualified health centers](#) have also been an important tool for reaching more people of color, low-income populations, and vulnerable communities. Half of people receiving their first dose of COVID vaccine at a federally qualified health center are persons of color.

The CDC has also suggested that [employers](#) consider establishing workplace vaccination programs or coordinate with offsite locations to help employees get vaccinated. Medicaid, Medicare, and other payors could be reaching out to their enrollees to help get them registered for vaccination.

E. Why are vaccination rates lower among certain populations?

Vaccination rates reflect vaccine supply, access to vaccines, *and* demand for vaccines. Vaccine supply is expected to open up dramatically between now and the end of May. But differential access to vaccines and demand for vaccines continue to drive disparities in vaccination rates.

The populations initially prioritized for vaccination included persons [over age 65](#), who skew whiter than the overall population. [Communities of color](#) are younger populations. Prioritization for vaccination on the basis of age predictably results in racial disparities in vaccination. But even as we've moved beyond the elderly to other priority groups—healthcare workers, the staff of long-term care facilities, teachers, school bus drivers, childcare workers, other essential

workers, and people with chronic medical conditions—the gap in vaccination rates between White Americans and Americans of color has [widened](#).

Initial vaccine rollout was focused on long-term care facilities, hospitals, and academic medical centers. While many healthcare systems are inviting their patients to schedule appointments, many people in this country remain underinsured or uninsured and aren't affiliated with such a system. Increasing this access problem, about [fifty hospitals](#) closed or filed for bankruptcy in 2020, including [nineteen rural hospitals](#). The end result is that many in this country do not have regular health care providers and aren't covered by health system outreach.

Although vaccination sites have been located, in part, on the basis of the CDC's Social Vulnerability Index—a composite of fifteen different variables spanning socioeconomic status, household composition, disability, race and ethnicity, language, housing type, and transportation—[geography has proven to be essential](#) but not sufficient in ensuring access to vaccination. Vaccine convenience and quality of service are important, too. Vaccines need to be delivered at a time and place that are convenient. Vaccination sites should be places where people feel comfortable getting vaccinated. [Black adults](#) are less likely to get vaccinated at work, government mass vaccination sites, or local schools than Whites or Hispanics; this speaks to a possible lack of trust for employers and government institutions. Information about vaccines and how to get vaccinated needs to be understandable and in someone's first language. COVID vaccines are free, but not everyone knows that, and there are other costs to getting vaccinated, like the cost of transportation, parking, time off work, and childcare. Many immigrants are worried they could jeopardize their [immigration status](#) by seeking vaccination.

To get vaccinated in this country, you have to be eligible, know that you're eligible, know there's supply in your area, and know who's providing the vaccines. You then need to schedule an appointment for vaccination. As we all know, the systems to schedule a COVID vaccine appointment in this country are complicated. You might need to sit at your computer for hours reloading a web page. It's difficult to complete all the pages of registration on a smartphone, even if you have one. The people most able to navigate these complex systems have [higher levels of education and income](#) and are [younger, whiter, and less rural](#). They have better access to [broadband internet](#) and computers. They may be more computer literate. They have more flexible jobs that might allow them to multitask, working while periodically refreshing that vaccine appointment website. They're also less likely to have a [disability](#), which can pose additional barriers to making and attending an appointment. [40% of people](#) who've gotten COVID vaccine appointments had help. Since our social networks tend to mirror our own socioeconomic status, those of us who are wealthier and better educated are also likely to be connected to others who are as well. We rely on our social networks better to help us get an appointment if we can't.

For people who do not have internet access, the federal government will launch by May 1st a 1-800 call center to provide assistance in getting vaccinated. [Almost 68 million Americans](#), or one in five, speak a language other than English at home and have difficulty navigating both telephone and online vaccination scheduling systems.

Finally, we need complete, accurate, real-time, publicly available [data on the demographics](#) of those who are being vaccinated—age, sex, race, ethnicity, zip code, and occupation—so that public officials can better target their vaccination efforts and be held accountable.

F. As more Americans are vaccinated, our challenge will increasingly become one of demand—of people actively seeking out vaccination.

Already we are hearing reports from across the country—in [Maine, Georgia, Mississippi, Louisiana, Michigan, Ohio, Illinois, Kansas, Montana, Oregon](#), and other states—that vaccination appointment slots are going unfilled. Some states, like [New Hampshire and Oklahoma](#), are opening up vaccination appointment slots to residents from other states because they have more than enough supply.

It's important not to characterize all persons who don't actively seek out vaccination as vaccine-hesitant. It's [stigmatizing](#) and [blaming](#). It's also not granular enough to help us identify and implement the right solutions. Some people have low levels of health literacy or information about COVID and the vaccines. Some people [worry the vaccines may not be safe or effective](#). Many worry about the potential for long-term [side-effects](#). They worry about real risks, such as allergic reactions, as well as fictitious risks promoted by disinformation campaigns, such as impact on fertility and whether the vaccines could change their DNA. Others ask whether the vaccines are safe and effective in [people like them](#)—i.e. people of color, people with underlying medical conditions, or pregnant and breastfeeding women. Some worry the vaccines were [developed and approved too quickly](#). Some are still undecided, weighing the risks and benefits of vaccination. Others just haven't gotten around to it or don't know how or aren't able to access vaccination. Some are indifferent, ambivalent, or apathetic—especially younger Americans—because they don't think they're at risk for COVID. Others falsely think that natural infection is a better path to immunity than vaccination. Some think the risk of COVID has been overplayed by the media. And finally, some are actively skeptical or resistant to vaccination.

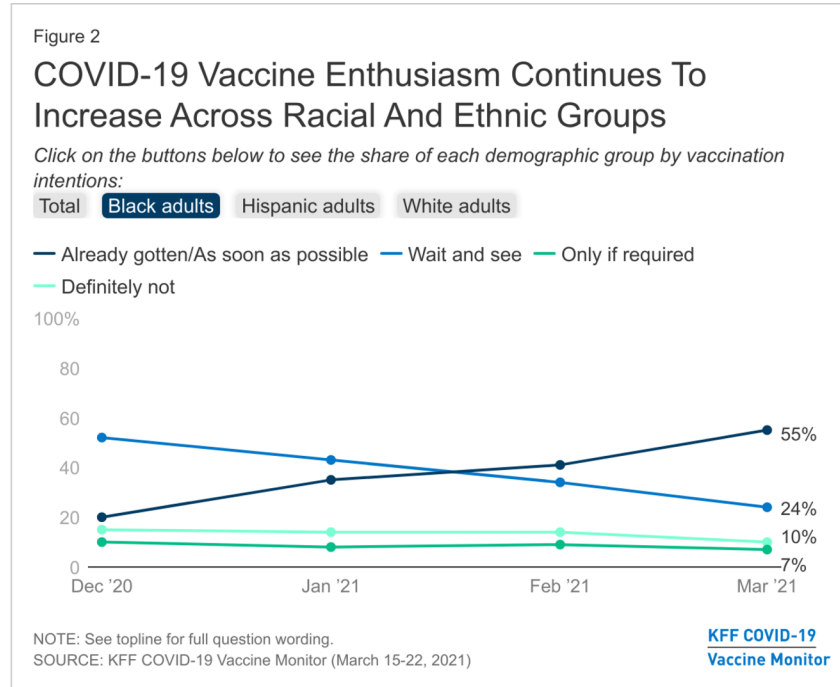
The share of Americans who want to “wait and see” if they will get vaccinated shrank from [39% in December 2020 to 17% in March 2021](#). We are [making progress](#) building vaccine confidence among that “moveable middle.” However, the proportion of Americans who say they will only get vaccinated if required or will definitely not get vaccinated remained [essentially unchanged at 20%](#) of Americans in March 2021.

We're running months behind on a broader public health campaign to address concerns and educate the American public about COVID and the vaccines. It wasn't until February that the Ad Council and COVID Collaborative—a consortium of major brands, media companies, community-based organizations, faith leaders, and other trust messengers—launched the [“It's Up to You”](#) campaign to educate the public about the COVID vaccines. And it was only this month that the Biden Administration announced it was creating a network of volunteer healthcare workers and community leaders, the [COVID-19 Community Corps](#), to build trust in the COVID vaccines. The Department of Health and Human Services and the CDC are providing the COVID-19 Community Corps with guidance on how to talk about the COVID vaccines and resources in the form of social media tool kits, fact sheets, infographics, and videos that can be used in doing grassroots outreach. This volunteer corps will also host virtual events and host vaccination drives.

1. Black Americans

Black Americans have been hit especially hard by the COVID pandemic. They have experienced [disproportionately high rates of disease, hospitalization, and death](#). Even if they haven't gotten COVID themselves, the vast majority of Black Americans know someone who has been hospitalized or died from COVID. [They know they're at risk, and they're very concerned](#). Yet Black Americans are less likely than White Americans to say they have been vaccinated or will get vaccinated as soon as possible.

According to the Kaiser Family Foundation COVID-19 Vaccine Monitor, 55% of Black adults have already been vaccinated or plan to get vaccinated as soon as possible; [24% say they will “wait and see”](#); 10% say they will only get vaccinated if required; and 7% say they will definitely not get vaccinated:



If Black Americans are worried about getting COVID or spreading it to others, why are they more likely to be on the fence about getting vaccinated?

Black Americans are [less likely to trust](#) the health system. [“I don’t trust doctors, nurses, physician assistants, hospitals, emergency rooms, waiting rooms, surgeries, prescriptions, X-rays, MRIs, medical bills, insurance companies or even the food from hospital cafeterias.”](#) said Damon Young, a contributing writer for *The New York Times*. But it’s overly simplistic and reductive to blame this distrust on the U.S. Public Health Service Syphilis Study at Tuskegee. The [history of medical abuse and experimentation](#) among people of color goes back to the days of slavery and extends right up to [the present day](#). Distrust is a *symptom* of structural racism, not a cause of health disparities. If we are to improve vaccine confidence among communities of color, it’s essential that we address structural racism by demonstrating trustworthiness, [not by blaming disparities](#) in vaccine distribution on vaccine hesitancy. Such trust-building begins with equity in vaccine distribution and access, but it doesn’t stop there. We also need to make [reparations for the disproportionate toll](#) the pandemic has taken on communities of color. At a

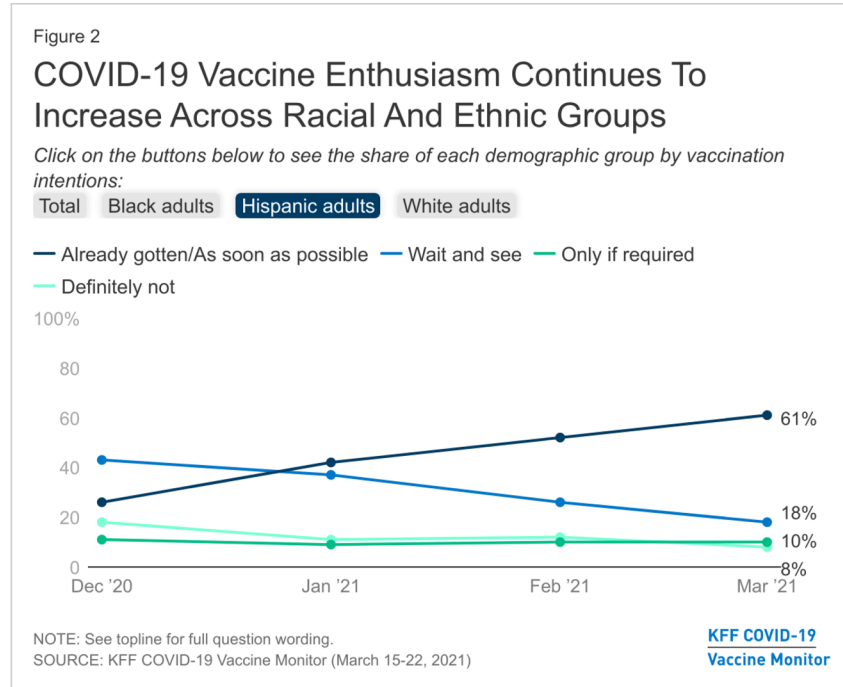
minimum, such reparations should include covering the long-term medical expenses and disability of *all* COVID survivors, much as the [September 11th Victim Compensation Fund](#) provided financial compensation to victims of the 9/11 terrorist crashes and first responders suffering from dust-related health effects.

Vaccine confidence among communities of color is not only a question of trust but also a question of information. Official, scientifically accurate information about COVID and the vaccines isn't reaching all Americans equally. Racial disparities in whether this [information](#) reaches Black people via social media have been documented. A recent study found that 41% of Black adults said they [knew “little or nothing”](#) about how vaccines were developed and tested, and 30% said they knew “only a little or nothing” about how vaccines work. Other information gaps are around the costs of getting vaccinated and how and where to get vaccinated. [Disinformation](#) has also been targeted at communities of color.

[Black healthcare workers](#) have taken matters into their own hands to improve vaccine access and to push out quality information to their communities on social media and in other venues, and the good news is that it's working. The proportion of Black Americans reporting they had already gotten vaccinated or wanted to get vaccinated as soon as possible has [increased from 20% to 55% since December](#), and the proportion saying they would “wait and see” has dropped from 52% to 24%.

2. Hispanics

Like Black Americans, Hispanics have borne a [disproportionate share of COVID infections, hospitalizations, and deaths](#). According to the Kaiser Family Foundation COVID-19 Vaccine Monitor, 61% of Hispanic adults have already been vaccinated or plan to get vaccinated as soon as possible; [18% say they will “wait and see”](#); 10% say they will only get vaccinated if required; and 8% say they will definitely not get vaccinated:

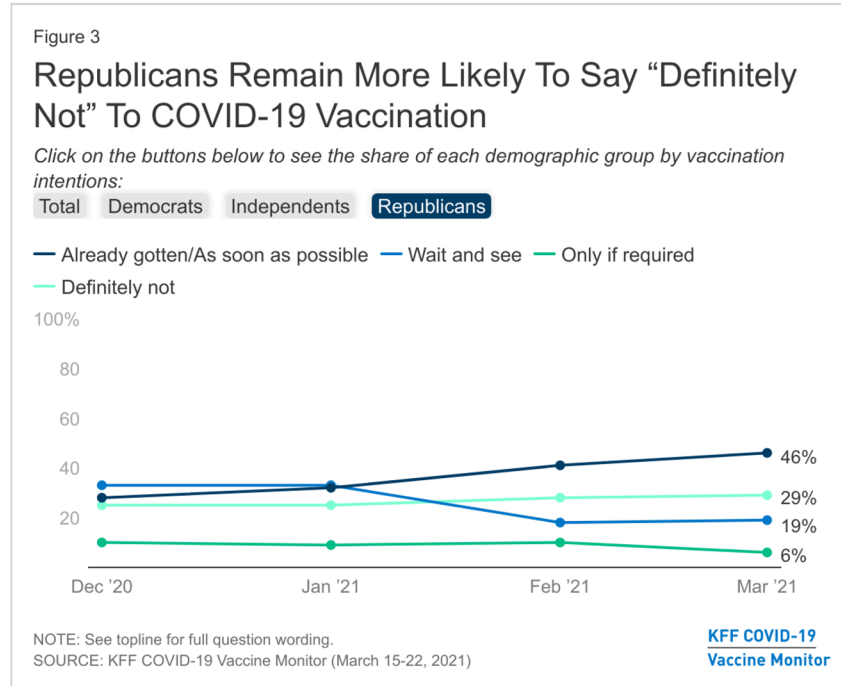


Like Black Americans, Hispanics have also endured a history of medical abuse and experimentation. Concerns about fertility among Hispanics relate to a [history of forced sterilizations](#) including [forced hysterectomies](#) at immigration detention centers just last year. Many Hispanic families, particularly undocumented persons or mixed-status families, worry that seeking COVID vaccination could jeopardize their [immigration status](#). Scientifically accurate information may be less likely to reach these Hispanics due to language and cultural barriers.

3. Republicans

[Survey](#) after [survey](#) after [survey](#) after [survey](#) has found that Republicans are the demographic least likely to seek a COVID vaccine, but unlike Black Americans and Hispanics, who have been more likely to say that they want to “wait and see,” Republicans are more likely to say they will reject vaccination outright.

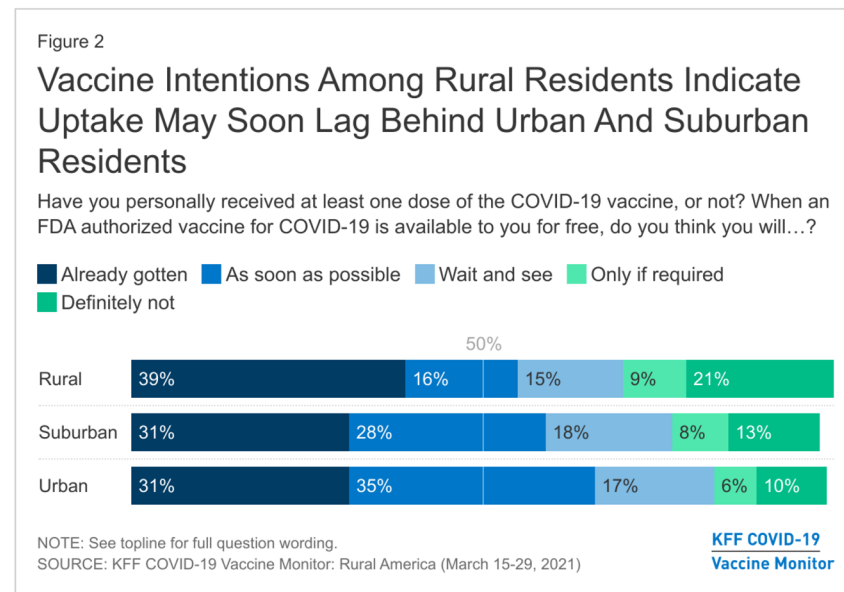
According to the Kaiser Family Foundation COVID-19 Vaccine Monitor, 46% of Republicans have already been vaccinated or plan to get vaccinated as soon as possible; 19% say they will “wait and see”; 6% say they will only get vaccinated if required; and [29% say they will definitely not get vaccinated](#):



Republicans who aren't confident in the COVID vaccines report many of the same concerns about side-effects, vaccine effectiveness, and vaccine testing as do other groups with low vaccine confidence. But a larger proportion of Republicans who don't plan to get vaccinated say they don't think they need to. Just as Black Americans are less likely to trust the health system, Republicans are [less likely to trust the government and the media](#), which is closely tied to lack of confidence in COVID vaccines. Many are concerned that the pandemic was [politicized and weaponized](#) against former President Donald J. Trump during the 2020 election.

4. Rural Americans

According to the Kaiser Family Foundation COVID-19 Vaccine Monitor, 55% of rural residents have already been vaccinated or plan to get vaccinated as soon as possible; 15% say they will “wait and see”; 9% say they will only get vaccinated if required; and [21% say they will definitely not get vaccinated](#):



Political partisanship appears to be the biggest driver of low vaccine confidence among rural Americans. Rural Americans are also less likely than suburban and urban Americans to believe the pandemic is a serious threat to their families or the country and more likely to believe that the [media exaggerates the risk](#). Rural Americans view the decision to get vaccinated as one of [personal choice](#) rather than one of personal responsibility.

Rural Americans report [better access to vaccination](#)—being able to get an appointment, adequate vaccine supply, enough vaccination locations—than suburban and urban Americans. It is likely that low vaccine confidence will soon be (if it isn’t already) the biggest obstacle to increasing vaccine coverage in rural areas.

5. Women

Women are less likely to be vaccinated than men and have lower confidence in the COVID vaccines than men. [Young mothers](#) have also been found to have lower vaccine confidence than other parents or non-parents. This is likely related to concerns about the potential impact of COVID vaccines on [fertility](#), but the data is mounting that [pregnant and breastfeeding women](#) have robust responses to the Pfizer and Moderna COVID vaccines and pass on immunity to their babies. As with influenza, pregnant women are at higher risk for severe disease from COVID than non-pregnant women. COVID during pregnancy also increases the risk of preterm birth.

Young mothers, in particular, have traditionally been the [targets of disinformation](#) by the anti-vaccination movement because they are often responsible for making decisions about whether or not to vaccinate their children.

6. Younger Americans

According to the Kaiser Family Foundation COVID-19 Vaccine Monitor, 49% of young adults between the ages of 18 and 29 have already been vaccinated or plan to get vaccinated as soon as possible; [25% say they will “wait and see”](#); 15% say they will only get vaccinated if required; and 11% say they will definitely not get vaccinated. Although this age group is less likely to develop severe COVID, to be hospitalized with COVID, or to die from COVID, a large proportion of SARS-CoV-2 transmission in the community is propagated by young adults. However, public health officials haven’t targeted young people in their COVID messaging, which leaves an important [information void](#). Messaging and outreach among young adults is likely to be effective, as it has been among Black Americans, because most of those who don’t yet intend to get vaccinated are in the moveable middle, who say they will “wait and see.” Colleges and universities are in a good position to educate students about COVID vaccines and offer vaccination, but a third of college-aged Americans aren’t enrolled in college. Most colleges and universities are encouraging but not mandating vaccination, though some (e.g. [Rutgers University](#), [Cornell University](#)) have recently announced they will require vaccination for students to return to campus in the fall.

7. Essential workers in non-health industries

According to the Kaiser Family Foundation COVID-19 Vaccine Monitor, 49% of essential workers in non-health industries have already been vaccinated or plan to get vaccinated as soon as possible; 19% say they will “wait and see”; 11% say they will only get vaccinated if required; and [21% say they will definitely not get vaccinated](#). People employed in the [retail, transportation, food and beverage industries](#) are the least likely to say they’ll seek vaccination.

It has been well established that [essential workers](#) are among those at highest risk for severe COVID. But many of these workers are chronically underpaid and feel disempowered in the workplace. They don't trust their employers, and sadly, the events of the past year have given them [good reason not to](#). Many feel that the government let them down in their moment of greatest need or never had their backs to begin with.

8. Healthcare workers

Vaccine confidence among healthcare workers is a bellwether for the rest of the American public. They were among the first to be prioritized for vaccination, yet as of early March [only about half of frontline healthcare workers](#) had received at least one dose of COVID vaccine. [More than a third](#) reported low vaccine confidence, and low vaccine confidence in this group foreshadows what we may be facing among the general public in the coming months.

Healthcare workers aren't a uniform group. They include doctors, with high levels of education and income, as well as [nursing home staff](#) and home health aides, with low levels of education and income. But unlike other Americans, they've been on the frontlines of the pandemic and have had a front row seat to the toll it's taken. They're also an important group because they're the most trusted messengers on vaccines, and so any lack of confidence in this group could have a significant impact on the public's confidence in general.

The same demographics that predict vaccine confidence among the general public—race, partisanship, income, and gender—also predict vaccine confidence among healthcare workers. Rates of low vaccine confidence are higher among [Black](#) and [Hispanic](#) healthcare workers than White healthcare workers; about twice as high among [Republicans and Independents](#) as among Democrats; more than twice as high among [lower-income](#) than higher-income healthcare workers; and twice as high among [female](#) healthcare workers as male healthcare workers. Healthcare workers cite the [same reasons for not getting vaccinated](#) as members of the general public.

Other important bellwether populations include members of the military. Almost [40% of U.S. Marines](#) are refusing COVID vaccinations. Black Americans are overrepresented in the military accounting for 29% of active-duty women, 17% of active-duty men, and 13% of the total U.S. population.

G. How do we build confidence in the COVID vaccines and improve vaccine uptake?

Person-to-person, hyperlocal outreach by trusted messengers and community health workers will have a far greater impact on building vaccine confidence than messages coming from politicians or government officials or glitzy public service announcements and ad campaigns. People will

trust people like themselves, who they believe genuinely care about them. People want the [freedom to do what others like themselves are doing](#), and so it's really [important to highlight that people are getting vaccinated](#), especially in communities and social networks where vaccine demand may be lower.

1. The right messengers

Information about vaccines should come from [doctors, nurses, and scientists, not politicians](#). When we hear from politicians, we ask ourselves, "What's their agenda?" Americans of all political stripes feel that the pandemic was politicized, and it makes it all the more important to [leave politics out](#) of our vaccine messaging now. It's unclear that the public service announcements featuring [four former presidents](#) have had much impact on vaccine confidence, and may in fact have led some to become even [more resistant](#). Only 20% of Republicans report being more likely to get vaccinated if [former President Donald Trump](#) strongly urged them to do so. [Dr. Anthony Fauci](#), the Director of the National Institute of Allergy and Infectious Diseases at the National Institutes of Health and Chief Medical Advisor to the President, is seen by some to be a partisan figure, and messages delivered by Dr. Fauci could strengthen resistance among Republicans. Celebrities and sports figures appear to have [minimal impact](#) on building vaccine confidence. Other community organizations—from unions to faith communities to immigrant rights organizations—may have a role in reaching specific demographics.

2. The right message

Delivering the right message begins with meeting people where they are, showing that you care, listening to them, acknowledging their concerns, answering their questions, and making it personal. Conversations about vaccine confidence are as much about [emotion](#) as they are about facts. Only after caring trust has been established, and with someone's permission, can you begin to offer them information.

The messages that resonate best focus on the benefits of COVID vaccination and personal experiences with COVID. Tens of thousands of people were vaccinated in clinical trials, and hundreds of millions of people have since been vaccinated around the world. COVID vaccination is one of the best ways we can protect ourselves and our families. While no vaccine is perfect, the COVID vaccines are among the best with respect to vaccine effectiveness. The COVID vaccines are more effective than influenza vaccines. The COVID vaccines are almost 100% effective in preventing hospitalization and death from COVID. When you're infected with SARS-CoV-2, billions of virus particles replicate throughout your body, which we know can cause long-term harm. Patients who suffer from [post-acute sequelae SARS-CoV-2 infection \(or PASC, also known as long COVID\)](#) experience long-term symptoms and disability. Even patients whose initial SARS-CoV-2 infections were mild may develop PASC. Meanwhile

COVID vaccines teach the immune system to respond to infection and then quickly get broken down by the body and disappear. Our COVID vaccines are based on [decades of scientific research](#). The vaccines were approved quickly because the emergency demanded that the [government cut red tape](#). The FDA cut no corners when it established rigorous standards to guide the clinical development of these vaccines and made the deliberations of its independent, external advisory council public. The [vast majority of doctors](#) who've been offered the COVID vaccine have gotten vaccinated. COVID vaccinations are our best path out of the pandemic. Getting vaccinated now is a personal investment in getting back to normal life. You deserve a COVID vaccine. Getting vaccinated will help free you from government restrictions.

Americans don't want to be told what to do. They don't want to be made to feel ignorant. They don't want to feel judged. And they may not change their minds right away. It takes time to build vaccine confidence.

3. The right audience

We're most likely to be successful in building vaccine confidence among those who currently say they want to "wait and see," the moveable middle. Communities of color and younger Americans, who are more likely to report they'll "wait and see," seem more persuadable, while Republicans, rural Americans, and essential workers, who are more likely to report that they will only get vaccinated if required or will definitely not get vaccinated, will be less persuadable.

H. The Anti-vaccine Industry

Even as we try to reach out to communities with the right messengers and right messages to build vaccine confidence, we also need to address the proliferation of misinformation about COVID and COVID vaccines in the mainstream media and online. [Even relatively low-level exposure to online misinformation](#) can significantly reduce vaccine-seeking.

It's low-hanging fruit to deplatform the biggest amplifiers of anti-vaccine misinformation, their organizations, and those they fund. The Center for Countering Digital Hate has identified [twelve repeat offenders](#) who are responsible for 65% of COVID vaccine misinformation online: Joseph Mercola, Robert F. Kennedy, Jr., Ty and Charlene Bollinger, Sherri Tenpenny, Rizza Islam, Rashid Buttar, Erin Elizabeth, Sayer Ji, Kelly Brogan, Christiane Northrup, Ben Tapper, and Kevin Jenkins. Their organizations include the Children's Health Defense, the Informed Consent Action Network (ICAN), the National Vaccine Information Center (NVIC), the Organic Consumers Association (OCA), and the Millions Against Medical Mandates. Many make money marketing books, DVDs, and courses about vaccines or sell dietary supplements and false cures as alternatives to vaccines. In short, they stand to profit from the dangerous misinformation they are spreading.

Facebook, Twitter, and Google have policies to prevent amplification of vaccine misinformation, but their enforcement of those policies is woefully inadequate. They [fail to act on 95% of the misinformation reported](#) to them. The social media platforms could also adopt a [two strikes rule](#): a warning after a first misinformation post, and deplatforming after the second.

Meanwhile, [Russian intelligence agencies](#) are orchestrating their own disinformation campaigns to discredit Western vaccines, amplifying anxieties about vaccine side-effects and effectiveness. Russia and China are seeking to sell their vaccines abroad and to use their vaccine supply as tools of [health diplomacy](#).

II. What is the projected trajectory for pandemic recovery in the United States?

I think of pandemic recovery in four phases: ending the emergency, relaxing mitigation measures, getting to herd immunity, and long-term control.

A. Ending the emergency

We remain in the emergency phase as we enter a fourth surge driven by decreased adherence to mitigation measures, travel, and the spread of the [more infectious and more virulent B.1.1.7 variant](#) first detected in the UK. We currently have [over 65 thousand new cases](#) and [almost 700 deaths per day](#) from COVID.

To end the emergency, we have to vaccinate the highest-risk persons who are most likely to develop severe COVID, most likely to be hospitalized, and most likely to die. That means vaccinating older adults and people with chronic medical conditions. There are 53 million Americans over the age of 65 and 110 million with chronic medical conditions in the U.S. [79%](#) of those over age 65 have now had at least one dose of COVID vaccine, and [61%](#) are fully vaccinated, and that's a tremendous public health success. As older Americans have gotten vaccinated, we've seen [hospitalizations decline sharply in that group](#). However, we do not know what proportion of people with [chronic medical conditions](#) have been vaccinated, and this is an important blindspot.

Some have suggested that we should continue mitigation measures until hospitalizations and deaths from COVID are [on par with those from influenza](#). Averaged over a year, [influenza](#) causes 55-140 deaths per day. The seven-day moving average of COVID deaths in the U.S. is currently [663 deaths per day](#). COVID remains five to twelve times as fatal as the flu.

We must also pay special attention to the hardest-hit, most vulnerable communities, including communities of color, rural communities, and high-risk workplaces like [meatpacking](#) and [food](#)

[processing plants](#) and [prisons](#). Black, Hispanic, and Indigenous Americans are [two to three times](#) more likely to be hospitalized with COVID and to die from COVID. Meatpacking and food processing plants and correctional facilities are major employers in many rural towns across the country. An outbreak in one of these facilities doesn't just affect the people working (or incarcerated) there. It can be devastating to the entire community. These rural communities also don't have the same health care capacity to cope with a spike in cases as do many urban centers.

Notably, the B.1.1.7 variant is causing more severe disease in younger adults, and we're seeing more adults in their thirties, forties, and fifties hospitalized for severe COVID due to B.1.1.7. For example, the Michigan Health and Hospital Association found that hospitalizations increased by [633% among adults in their thirties and by 800% for adults in their forties](#) over the course of March, and those are groups that have lower vaccination rates. We must pay close attention to hospitalization rates and vaccination coverage among these younger adults as we weigh when to relax mitigation measures.

In Israel, the B.1.1.7 variant is dominant, as it is now in the U.S. Even as Israel was among the first and most successful to vaccinate its citizens, the country experienced a [surge](#) in COVID cases. With the arrival of vaccines, lockdown-weary Israelis lifted other mitigation measures. As we're now seeing in Michigan, younger people started filling hospital beds. We cannot end the emergency phase of the pandemic by [relying only on vaccination](#) without risking another surge in cases, hospitalizations, and deaths. Mask-wearing and some restrictions on indoor business remain necessary.

B. Relaxing mitigation measures

We can declare an end to the emergency and *safely* relax mitigation measures once we're on the other side of our fourth surge; the rate of new cases, hospitalizations, and deaths has been suppressed; *and* we've achieved high levels of vaccine coverage among persons over age 65 and persons with chronic medical conditions, who are highest risk for severe COVID disease, hospitalization and death.

Lifting mitigation measures too soon is like taking your foot off the brake before putting the car into park. With the emergence of more infectious variants (e.g. B.1.1.7, B.1.526), the virus is hitting the gas at the same time. Vaccination is like a parking brake: it works well once a car is in park, but not nearly as well when you're racing down a highway.

In Michigan, where [58%](#) of 65-74 year-olds, [59%](#) of people over 75, and [25%](#) overall have been fully vaccinated, hospitalizations are increasing. [About 40% of new cases](#) in Michigan are thought to be due to the more infectious and virulent B.1.1.7 variant first identified in the UK.

Fewer people are wearing [masks](#). The state has [lifted or loosened](#) many of its restrictions on indoor business.

It does not make sense to surge vaccine supply to [Michigan](#) right now because the state has enough vaccine supply but not enough distribution capacity. Furthermore, it's important to remember that vaccination does not have instantaneous impact. It takes 14 days after two doses of Pfizer and Moderna vaccine and 14-28 days after one dose of Johnson and Johnson vaccine to be "fully immunized." COVID has a median incubation period of 4-5 days. So even if a large proportion of Michigan residents are vaccinated now in the middle of their surge, the impact of vaccine-induced immunity won't be seen until more than a month from now, which doesn't help people who are being infected right now. The measures that will help curb the surge are the non-pharmaceutical interventions that take effect instantly: masking, sticking to household bubbles, socializing outdoors, and not gathering indoors. Furthermore, vaccines work best at a population-level. Eventually, as more and more of the population is vaccinated, there will be protection against transmission and a future surge, we won't be as dependent on non-pharmaceutical interventions, and that's when we can *safely* relax mitigation measures.

Real-world evidence has shown that the Pfizer and Moderna vaccines are highly effective in preventing infection, but they are not perfect. The evidence to date shows that there remains a risk, especially so long as community transmission rates remain high. We measure effectiveness as a percent risk reduction, so when the baseline risk is very high, even a significant reduction in risk will not completely eliminate all risk. Although relatively rare, we are seeing reinfections among fully vaccinated persons. Think of vaccines like a raincoat and umbrella. They'll keep you dry in a thunderstorm, but not in a hurricane. With community transmission of SARS-CoV-2 as high as it is right now, we're still in a [COVID hurricane](#). This is why the [CDC is counseling](#) fully vaccinated people to avoid crowds and wear masks in public or when around unvaccinated persons at high risk for [severe COVID](#).

We are in a race between vaccination, viral transmission, and the variants, and in the meantime, we need to continue with mitigation measures. These mitigation measures don't need to continue forever. There is an end in sight. Although we'll be able to *safely* relax most mitigation measures before too long, masks may be with us for at least a little while longer.

C. Getting to herd immunity

Herd immunity is when so many people are immune to the virus, it has no place to go. We don't yet know what proportion of the population we'll need to vaccinate to reach herd immunity because this is highly dependent on how infectious the virus is, and on the emergence of more infectious variants, which is a moving target. The more infectious the virus, the higher the threshold to reach herd immunity. Finally, we don't know how long immunity after vaccination will last. Currently, our best estimate is that we'll reach herd immunity to SARS-CoV-2 when approximately 75-85% of the population is immune.

We also don't know how much vaccination will prevent [infection and transmission](#). The clinical trials were designed only to assess whether the vaccines prevent serious illness, hospitalization, and death, and, to be clear, by that measure, the Pfizer, Moderna, and Johnson & Johnson vaccines were all [100% effective in clinical trials](#). Preliminary data suggests that vaccination will reduce transmission significantly but not completely. [Real-world evidence](#) has shown that the Pfizer and Moderna vaccines are 80% effective against infection fourteen days after the first dose of vaccine but prior to the second dose, and 90% protective against infection fourteen days after the second dose (pretty close to sterilizing immunity). We don't yet have analogous data for the Johnson and Johnson vaccine, which received emergency use authorization from the FDA more recently. The [Prevent COVID U Study](#) will yield more definitive data on whether mRNA COVID vaccines prevent transmission and by how much. Researchers will be enrolling twelve thousand students at twenty universities nationwide in this study. Half will receive the Moderna vaccine at the start of the study, and half will be vaccinated four months later, at the end of the study in July. Scientists will measure infection and transmission in both groups and their close contacts. If infection and transmission are only partially reduced, then you'd need a higher level of vaccination coverage to reach herd immunity.

We aren't yet vaccinating children under the age of 16. Children account for about a quarter of the U.S. population, so to get to herd immunity, we'll have to vaccinate kids. In addition, COVID is not a benign disease in all children. About 2% of children who get COVID are hospitalized, and almost three hundred kids have died from COVID in the U.S. Furthermore, [even children with mild or symptomless cases of COVID](#) have experienced multiple inflammatory syndrome in children (MIS-C), including gastrointestinal symptoms and cardiac dysfunction. We also don't know the long-term impacts of mild SARS-CoV-2 infections in children (or adults). We anticipate having data on the safety and effectiveness of the COVID vaccines in children 12 and up this summer and to begin vaccinating that age group by late summer.

Pfizer recently announced that its phase 3 clinical trial among [children ages 12 to 15](#) in the U.S. found the vaccine was safe and 100% effective in preventing infection. [Pfizer has requested emergency use authorization](#) for its vaccine to be used in children as young as age 12. Pfizer is

now testing its vaccine in children ages 6 months to 11 years. We expect trial results by the end of 2021. Moderna is testing its vaccine among [adolescents 12 to 17](#) and [children 6 months and 11 years](#) in two separate clinical trials. Meanwhile, Johnson and Johnson is enrolling [adolescents 12 to 17](#) in a phase 2 trial.

We anticipate vaccination of children 12 and up will begin in July or August, before the start of the next school year. Younger children will likely be vaccinated starting in late 2021 or in early 2022.

D. COVID credentials to reopen safely

We are likely facing a prolonged interim period, when we can safely lift mitigation measures because the most at-risk have been shielded by vaccination, but before we've reached herd immunity. This means that even once restrictions are lifted, we're unlikely to get back to business-as-usual right away. Businesses have a legal and ethical obligation to ensure a safe environment for their customers and workers. People need to feel safe traveling, going to the gym, or going out to eat. While some may not need that assurance, many do.

While COVID credentials may not be mandated by the government, the private sector is forging ahead. The purpose of COVID credentials, what some mislabel COVID passports, is to demonstrate that when individuals engage in certain activities—for example, returning to college campuses or attending live sporting events—they pose minimal infectious risk to others. COVID credentials help provide that assurance and are an important tool to help reopen the economy.

COVID credentials are already here. They may take the form of a COVID test result and/or COVID vaccination status. During the pandemic, many public and private institutions have been screening people for COVID symptoms, conducting temperature checks, and testing people before entry. State health departments already require proof of other vaccinations to attend [K-12 schools](#) and [colleges and universities](#) and to work in [healthcare](#). What is new is the range of public and private venues where COVID credentials may be requested and the proportion of the population being asked to produce them.

The ethics of public health dictate that “the least restrictive alternative” should be used. What that least restrictive alternative looks like may not be the same for everyone. It's important that we create a pathway for people to opt out of vaccination while minimizing the infectious risk to others. In lieu of providing proof of COVID vaccination status, individuals could be required to undergo COVID testing or to wear a mask. There is a precedent for this approach. In [New York State](#), for example, where I practice medicine, healthcare providers are required to be vaccinated against influenza every year *or* to wear a surgical face mask for the duration of flu season while

at work. People should not be denied jobs, services, or an education because they can't or won't get vaccinated, so long as they are compliant with alternatives like masking or testing.

Former FDA Commissioner Dr. Scott Gottlieb has likened COVID credentials to an [EZ pass](#). You can present COVID credentials showing that you're fully vaccinated or have recently tested negative for COVID in the same way that you can speed through the EZ pass lane. But if you don't want to present COVID credentials, you can still stop and get screened and tested, much as you might stop and pay in cash at a toll both.

The current administration has stated that it does not have plans to issue COVID credentials or to require COVID credentials. However, there is a need for the federal government to help coordinate, standardize, and regulate COVID credentialing efforts to ensure accessibility, standardization, reliability, interoperability, individual privacy, system security, and fraud prevention. COVID credentials should not create or reinforce health disparities.

COVID credential systems consist of a digital record of someone's COVID test result and/or COVID vaccination status and an app or website that allows for downloading of that data to a smartphone or for printing. COVID credentialing systems must be free and open source, so that they can be adapted as needed for local use. COVID credentials must be accessible digitally and in paper form so that people without [smartphone access](#) can still use them. There must also be clear legal restrictions on state powers and its use of COVID credential data. COVID credentials should not, for example, be accessible for use by federal, state, or local law enforcement or the Department of Homeland Security.

There are additional issues when considering the use of COVID credentials for international travel. There are precedents for vaccination requirements for travel, as with yellow fever vaccination. Countries like Israel, the UK, and the United States are [far ahead the rest of the world](#) in vaccinating their citizens. The COVID vaccines are new, and not all vaccines have been authorized for use in every country. For example, the Oxford-AstraZeneca, which is being used in much of the world, has not yet been granted emergency use authorization by the FDA in the U.S. Some vaccines may be more protective against the B.1.351 variant first identified in South Africa, the P.1 variant first identified in Brazil, and other variants, and so vaccines that are appropriate in some countries may not be appropriate in others. China has said it would allow foreigners to enter the country only [if they have received a Chinese COVID vaccine](#). The Chinese [Sinovac](#) vaccine appears significantly [less effective](#) compared to those authorized for use here in the U.S. There needs to be global agreement on which COVID credentials, including which vaccinations, would be accepted. As with domestic COVID credentials, alternatives to pre-travel vaccination should also be offered, such as pre-travel testing, quarantine upon arrival, and post-travel vaccination. Low- and middle-income countries are at the [back of the line](#) in securing vaccine supply and are far behind in vaccination rollout. COVID credentials that allow

citizens of high income countries to travel freely but restrict the movement of persons from low- and middle-income countries would [exacerbate inequities](#) and limit access to work, financial, educational, and personal opportunities.

E. The role of COVID vaccination mandates

It is important to distinguish COVID credentials from COVID vaccination mandates. COVID credentials may take the form of a COVID test result and/or COVID vaccination status documenting that someone poses minimal infectious risk to others. A strict vaccination mandate requires that someone be vaccinated and does not allow for reasonable alternatives.

Many of us in the public health community are concerned that vaccination mandates could backfire, especially this early in our COVID vaccine rollout efforts. The history of the anti-vaccination movement is rooted in the late 1800s, when [smallpox vaccination mandates](#) were punitive and targeted the poor. We must not repeat the mistakes of the past. Vaccination mandates for childcare, school, and college attendance have been shown to [increase vaccine uptake](#), but these requirements should be flexible. If we impose strict COVID vaccination mandates, people who might eventually have come around to getting vaccinated might become actively resistant, and this resistance could reduce uptake of all vaccinations.

Vaccination mandates should only be considered after everyone who wants to get vaccinated has access; federal, state, and local governments have done the hard work of building confidence in the vaccines and ensuring equity in distribution and access; federal, state, and local governments have addressed financial and logistical barriers to accessing vaccination; we observe a significant drop in vaccine-seeking by unvaccinated individuals; the FDA issues [full approval for a COVID vaccine, not just emergency use authorization](#); and the federal government establishes a fund like the [Smallpox Vaccine Injury Compensation Program](#) to compensate people who have serious adverse reactions attributable to COVID vaccination. The [military](#) as well as [state and local health preparedness programs](#) offer smallpox vaccination to service members, some civilian workers, and designated emergency responders who might be on the frontlines of a bioterrorist attack.

As demand for vaccination drops, more infectious and virulent SARS-CoV-2 variants spread, and economic pressures continue to mount, the question of whether to impose COVID vaccination mandates will become more urgent. Vaccine certificates and mandates could be effective with the [7%](#) of Americans who report they'll only get vaccinated if required and, if enforced, at least some of the [13%](#) who say they will definitely not get vaccinated.

[States](#) have the authority to require vaccination for [school attendance](#) and [employment in healthcare](#). It is unclear whether the [federal government](#) has the authority to mandate

vaccination, but under the Commerce Clause of the U.S. Constitution and the Public Health Service Act, the U.S. Department of Health and Human Services has the authority to implement isolation and quarantine measures to prevent the spread of infectious diseases between states. In December, the [Equal Employment Opportunity Commission](#) ruled that employers could make COVID vaccination mandatory for their workers, subject to reasonable accommodation requests under the American Disabilities Act and Section 504 of the Rehabilitation Act. Vaccine mandates may be subject to exemptions on the basis of disability or religious objection.

F. Long-term control of SARS-CoV-2 in the United States

Most scientists believe that [SARS-CoV-2 is here to stay](#) and that the virus will become endemic, circulating at some level in many countries for years to come. Elimination of the virus requires high and sustained vaccination coverage to achieve herd immunity, and it's unclear whether and how quickly we in the United States will get there. Currently, [13%](#) of adults report that they would definitely not get vaccinated, and [7%](#) say they would only get vaccinated if required, which means that we're right on the edge of being able to reach the 75-85% vaccination coverage likely needed to reach herd immunity. To maintain elimination, we'll also likely need to implement restrictions around travel, including requirements that travelers produce documentation of vaccination or a negative test.

Once the vast majority of people in the U.S. who want to be vaccinated have been vaccinated (adults by late summer 2021, adolescents by winter 2021, younger children in 2022), the COVID vaccine will increasingly be seen as a childhood, old age, and traveler's vaccination. Newborns, persons with waning immunity (the elderly and immunocompromised persons), vaccine skeptical persons, and travelers from overseas will then make up the vast majority of susceptible persons in this country. Given that most of those currently reporting that they definitely will not get vaccinated also [cluster geographically](#), it is highly likely that there will remain pockets of susceptibility where outbreaks will occur periodically and seed wider transmission.

It may not be enough to fully vaccinate 75-85% of the population once. We don't know how long vaccine-induced immunity will last. It may be that we have enough long-term immunity that symptoms are mild upon reinfection, along the lines of the common cold. We don't know how the virus will continue to mutate and evolve. Reinfections will be more likely the more the virus mutates to evade our immune response to prior infection or the vaccines. It's likely that there will be much more viral heterogeneity in the early years after the virus has jumped into humans and that the virus will stabilize over time. We're already observing convergent evolution. But we don't yet know whether we'll need one-time revaccination for protection against emerging mutant variants or whether we'll need an updated vaccine every couple years.

So long as the virus is allowed to spread anywhere in the world and it will continue to mutate, more variants will emerge—some more infectious (spreading more easily from person to person), some more virulent (causing more severe disease), and some more resistant to our immune responses to natural infection and vaccination. The Pfizer, Moderna, and Johnson & Johnson vaccines remain protective against hospitalization and death due to infection with B.1.1.7, B.1.351 and P.1, but we have seen that [higher neutralizing antibody levels](#) are necessary to protect against these variants. The NIH and pharmaceutical companies are studying boosters using current vaccines as well as second-generation vaccines against variants.

1. What's the long-term role of COVID testing?

COVID is here to stay. We'll continue to need COVID testing for both diagnostic and screening purposes, particularly since a significant proportion of the population may not opt seek vaccination. Over the past year, we have learned that people who have [pre-symptomatic or asymptomatic SARS-CoV-2 infection](#) contribute significantly to the spread of the virus. Last month, the FDA [approved](#) two relatively inexpensive at-home, over-the-counter SARS-CoV-2 tests: [the Quidel QuickVue At-Home OTC COVID-19 test](#) and [the Abbott BinaxNOW Antigen Self Test](#). These tests have been approved for serial screening—twice over two or three days 24-36 hours apart—of asymptomatic persons for SARS-CoV-2 infection. These tests will allow schools, workplaces, and other public and private spaces to quickly and cheaply screen for asymptomatic carriers of infection. These are not diagnostic tests to be used in patient care. However, [pooled saliva PCR testing](#), may be cheaper and may better suited for most K-12 school environments and many workplaces.

2. We need to scale up genomic surveillance for SARS-CoV-2.

The only way to know how the SARS-CoV-2 virus is mutating and evolving is to dramatically scale up genomic surveillance. The CDC has contracted with universities and Quest, LabCorp, Illumina, and Helix to scale up genomic testing capacity. Although we've increased the volume of genomic testing from [under four thousand tests per week to over seven thousand tests per week](#) since January 2020, this is not nearly enough. We should be sequencing [at least 5% of SARS-CoV-2 infections](#) to detect a new variant causing 0.1-1% of the nation's COVID cases. This currently amounts to about twenty-three thousand tests per week. We need to be detecting and characterizing new variants when they're still relatively rare and we have time to prepare and take action. In this we are not a world leader. The U.S. ranks [behind more than thirty countries](#)—including Rwanda, Equatorial Guinea, Thailand, and Vietnam—in [reporting genomic sequencing data](#). The American Rescue Plan Act includes new funding to support American genomic surveillance efforts, but that [funding isn't flowing fast enough](#) and coordination of efforts and data across academic medical centers, commercial labs, hospitals, and health departments has been challenging. Furthermore, we need real-time data. The CDC is publicly

reporting its genomic surveillance data [only every two weeks](#), and there's a lag between when outside labs perform genomic testing and when they report the results to the CDC. We're essentially functioning with month-old data.

3. We need better COVID treatments.

We need to develop more drugs to prevent severe COVID and to treat COVID, including post-acute sequelae of SARS-CoV-2 infection (PASC, or "long COVID"). These [drugs](#) need to be affordable and deliverable at scale. People will be getting sick and hospitalized from COVID for years to come. We need better tools at our disposal. Some promising candidates include [colchicine](#), [inhaled interferon](#), and [fluvoxamine](#). Operation Warp Speed helped overcome market failures and spur the development and testing of multiple new COVID vaccines. We need a similar effort for COVID treatments.

4. Caring for COVID survivors

We are only beginning to recognize and understand post-acute sequelae of SARS-CoV-2 Infection (PASC), also known as "long COVID." It's estimated that [about a third](#) of patients who recover from COVID will develop PASC, even if their initial infections were asymptomatic or mildly symptomatic. [Fatigue, headache, respiratory, cognitive, psychiatric, and gastrointestinal symptoms](#) are common (see also [here](#) and [here](#)). Many have difficulty working. Some may be permanently disabled. COVID survivors will have ongoing healthcare and rehabilitation needs.

5. We need to strengthen our public health infrastructure.

The CDC, state, and local health departments have been chronically underfunded. Since the 2008-09 recession, we've lost [over fifty thousand](#) public health workers across the country. Some experts have estimated that we currently have a [deficit of 250,000 public health workers](#) to meet the needs on the ground. President Biden's America Rescue Plan calls for a public health jobs program: 100,000 community health workers, contact tracers, and public health nurses to help fight the pandemic. But we need more than a [surge](#) in workforce for the duration of the pandemic. We need a professional public health corps, not quick patchwork fixes when emergencies strike.

We also need to strengthen public health bioinformatics systems to better track data and potential public health threats in real time. We need to have the capacity to integrate clinical, epidemiologic, and laboratory data. So we'll need better systems to manage vaccine operations: tracking who's been vaccinated and who needs vaccination, registering patients, scheduling appointments, reaching out to the community, and managing staff and supply chains. We need to

be upgrading our public health infrastructure for the long-term so we're better prepared to cope with future public health crises.

We also need to acknowledge that new infections are emerging with greater frequency—something that's being driven by climate change, environmental degradation, globalization, and overpopulation—in other words anything that brings people in closer contact with wildlife habitats resulting in virus spillover. This means that in our new normal post-COVID, we need to better insulate ourselves against the next COVID.

We need to do a better job of pandemic-proofing especially high-risk settings like [meatpacking](#), [food processing](#), and [prisons](#). We need to improve access to screening and testing, improve ventilation, and ensure adequate supply and availability of personal protective equipment in these settings. These measures will not only prevent transmission of SARS-CoV-2, but also of other infectious pathogens. Meatpacking and food processing plants and prisons are major employers in many rural towns across the country. An outbreak in one of these facilities doesn't just affect the people working (or incarcerated) there, but can be devastating to the entire community. Rural communities have less health system capacity to cope with outbreaks, so it's even more essential to prevent outbreaks from occurring there in the first place.

G. Long-term control of SARS-CoV-2 globally

As long as SARS-CoV-2 continues to spread from person to person anywhere in the world, it will continue to mutate and evolve. New mutant variants may be more infectious (spreading more easily from person to person), some more virulent (causing more severe disease), more virulent (causing more severe disease), or could evade our immune responses to natural infection or vaccines. As this pandemic has shown us, the emergence of a new virus halfway around the world poses a very real and present danger to all of us. We must contribute to [global vaccine supply](#), but we should be thinking even bigger. Former President George W. Bush understood that the AIDS pandemic was not only a threat to public health, but also a threat to economic and political stability. He launched the President's Emergency Fund for AIDS Relief (PEPFAR), which is the largest commitment by any nation to address a single disease in history. We need a PEPFAR for global COVID vaccination, providing not only vaccine supply, but also [managing vaccine logistics and distribution](#). It is in the interest of American public health, the American economy, American diplomacy, and American national security that we contribute to global COVID vaccination efforts.

**STATEMENT OF DR. PAUL ROMER, NOBEL PRIZE WINNING ECONOMIST AND
NYU PROFESSOR, NEW YORK, NEW YORK**

Dr. Romer. Yes, Chairman, Vice Chairman, Ranking Member, other Members, thank you for the chance to speak with you today. As all of the speakers have emphasized so far, we are benefiting from some dramatic successes right now -- the success in developing the vaccines, and then the very difficult logistical challenge but one we have successfully met, of getting these vaccines into the arms of the American people.

Now in the context of these two dramatic successes, I want to offer two notes of caution. The first is to remind everyone that the damage to the economy and to livelihoods has been very significant, and we need to have an economic recovery that gets everyone who was working before in 2019 back into some kind of employment opportunity. And, only decide that we have recovered when we reach that point.

But yet we should go even farther. We should not just get back to the employment-to-population ratio we had in 2019, we should aim for the employment-to-population ratio that we had in 1999, 20 years ago, which was one percentage point higher.

We have tolerated over the last 20 years a steady reduction in the employment-to-population ratio, which has not been visible in our unemployment rate because the employment-to-population ratio falls when people become so discouraged they stop even trying to find a job.

So we need a goal for recovery which is not just to get back to the kind of low unemployment rates we saw in 2019; we want to get back to the very hot labor market conditions of 1999 where more people went to work, and where wages for the lowest skilled members of the workforce were rising because of the demand for these workers. We cannot lose track of the right measure of recovery, and we cannot give up until we get back to full recovery in this sense.

The second cautionary note is that even though the vaccines can with certainty end this pandemic by the Fall, we face a non-trivial risk of a third wave of infections and deaths this Spring and the Spring. We face this risk because we are in a race right now between vaccines and variants. A new variant, which spreads more rapidly, is taking over in the US. Control measures that held the old variant in check may not be enough to limit the spread of this new variant, which spreads 1.5 to 1.7 times more readily.

This race is very close. Even if enough people eventually get vaccinated to bring the pandemic to a halt, there is a risk that for a time, the variant pulls ahead and the number of infections starts to grow exponentially. Unfortunately, there is even a chance that this is already taking place, but that we do not see it because our vaccination strategy of protecting our oldest citizens first, is reducing the average number of deaths per infection. What we see is that deaths fell during January, February and March and have been stable so far in April. Unfortunately, this good news is encouraging a relaxation of social distance measures. The real risk is that a combination of relaxed social distance measures and a take over by a more aggressive variant together will get ahead of vaccinations. If this happens, we could face another wave of infections and deaths. What we are seeing in Michigan is a kind of an early warning signal of what we could see throughout the country.

If this happens, we should not panic. We need to understand we will get to the end of this pandemic by the fall. We need to avoid obsessing about whom to blame and focus instead on what we can do. If you read Dr. Gounder's her recent op ed, you understand that accelerating the pace of vaccinations, is not the most effective response to a new wave because it takes about 5 or 6 weeks after the first shot for a person who receives the Moderna or Pfizer vaccines to become immune.

If we face a new wave, we need to respond with interventions that work quickly. An example of this type of intervention is a program that get virus tests into the hands of people who might be infected. If someone takes an at-home test and gets a positive response, he or she can stop spreading the virus the same day by going into isolation to protect the people around them. So my advice on Michigan is the kind of advice I gave a year ago for the country, which is to make these tests widely available. I would be carpet-bombing Michigan right now with these at-home tests. No one let concern about collecting official data on the results from temperature checks stand in the way of this nearly useless test for infection. Let's be sure not to let a concern about collecting official data stand in the way of at-home antigen tests that actually work.

Alongside of wide distribution of at-home tests, we should have policies that make it very easy for anyone who tests positive on one of these "lateral flow antigen tests" to get an official "molecular" test that confirms the result. We should also have use public resources to make up the lost wages that someone suffers during isolation. If we set up the mechanisms now, we can be ready to deploy them if the need arises.

So to conclude, if we work hard enough, we can recover not just to where we were in 2019, but all the way back to where we were in 1999. That is the kind of recovery we should aim for. In addition, we should prepare for one final battle in the war against this virus. This final battle may not materialize, but if it does, we need to be ready with a battle plan and the resources we'll need to carry it out.

Thank you.

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Written Testimony to the Joint Economic Committee on “Vaccinations and the Economic Recovery”

Belinda Archibong

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April 13, 2021

1 Introduction

The COVID-19 pandemic has worsened inequality and racial disparities in factors from health to employment, income and wealth. As the US, which currently leads the world in number of cases globally, at over 31 million cases, looks towards a post-pandemic economy, it is important to address the disparities highlighted by the pandemic for an effective, and more equitable recovery. A first step to doing this is to acknowledge and outline the challenges faced by minority communities, particularly Black communities in the United States as a result of the pandemic. Doing this allows us to carefully examine the role of vaccination along with the necessary policies for economic recovery in a post-pandemic economy. In the following sections of this testimony, I provide a brief history of the differential employment and health risks faced by Black communities during the pandemic, highlighting the unequal pandemic response, using evidence from employment data and the Paycheck Protection Program. I then outline the role of vaccination in the economic recovery, with a focus on addressing disparities in vaccine access and compliance. Finally, I conclude with an outline of four main policy recommendations for a more equitable post-pandemic economic recovery.

Any effective economic recovery policy must focus on equitable recovery, particularly

aimed at improving the lives of Black communities, communities of color and women within these communities that have been disproportionately harmed by the pandemic.

2 Highlighting the Differential Risks and Disparities in Economic Recovery Faced by Black Communities During the COVID-19 Pandemic

2.1 A History of Differential Employment and Health Risks

Black communities in the United States have been and continue to be disproportionately harmed by the negative effects of the COVID-19 pandemic. This is true in everything from infection rates and health to employment, wealth and income. Early statistics from 14 states in the United States at the start of the pandemic, and more recent data reveal that African-Americans are significantly more likely to be infected and die from COVID-19 (Archibong, 2020; Ray, 2020; Lopez, Hart, and Katz, 2021). According to the Centers for Disease Control and Prevention (CDC), based on early data, with populations that were 18% Black and 59% white, 45% of the hospitalized patients were white while 33% were Black, with Black people over-represented in the infection and case fatality rates relative to their population shares (Archibong, 2020; Aubrey, 2020). A snapshot of these disparities in infection rates is shown in Figure 1 below.

As discussed in Archibong (2020), these disparities have a long history in the United States and are rooted in structural, institutional racism that is reflected in wealth inequality, unequal access to healthcare and relative lack of health insurance, racism in treatment of Black patients, neighborhood segregation and resultant inequalities in environmental quality and access to healthy food resources, and racial gaps in employment and labor market outcomes that predispose African-Americans to having higher risk of infection and death

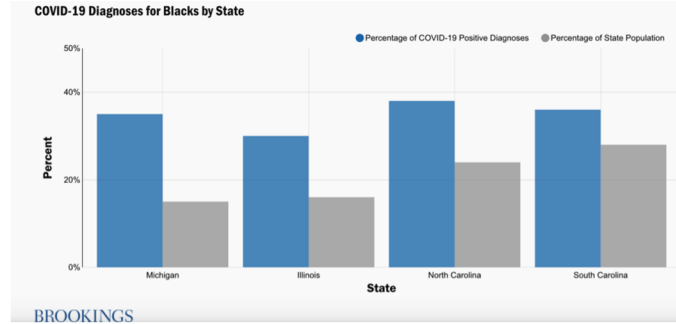


Figure 1: COVID-19 Diagnoses for Black people by State, April 2020. Source: Brookings Institution

from COVID-19. A history of racial disparities in employment led to Black-Americans being more heavily represented in low wage service sectors, so-called “essential sectors” that placed them at higher risk from person to person contact and infection from the virus.

These employment risks are reflected in the fact that although African-Americans make up only 13% of the US workforce, they, along with Hispanic populations, are often more heavily represented in low wage service sector jobs like restaurant service workers, taxi drivers, bellhops, maids/housekeepers and home health aides as shown in Figure 2.

These jobs are much less likely to have health insurance, and are among the lowest paid sectors in the US economy (Weller, 2019). Within these jobs, Black women remain among the most vulnerable populations; exemplified by the fact that home health-aides, a sector with a major share of Black women at about 25%, have no benefits, no paid sick leave, no union and earned around \$24,060 in May 2018, a figure lower than the median annual wage for all occupations in the United States (Legrain, 2019; Archibong, 2020).

It’s important to highlight that none of these trends are by chance or from some random distribution of individual preferences, but come from a history of slavery and racial

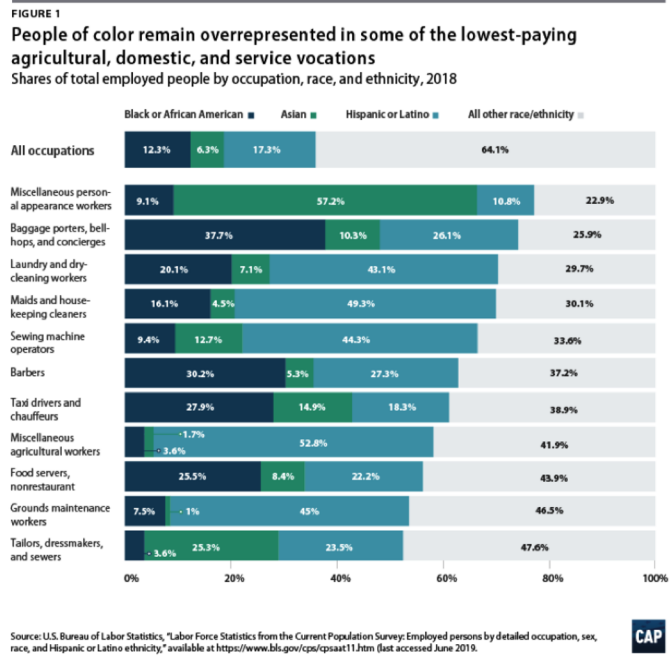


Figure 2: People of color remain overrepresented in some of the lowest-paying service sector jobs, 2018. Source: Center for American Progress

discrimination in the United States. The history of Black employment in these low wage service sectors can be traced back to slavery where Black people were enslaved as coerced labor to work on agricultural plantations and as domestic servants within the households of white owners (Solomon, Maxwell, and Castro, 2019; Archibong, 2020). After the civil war, many freed Black workers attempted to move out of the undervalued, low wage farm work and domestic service work and were met with opposition in the form of laws called Black codes, that explicitly limited Black workers to service work as under slavery. Jim Crow laws, in place through the 1960s, continued to limit Black workers' access to higher paid sectors.

In 1938, one of the most sweeping pieces of labor legislation the 1938 Fair Labor Standards Act (FLSA) is passed as part of the New Deal post Great Depression legislation. The FLSA expanded labor protections, established a 40 hour work week and minimum wage and employer mandated benefits for many sectors in the economy. Crucially many low wage service sectors like domestic service and agricultural occupations, where Black workers were heavily represented, were left out of FLSA protections, partly to appease white segregationists (Solomon, Maxwell, and Castro, 2019; Archibong, 2020). This meant that Black workers continued to have less job protection, wage security and benefits like employer sponsored retirement accounts, further limiting their abilities to earn a living wage and widening racial disparities in everything from wealth to health.

Even after the passage of the Civil rights act in the 1960s and anti-discrimination laws, Black workers continue to be discriminated against and are less likely to be hired today than similarly qualified white applicants (Pager, 2007). One study found that Black men without a criminal record were less likely to get call backs for job interviews than white men with criminal records (Pager, Western, and Sugie, 2009). Black workers continue to be disadvantaged in the labor market, and the history of racial labor market segmentation means that they are over-represented in higher exposed to COVID-19 service sectors today.

2.2 Unequal Pandemic Response and Recovery: Evidence from Unemployment Data and the Paycheck Protection Program

Any pandemic economic recovery plan must address these differential employment risks faced by Black populations and minority communities in the United States. While the recent US Bureau of Labor Statistics jobs data has reported an increase in total non-farm payroll employment by 916,000 in March 2021, with the unemployment rate falling to 6% from a peak of around 15% in 2020, gains have been uneven across different populations.

The fall in the jobless rate was even larger for white populations at around 5.4%, but only fell to 7.9% for Hispanic populations and remains high at 9.6% for African-American workers. The Black unemployment rate remains, as before the pandemic at twice the rate of white workers, and the magnitude of this gap has been further enhanced by the pandemic. And the labor market effects have also significantly disproportionately harmed Black business owners. A recent study from the National Bureau of Economic Research (NBER) found that the number of Black business owners actively working fell 41% between February and April 2020, with over 400,000 Black business owners losing employment, and bringing the numbers of Black business owners down to 640,000 in April from 1.1 million (Fairlie, 2020). The comparable loss in business owner employment was 17% for white business owners, 32% for Hispanic business owners and 26% for Asian business owners over the same time period (Fairlie, 2020).

Despite these racial gaps in losses to business employment, with Black business owners losing the most employment over the pandemic period, banking and lending policies intended to provide relief to business owners have targeted Black businesses. Under the Coronavirus Aid, Relief and Economic Security Act (CARES) and the Paycheck Protection Program (PPP) it created, only 12% of Black and Hispanic business owners who applied for aid from the Small Business Administration under the PPP received what they asked for (Flitter,

2020; Liu and Parilla, 2020) as of 2020. Just 26% said they had received a fraction of what they requested. And during the first phase of the PPP, 75% of loans went to businesses in census tracts with majority white populations, while just 68% of the population lives in majority white areas (Liu and Parilla, 2020).

Three main reasons have been provided for these trends. First, banks participating in the low interest forgivable loan PPP were only issuing loans to existing clients in the early stages of lending to speed up the approval process and allow potential borrowers quicker access to money needed during the pandemic. However, given that many Black-owned businesses were less likely to have commercial banking relations with major banks involved in these rapid lending process, they were often excluded from the initial round of lending. Second, banks were also allegedly more likely to prioritize larger loan applications to maximize fees, which automatically excluded minority and women owned businesses which tend to be smaller and have 30% fewer employees compared to male or white owned businesses according to analysis from the Brookings Institution (Flitter, 2020; Liu and Parilla, 2020).

Finally and crucially, lending discrimination against Black business owners and loan applicants, has been identified as a major barrier to access to credit for Black borrowers (Cowley, 2021; Lederer et al., 2020; Liu and Parilla, 2020). A study conducted by the National Community Reinvestment Coalition, a nonprofit based in DC, found that Black applicants for PPP loans, with exactly the same credit and asset profile as their white counterparts, were treated much worse, offered different products and less likely to be encouraged to apply for a loan by loan officers than white applicants. Black women fared even worse in the study, with no Black female customers encouraged to apply for loans by being assured they would qualify while white customers were more frequently assured that they would qualify for loans, compared to their Black counterparts (Lederer et al., 2020; Liu and Parilla, 2020).

3 The Role of Vaccination in Economic Recovery: Addressing Disparities in Access and Vaccine Compliance

Vaccination is a key part of the pandemic response and is crucial for any plan aimed at economic recovery in the next few months. Given the employment and broader economic challenges outlined in the previous sections and borne more heavily by Black communities, any effective pandemic response will need to focus on shoring up vaccine access and coverage in these communities. The current consensus from the public health community and from past studies on epidemics, is that vaccination coverage will need to be as high as 85% to 90% to get the positive external benefits of reduced disease exposure and infection rates from the virus (Carlsen et al., 2021; Archibong and Annan, 2021). Vaccination distribution began in the US in December, and as of April 11, 2021, around 22% of the population has been fully vaccinated, or just over 72 million people (Carlsen et al., 2021).

There are significant differences in vaccination rates by state, with rates of fully vaccinated populations as low as 15% in Georgia and as high as 29% in New Mexico. Around 3.5 million doses are being administered per day, and if the US continues vaccination at its current pace, the country is on track to hit the 85% threshold by August 2021 (Carlsen et al., 2021). Within these rates, there are racial disparities in access to vaccines and vaccination, with states with more Black and Hispanic populations receiving smaller shares of vaccines compared to their shares of cases and deaths and compared to their shares of the total population (Ndugga et al., 2021). For example, in California, 23% of vaccinations have gone to Hispanic people while they make up 55% of cases, 57% of deaths and 40% of the total population in the state. Comparably, in DC, Black populations have received 37% of vaccinations while making up 49% of cases, 69% of deaths and 46% of the total population (Ndugga et al., 2021). In contrast, areas with white populations have received a higher share

of vaccinations compared to their shares of cases and deaths and their shares of the total population; In Colorado, for example, 82% of vaccinations were received by white populations, while they make up 68% of the population (Ndugga et al., 2021). Across 41 states with data, the vaccination rate among white populations at 28% is 1.8 times higher than the rate for Hispanic populations (16%) and 1.6 times higher than the rate for Black populations (17%). The racial disparities in vaccination are summarized in Figure 3.

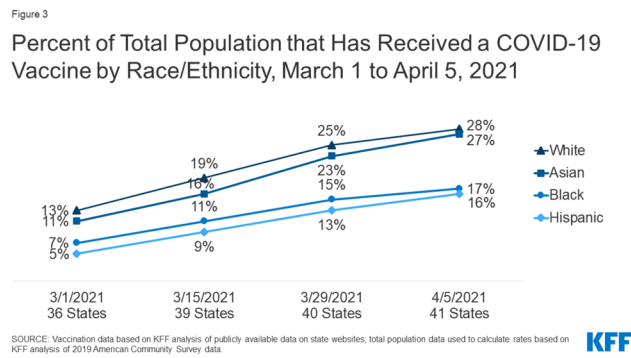


Figure 3: Racial disparities in COVID-19 vaccinations, 2021. Source: KFF

These racial disparities in vaccination are a significant barrier to vaccination and economic recovery, especially given that Black and Hispanic workers constitute a major part of the essential workforce in many states as discussed in Section 2. Section 4 outlines some policy recommendations to address these disparities in detail.

4 Policies for a More Equitable Post-Pandemic Economic Recovery

There are many different policies to address the issues related to racial disparities in economic recovery and vaccination during the pandemic that have been outlined in the preceding

sections. I outline four main recommendations here.

First, to address the disparities in employment risk and access to recovery aimed programs like the PPP, loans, cash grants and stimulus need to be more explicitly targeted to small businesses in Black neighborhoods and to low-income households as well. Previous research on epidemics has shown that these types of targeted aid in response to epidemics can reverse the short to medium and long-run negative effects of epidemics (Archibong, Annan, and Ekhatior-Mobayode, 2020). Micro loan programs should be targeted at small businesses in affected industries- restaurants, hotels, construction, for example, that have higher concentrations of Black business owners. Additionally, improved regulation and monitoring is needed to ensure no discrimination in lending practices, as well as an easy to access reporting system when such events occur. Processes need to be improved to make it easier for business owners in Black and Hispanic communities to apply for and access credit from these programs- including working with local community partners/banking institutions to provide information on how to access these programs.

Second, on the issue of disparities in vaccination, more vaccine clinics should be located in Black and Hispanic neighborhoods to improve ease of access to vaccination. On the demand for vaccination, it's important to acknowledge and factor in the history of anti-Black racism in medicine and its long-run detrimental effects on trust in health institutions, exemplified by events like the Tuskegee trials and how that, in addition to current racist practices in medicine, has increased mistrust in traditional health institutions among Black communities (Alsan and Wanamaker, 2018; Archibong and Annan, 2021). Research has shown that working with trusted local community partners to provide information on vaccination is an important and effective way to increase utilization of medical resources and vaccine uptake among these communities (Alsan and Wanamaker, 2018; Archibong and Annan, 2021).

Third, given the ways the pandemic has worsened and widened racial and gender dis-

parities in employment, health and wealth, with predictions, based on past research on epidemics, that these effects will last for long periods of time without immediate policy intervention (Archibong and Annan, 2017; Archibong, Annan, and Ekhat-Mobayode, 2020), it's essential that policies that address the underlying drivers of these disparities be passed. Among them include, extending labor regulation protections to service sectors like home health aides, restaurant service workers (including eliminating tipping laws that allow employers to pay restaurant servers as low as \$2.50 an hour if they are tipped over a certain amount in a year). And extending sick paid leave, retirement benefits and other labor protections to workers in this sector as well. Others include universal health insurance, job guarantees, 'baby bonds' or government funded savings accounts for low-income families and cash grants to ensure households are able to smooth consumption during the pandemic (Archibong, 2020; Darity Jr et al., 2018). Support for access to unions for service workers to strengthen their bargaining power re-employers has historically been an important means of worker mobilization for these workers in the US. Access to information on labor protections, increased funding to the US Equal Employment Opportunity Commission (EEOC) and accompanying enforcement of anti-discrimination laws are essential policies as well (Archibong, 2020).

Fourth, we need to invest in environmental policies that reduce the health/environmental vulnerabilities faced by Black populations from pandemics; especially since recent scientific literature have provided evidence that future global warming and climate change may significantly increase the incidence of epidemics and pandemics in the future (Archibong, Annan, and Ekhat-Mobayode, 2020). This means strengthening environmental regulation under the US Environmental Protection Agency (EPA). Given that Black neighborhoods tend to have higher levels of air pollution historically, for reasons related to racially discriminatory policies around where polluting industries were allowed to locate, they tended to have disproportionately higher rates of respiratory illness that place them at higher risk from contracting

COVID-19 (Ray, 2020; Currie, Voorheis, and Walker, 2020). Research has shown that investing in tightening environmental regulation like the Clean Air Act, led to improvements in air quality that significantly benefited Black neighborhoods and communities and helped thin racial gaps in access to air quality (Currie, Voorheis, and Walker, 2020).

These policies are essential for a more equitable economic recovery focused on improving the lives of all Americans in a post-pandemic economy.

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Alex Tabarrok Testimony, Joint Economic Committee, "Vaccinations and the Economic Recovery in 2021." April 14, 2021

Thank you all for inviting me it's a pleasure to be here. About a year ago, Nobel Prize winner Michael Kremer and I were asked by the Domestic Policy Council of the White House to write a report about accelerating vaccines using incentives. Joined by a number of top economists, we advocated for world spending on the order of ~\$150 billion to invest in approximately 18 vaccine candidates. We wrote similar reports for the British government and subsequently came to advise the World Bank and other governments and organizations around the world.

The world did not go as big as we wanted but Operation Warp Speed spent about \$15 billion and was tremendously successful.

In a paper in Science we calculate that if we get 3 billion vaccine courses in 2021, which is a conservative estimate, that they will be worth \$17.4 *trillion* dollars and OWS should be credited with, certainly not all, but a significant fraction of that.

Moreover, it is not too late to do more. We calculate that an additional 1 billion courses of capacity available in 2021 would be worth 500 bn to 1 trillion dollars for the world depending on how fast we can get that capacity online.

Is it possible to get more doses this year? Yes. For example, the Biden administration paid Merck \$269 million to upgrade plants to produce the J&J vaccine. That was a smart investment that will pay off not just for the US but for the entire world.

Another smart investment would be to put more money into Nasal and Oral vaccines. The next battle is vaccine hesitancy and a lot of vaccine hesitancy is fear of needles. Adults don't like to say that they are afraid of needles but many are. Nasal vaccines, therefore, could do a lot to alleviate vaccine hesitancy and nasal vaccines have advantages in uniquely stimulating the mucosal immune system. There are nasal vaccines in phase 1 clinical trials and the US could accelerate these with investments in trials and manufacturing.

Once the US is vaccinated, the next job is to vaccinate the world. There are health, economic and political reasons to vaccinate the world.

The unvaccinated are the biggest risk for generating mutations and new variants. You have heard of the South Africa and Brazilian variants, well the best way to protect your constituents from these and other variants is to vaccinate South Africans and Brazilians.

Moreover, even after the US and other high-income countries are vaccinated the US will continue to bear economic costs due to reduced exports, imports and supply-chain disruptions so there are pure economic reasons to vaccinate the world.

The US could significantly advance world vaccination with an additional \$4bn support for COVAX. The benefits are much bigger the costs (see Agarawal and Reed in attachments).

Politically we also have a choice, do we want an American Plan to vaccinate the world or a Chinese Plan? I would rather have an American plan.

As we vaccinate the world we should think about ways to stretch doses until scarcity is ended.

For example, the first Pfizer or Moderna dose protects at about 80% efficacy (see Canadian Statement and NEJM letter in attachments). It is better in my view to bring two people from 0% protected to 80% protected than to bring one person to 80% and then to 95% protected. Loosely speaking, the first dose prevents you from dying, the second dose avoids the sniffles.

Getting more first doses out sooner will also reduce transmission and get us to herd immunity sooner.

We should also run trials on fractional dosing, such as half dosing. Fractional dosing has been used successfully in previous epidemics.

Note that half dosing is equivalent to doubling the number of Pfizer and Moderna factories instantly! And hence potentially very valuable. Variations are possible such as half-dosing on the second dose.

Great Britain and Canada have delayed the second dose and other countries will likely follow suit — stretching doses will be important to vaccinate the world quickly.

Summing up.

It is not too late to do more.

We should invest in nasal vaccines.

We should vaccinate the world

We should stretch doses through fractional dosing and delaying the second dose.

Thank you.

Alex Tabarrok

Bartley J. Madden Chair in Economics at the Mercatus Center and Professor of Economics at George Mason University

Exhibits

Global value of vaccine capacity

| GLOBAL CAPACITY (BILLION COURSES) | GLOBAL BENEFIT (TRILLION \$) | | TIME TO 70% VACCINATION (MONTHS) | |
|--|---------------------------------|---------------|-------------------------------------|-------|
| | GDP ALONE | COMPREHENSIVE | HIGH-INCOME COUNTRIES | WORLD |
| 1 | 5.3 | 10.5 | 31.5 | 66.0 |
| 2 | 7.5 | 15.0 | 16.5 | 33.7 |
| 3 | 8.7 | 17.4 | 11.5 | 23.0 |
| 4 | 9.4 | 18.8 | 9.0 | 17.6 |
| 5 | 9.8 | 19.7 | 7.5 | 14.4 |

Global value of additional 1 billion
annual courses of capacity

| SCENARIO | | ADDITIONAL GLOBAL BENEFIT (BILLION \$) | | SPEED-UP TO 70% VACCINATION (MONTHS) | |
|-------------------------------|--|---|---------------|---|-------|
| ADDITIONAL CAPACITY ONLINE | BASELINE CAPACITY (BILLION COURSES) | GDP ALONE | COMPREHENSIVE | HIGH-INCOME COUNTRIES | WORLD |
| | 2 | 970 | 1940 | 4.5 | 10.2 |
| April 2021 | 3 | 495 | 989 | 2.1 | 5.0 |
| | 4 | 270 | 540 | 1.2 | 2.9 |
| | 2 | 636 | 1273 | 3.5 | 9.2 |
| July 2021 | 3 | 288 | 576 | 1.4 | 4.3 |
| | 4 | 129 | 257 | 0.6 | 2.3 |

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RESPONSE FROM DR. GOUNDER TO QUESTIONS FOR THE RECORD SUBMITTED BY
REPRESENTATIVE HERRERA BEUTLER

1. A report in September showed that close to 100,000 businesses have permanently shut down during the pandemic.¹ In Washington state, 27% of businesses have closed their doors temporarily due to a government-mandated closure.² Congress has worked to keep small businesses afloat throughout the pandemic with the Paycheck Protection Program, which saved 90,000 jobs in my district. Despite this, 6 out of 10 small businesses are still struggling with overhead costs.³ We know that small businesses have a substantial footprint in the U.S. economy.

a. What role will small businesses play in our nations' economic recovery? How can Congress continue to support small businesses in conjunction with the roll out of the vaccine?

As a former Washingtonian and a graduate of the University of Washington School of Medicine, it is an honor to receive this question from Rep. Jaime Herrera.

I strongly believe that small businesses will play a crucial and central role in our nations' economic recovery. Restaurants, bars, and gyms have been hit especially hard by public health restrictions. These establishments are the cultural hubs and economic drivers for many communities, including my own. However, I will defer to Drs. Paul Romer, Alexander Tabarrok, and Belinda Archibong to address how Congress can best support small businesses through pandemic recovery.

2. Dr. Gounder, you have spoken about how vaccines are only one part of the equation to recovery from the economic harm the pandemic has caused. One of the counties I represent, Cowlitz County, was recently reverted from Phase 3 to Phase 2 due to failing metrics for case counts and hospitalizations. In this situation, it seems that increasing vaccination rates would help reduce the threat of regressing to a more restrictive phase, which hurt businesses and employees that must lower capacity and economic activity.

a. Could you speak more to this point and what you view as other essential policy areas we must focus on in conjunction with vaccines?

Vaccinations work best at a population level rather than an individual level. As more people are vaccinated, you get a multiplicative, synergistic reduction rather than simply additive reduction in risk. It's also important to remember that, when we're talking about vaccine effectiveness, that's a percentage or proportionate reduction in risk. A 95% vaccine effectiveness is excellent, but when there's still a lot of viral transmission in a community 95% reducing from very high risk may still be a significant risk. Finally, vaccines don't take effect the second a needle hits your arm. It takes two weeks after two doses of the Pfizer and Moderna vaccines and 4 weeks after a dose of the Johnson and Johnson vaccine before someone reaches full immunity.

Until we have attained high enough vaccination coverage, we will need to continue employing public health mitigation measures like masking, social distancing, ventilation, and testing to suppress transmission of the virus. COVID credentials will be an important tool that must be regulated to ensure privacy and equity. We must develop better COVID therapeutics and plan for the long-term needs for COVID survivors. And we must strengthen our public health infrastructure: our public laboratories, including genomic surveillance capacity, our public health bioinformatics, and our public health workforce.

Please see Section II of my written testimony (pages 27–37) for more details on what a comprehensive public health response would look like.

RESPONSE FROM DR. GOUNDER TO QUESTIONS FOR THE RECORD SUBMITTED BY
SENATOR CRUZ

Question 1:

During the hearing you stated, "We have also seen that women can be safely vaccinated during pregnancy or when they are trying to get pregnant and when they are breastfeeding."

¹ Fortune, Nearly 100,000 establishments that temporarily shut down due to the pandemic are now out of business

² The Centers Square, Shutdowns closed 27% of Washington businesses—and more could close for good

³ Business Wire US. Jobs Recovery Depends on Small Business, Which Remains Under Great Threat, According to IHS Markit

CDC's COVID-19 vaccine guidance for pregnant women states, "Based on how these vaccines work in the body, experts believe they are unlikely to pose a specific risk for people who are pregnant. However, there are currently limited data on the safety of COVID-19 vaccines in pregnant people If you are pregnant, you may choose to receive a COVID-19 vaccine. You may want to have a conversation with your healthcare provider to help you decide whether to get vaccinated with a vaccine that has been authorized for use under Emergency Use Authorization. While a conversation with your healthcare provider may be helpful, it is not required prior to vaccination."

(a) Do you disagree with these statements from CDC?

(b) Do you disagree with CDC's statement that "there are currently limited data on the safety of COVID-19 vaccines in pregnant people"? If so, please explain why you disagree and provide data and scientific studies to support your position.

I agree with the CDC and CDC Director Dr. Rochelle Walensky that there are "no safety concerns" for pregnant women to receive COVID vaccination.

Earlier this month, researchers published data from several national surveillance systems in the New England Journal of Medicine showing that pregnant women have no higher rate of side-effects from vaccination than the rest of the population. This is just the latest report on COVID vaccine safety in pregnant and breastfeeding women. Others include:

- Gray KJ, et al. COVID-19 vaccine response in pregnant and lactating women: a cohort study. AJOG. March 25, 2021
- Mithal LB, et al. Cord Blood Antibodies following Maternal COVID-19 Vaccination During Pregnancy. AJOG. March 31, 2021
- Perl SH, et al. SARS-CoV-2-Specific Antibodies in breast milk after COVID-19 vaccination of breastfeeding women. JAMA. April 12, 2021
- Prabhu M, et al. Antibody response to SARS-CoV-2 mRNA vaccines in pregnant women and their neonates. Pre-print not yet certified by peer review. April 6, 2021
- Rottenstreich R, et al. Efficient maternofetal transplacental transfer of anti-SARS-CoV-2 spike antibodies after antenatal SARS-CoV-2 BNT162b2 mRNA vaccination. Pre-print not yet certified by peer review. March 12, 2021

We also know that pregnant women are far more likely to experience severe disease from SARS-CoV-2 (as they do from influenza). Pregnant women experiencing COVID in pregnancy are more likely to suffer from complications like severe COVID, need for intensive care unit care, preeclampsia, eclampsia, and death. They are also more likely to have preterm births. COVID in pregnancy is dangerous for the life of the mother and the unborn child.

- Villar J, et al. Maternal and neonatal morbidity and mortality among pregnant women with and without COVID-19 infection: The INTERCOVID multinational cohort study. JAMA Pediatrics. April 22, 2021
- Healy CM. COVID-19 in pregnant women and their newborn infants. JAMA Pediatrics. April 22, 2021

(c) Do you disagree with CDC's statement that pregnant women "may want to have a conversation with your healthcare provider to help you decide whether to get vaccinated with a vaccine that has been authorized for use under Emergency Use Authorization"? If so, please explain why you disagree and provide data and scientific studies to support your position.

I agree with this statement and not only with reference to pregnant women, but also with respect to anyone who has questions about COVID, the COVID vaccines, and their personal health and healthcare in general. An important but unfortunately undervalued and undercompensated role of primary care providers is to educate and counsel their patients about their personal health decisions.

To all witnesses:

Question 1: If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with an airline refusing service or otherwise discriminating against an individual that:

(a) chooses not to receive the vaccine?

(b) is not a suitable candidate to receive the vaccine for medical reasons?

Question 2:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with a res-

restaurant refusing service or otherwise discriminating against an individual that:

- (a) chooses not to receive the vaccine?
- (b) is not a suitable candidate to receive the vaccine for medical reasons?

Question 3:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with a hotel refusing service or otherwise discriminating against an individual that:

- (a) chooses not to receive the vaccine?
- (b) is not a suitable candidate to receive the vaccine for medical reasons?

Question 4:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with a movie theater or any type of live entertainment venue refusing service or otherwise discriminating against an individual that:

- (a) chooses not to receive the vaccine?
- (b) is not a suitable candidate to receive the vaccine for medical reasons?

Question 5:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with a grocery store refusing service or otherwise discriminating against an individual that:

- (a) chooses not to receive the vaccine?
- (b) is not a suitable candidate to receive the vaccine for medical reasons?

Question 6:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with any other type of retail establishment refusing service or otherwise discriminating against an individual that:

- (a) chooses not to receive the vaccine?
- (b) is not a suitable candidate to receive the vaccine for medical reasons?

Question 7:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with a private school or educational institution refusing service or otherwise discriminating against an individual that:

- (a) chooses not to receive the vaccine?
- (b) is not a suitable candidate to receive the vaccine for medical reasons?

Question 8:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with a children's day care facility refusing service or otherwise discriminating against an individual that:

- (a) chooses not to receive the vaccine?
- (b) is not a suitable candidate to receive the vaccine for medical reasons?

Question 9:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with a doctor's office refusing service or otherwise discriminating against an individual that:

- (a) chooses not to receive the vaccine?
- (b) is not a suitable candidate to receive the vaccine for medical reasons?

Question 10:

In terms of a vaccine passport or any other type of vaccine credential, do you have any concerns with a local, state, or Federal Government entity refusing services or otherwise discriminating against an individual that:

- (a) chooses not to receive the vaccine?
- (b) is not a suitable candidate to receive the vaccine for medical reasons?

Question 11:

In terms of a vaccine passport or any other type of vaccine credential, do you have any concerns with a local, state, or Federal Government entity refusing to allow an individual to vote or otherwise discriminating against an individual that:

(a) chooses not to receive the vaccine?

(b) is not a suitable candidate to receive the vaccine for medical reasons?

With respect to questions 1–11 for all witnesses above, I would refer Senator Cruz and his staff to Section II–D of my written testimony (pages 31–33) and to the 1905 Supreme Court decision in *Jacobson v. Massachusetts*. Please note that the term “vaccine passport” is inappropriate because that implies COVID credentials are a form of identification. No such identification is being proposed.

RESPONSE FROM DR. GOUNDER TO QUESTION FOR THE RECORD SUBMITTED BY
SENATOR KELLY

At this point, Arizonans can get a vaccine at a mass vaccine site, a retail pharmacy, a federally qualified health center, a health clinic or hospital, or a pop-up distribution site. But there are still barriers to accessing the vaccine. In communities that have been hit hard but still have low vaccination rates, folks say that one of the best ways to convince them to get the vaccine is to have their own doctor recommend it. Involving primary care providers strikes me as another potential piece of the puzzle to get everyone vaccinated—especially those who are hesitant about the vaccine. Even better if the primary care doctor can not only recommend the vaccine, but actually give it to you after they suggest it. In your opinion, what is the role of primary care providers in vaccination efforts? What should their role be?

In survey after survey, Americans say that they trust their primary care provider above any other messenger to provide information about COVID and COVID vaccines. Not every primary care provider will have the staffing, space, and equipment necessary to administer vaccines in their office. However, they can still play an important role in counseling patients about COVID and COVID vaccination and help patients access vaccination. Counseling and health system navigation are impactful but time-consuming, and these services must be compensated appropriately, whether a patient is covered by private insurance, Medicare, Medicaid, or has no insurance.

Please also see Section I–G-1 of my written testimony (page 25).

RESPONSE OF DR. ROMER TO QUESTIONS SUBMITTED BY REPRESENTATIVE HERRERA
BEUTLER

1. A report in September showed that close to 100,000 businesses have permanently shut down during the pandemic.¹ In Washington State, 27 percent of businesses have closed their doors temporarily due a government mandated closure.² Congress has worked to keep small businesses afloat throughout the pandemic with the Paycheck Protection Program, which saved 90,000 jobs in my district. Despite this, 6 out of 10 small businesses are still struggling with overhead costs.³ We know that small businesses have a substantial footprint in the US economy.

a. What role will small businesses play in our nations’ economic recovery? How can Congress continue to support small businesses in conjunction with the roll out of the vaccine?

We know that compared to previous recessions, the pandemic has forced many more closures of small businesses, especially in the restaurant and hospitality sectors. We see it in the data. We see it when we walk down the street. The path I recommend is first to use the right measure—the employment to population ratio for prime age adults—to see if we have succeeded in getting employment back to the level we should aspire to, the level that prevailed in the late 1990’s. Then we

¹ Fortune, Nearly 100,000 establishments that temporarily shut down due to the pandemic are now out of business

² The Centers Square, Shutdowns closed 27 percent of Washington businesses—and more could close for good

³ Business Wire US. Jobs Recovery Depends on Small Business, Which Remains Under Great Threat, According to IHS Markit

should be creative and doggedly persistent, trying a variety of interventions that create opportunities for work and not giving up until we truly recover.

2. As of January 2021, women's labor force participation has hit a 33-year low. 2.3 million women have left the labor force since February 2020.⁴ Data has shown that the U.S. could add \$1.6 trillion to the GDP if women entered and stayed in the workforce.⁵

a. Dr. Romer, could you speak more to the exodus of women from the labor force due to the pandemic and how this will impact on the U.S. economic recovery?

In the wake of the recession in 2001 and the financial crisis, we know that many of the potential workers who gave up on the possibility of finding work were young men. In the wake of the pandemic, we are seeing signs that this time the discouraged workers are more likely to be women. One advantage of the strategy that I have outlined is that it works in either case: do whatever it takes to get the discouraged workers back into jobs because this is the only way to bring the employment rate back to where it could and should be.

RESPONSE FROM DR. ROMER TO QUESTION FOR THE RECORD SUBMITTED BY SENATOR CRUZ

Question 1: If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with an airline refusing service or otherwise discriminating against an individual that:

(a) chooses not to receive the vaccine?

(b) is not a suitable candidate to receive the vaccine for medical reasons?

Because you are asking me to entertain hypotheticals, what I can say definitively is that I would have concerns if a member of Congress tried to use hypothetical questions to enlist me in an attempt at spreading misunderstandings and disinformation.

Question 2:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with a restaurant refusing service or otherwise discriminating against an individual that:

(a) chooses not to receive the vaccine?

(b) is not a suitable candidate to receive the vaccine for medical reasons?

Because you are asking me to entertain hypotheticals, what I can say definitively is that I would have concerns if a member of Congress tried to use hypothetical questions to enlist me in an attempt at spreading misunderstandings and disinformation.

Question 3:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with a hotel refusing service or otherwise discriminating against an individual that:

(a) chooses not to receive the vaccine?

(b) is not a suitable candidate to receive the vaccine for medical reasons?

Because you are asking me to entertain hypotheticals, what I can say definitively is that I would have concerns if a member of Congress tried to use hypothetical questions to enlist me in an attempt at spreading misunderstandings and disinformation.

Question 4:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with a movie theater or any type of live entertainment venue refusing service or otherwise discriminating against an individual that:

(a) chooses not to receive the vaccine?

(b) is not a suitable candidate to receive the vaccine for medical reasons?

⁴ CBS News, Nearly 3 million U.S. women have dropped out of the labor force in the past year (Here)

⁵ S & P Global, Women at Work: The Key to Global Growth

Because you are asking me to entertain hypotheticals, what I can say definitively is that I would have concerns if a member of Congress tried to use hypothetical questions to enlist me in an attempt at spreading misunderstandings and disinformation.

Question 5:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with a grocery store refusing service or otherwise discriminating against an individual that:

- (a) chooses not to receive the vaccine?**
- (b) is not a suitable candidate to receive the vaccine for medical reasons?**

Because you are asking me to entertain hypotheticals, what I can say definitively is that I would have concerns if a member of Congress tried to use hypothetical questions to enlist me in an attempt at spreading misunderstandings and disinformation.

Question 6:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with any other type of retail establishment refusing service or otherwise discriminating against an individual that:

- (a) chooses not to receive the vaccine?**
- (b) is not a suitable candidate to receive the vaccine for medical reasons?**

Because you are asking me to entertain hypotheticals, what I can say definitively is that I would have concerns if a member of Congress tried to use hypothetical questions to enlist me in an attempt at spreading misunderstandings and disinformation.

Question 7:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with a private school or educational institution refusing service or otherwise discriminating against an individual that:

- (a) chooses not to receive the vaccine?**
- (b) is not a suitable candidate to receive the vaccine for medical reasons?**

Because you are asking me to entertain hypotheticals, what I can say definitively is that I would have concerns if a member of Congress tried to use hypothetical questions to enlist me in an attempt at spreading misunderstandings and disinformation.

Question 8:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with a children's day care facility refusing service or otherwise discriminating against an individual that:

- (a) chooses not to receive the vaccine?**
- (b) is not a suitable candidate to receive the vaccine for medical reasons?**

Because you are asking me to entertain hypotheticals, what I can say definitively is that I would have concerns if a member of Congress tried to use hypothetical questions to enlist me in an attempt at spreading misunderstandings and disinformation.

Question 9:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with a doctor's office refusing service or otherwise discriminating against an individual that:

- (a) chooses not to receive the vaccine?**
- (b) is not a suitable candidate to receive the vaccine for medical reasons?**

Because you are asking me to entertain hypotheticals, what I can say definitively is that I would have concerns if a member of Congress tried to use hypothetical questions to enlist me in an attempt at spreading misunderstandings and disinformation.

Question 10:

In terms of a vaccine passport or any other type of vaccine credential, do you have any concerns with a local, state, or Federal Government entity refusing services or otherwise discriminating against an individual that:

(a) chooses not to receive the vaccine?

(b) is not a suitable candidate to receive the vaccine for medical reasons?

Because you are asking me to entertain hypotheticals, what I can say definitively is that I would have concerns if a member of Congress tried to use hypothetical questions to enlist me in an attempt at spreading misunderstandings and disinformation.

Question 11:

In terms of a vaccine passport or any other type of vaccine credential, do you have any concerns with a local, state, or Federal Government entity refusing to allow an individual to vote or otherwise discriminating against an individual that:

(a) chooses not to receive the vaccine?

(b) is not a suitable candidate to receive the vaccine for medical reasons?

Because you are asking me to entertain hypotheticals, what I can say definitively is that I would have concerns if a member of Congress tried to use hypothetical questions to enlist me in an attempt at spreading misunderstandings and disinformation.

RESPONSE FROM DR. ROMER TO QUESTION FOR THE RECORD SUBMITTED BY SENATOR KELLY

1. About a month ago we passed the American Rescue Plan. The bill included nearly \$93 billion for COVID-related public health work, including for vaccine distribution and to improve vaccine confidence. We have already seen at least \$135 million of those resources come to Arizona to help get vaccines into arms. Do you believe our investment in speeding up vaccine distribution and increasing testing is adequate to set us up for a strong economic recovery?

No, stopping the pandemic is a necessary condition for full recovery, but it alone will not be sufficient. We faced no pandemic during the recovery from the recession of 2001. Nor did we face a pandemic in the recovery from the financial crisis of 2007–9. But after both of these recessions, we failed to fully recover according to the measure that I believe we should be using—the employment rate for prime-aged adults. To escape from our recent pattern of recoveries that fail to get us back to where we were before the recession hit, we need to implement aggressive recovery policies and we need to stick with them until we truly recover.

2. I'd like to ask you about the impact of virus variants. Researchers at Arizona State University have discovered a variant in the past couple of weeks. The UK variant has become the most common strain throughout the US, and we know already that it's more contagious and more deadly. The California variant is also becoming a threat. The Pfizer and Moderna vaccines appear to be effective in protecting against the UK variant, but other variants are or might become a greater problem. How do we pivot to ensure vaccinated Americans remain protected from all variants? What do we need from the manufacturers, and what do we need from Congress?

As I indicated in my testimony, the biggest threat posed by the UK variant that is taking over arises because it spreads so much faster than the variants that we were fighting during 2020. Experts are not certain about whether this new variant is more deadly for those who catch it. The balance of the evidence seems to suggest that it is somewhat more deadly, but the experts have not yet reached a consensus on this. So far, there is no reason to think that our vaccines are less effective in protecting us from this variant. But the evidence is very clear that this variant spreads much faster. This is why it is taking over. Faster spread puts us at risk. We need to make sure that our measures that limit the spread are getting more effective quickly enough to stay ahead in this race with this variant

RESPONSE FROM DR. ARCHIBONG TO QUESTION FOR THE RECORD SUBMITTED BY
REPRESENTATIVE HERRERA BEUTLER

Question 1. A report in September showed that close to 100,000 businesses have permanently shut down during the pandemic.¹ In Washington state, 27% of businesses have closed their doors temporarily due a government-mandated closure.² Congress has worked to keep small businesses afloat throughout the pandemic with the Paycheck Protection Program, which saved 90,000 jobs in my district. Despite this, 6 out of 10 small businesses are still struggling with overhead costs.³ We know that small businesses have a substantial footprint in the U.S. economy.

a. What role will small businesses play in our Nations' economic recovery? How can Congress continue to support small businesses in conjunction with the roll out of the vaccine?

Thank you very much for the question Congresswoman Beutler. It is extremely important that we focus resources on small businesses that have struggled with recovery during the pandemic. As I outlined in my written testimony, a major share of losses to small business owners has been to Black and Hispanic business owners. The number of Black business owners actively working fell 41% between February and April 2020, with over 400,000 Black business owners losing employment, and bringing the numbers of Black business owners down to 640,000 in April from 1.1 million (Fairlie, 2020). The comparable loss in business owner employment was 17% for White business owners, 32% for Hispanic business owners, and 26% for Asian business owners over the same time period (Fairlie, 2020). Despite these racial gaps in losses to business employment, banking and lending policies intended to provide relief to business owners have not targeted Black and Hispanic businesses. Any economic relief program aimed at improving the welfare of small businesses must target Black and Hispanic businesses with grants and loans, as they have been the hardest hit and serve some of the most vulnerable communities during the pandemic. Just as with vaccination efforts, there needs to be a concerted effort at the Federal, state, and local levels to provide more financial access, including information and access to credit to Black and Hispanic small business owners who have been worst off and have received relatively little of the PPP/CARES Act funding over the pandemic.

RESPONSE FROM DR. ARCHIBONG TO QUESTION FOR THE RECORD SUBMITTED BY
SENATOR CRUZ

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with an airline (and other establishments) refusing service or otherwise discriminating against an individual that:

(a) chooses not to receive the vaccine?

(b) is not a suitable candidate to receive the vaccine for medical reasons?

Thank you for the questions Senator Cruz. Based on my research into the issue of vaccine passports, I can say that, for years, people traveling to particular countries around the world have had to provide proof of vaccination against diseases like yellow fever and rubella with yellow cards showing proof of vaccination, so the idea of a "vaccine passport" is not a new one. The particular details of how these policies should be implemented, if they are implemented, in the case of the COVID-19 pandemic is something that governments will need to consult with health and medical professionals at the CDC to flesh out.

RESPONSE FROM DR. ARCHIBONG TO QUESTION FOR THE RECORD SUBMITTED BY
SENATOR KELLY

Two point one million women left the labor force between February and December 2020. Just like the health impacts of the pandemic, unemployment has disproportionately impacted women of color. I've heard this in

¹ Fortune. Nearly 100,000 establishments that temporarily shut down due to the pandemic are now out of business

²The Centers Square. Shutdowns closed 27% of Washington businesses—and more could close for good

³Business Wire. U.S. Jobs Recovery Depends on Small Business, Which Remains Under Great Threat, According to IHS Markit

Arizona. Last summer I spoke to a woman named Sandy who was furloughed from her job as a housekeeper at a Phoenix hotel on March 28th, 2020. She spent months hoping to go back to work. She and her husband struggled to pay their bills for themselves and their two children. She skipped meals, and was helped by increased unemployment benefits. Sandy has fortunately found a new job, but there are many women and women of color who are still looking for jobs or waiting to return to work in Arizona. As vaccinations increase and the country returns to work, how do we ensure women who have left the labor force and want to return are able to do so?

Thank you very much for the question Senator Kelly. Women were particularly hard hit by the pandemic, with a net 2.4 million women leaving the work force between February 2020 and February 2021, according to Pew Research Center statistics. The figure was much higher than for male counterparts (1.8 million men), and there is a concern that, without concerted policy efforts aimed at lowering the costs of women's reentry into the labor market, the gender gap in employment may remain persistent over time. Within this loss, Black and Hispanic women have been worst hit, with these populations accounting for a major share of service sector jobs that saw significant losses during the pandemic. Bringing these women back into the work force is an essential part of the economic recovery post pandemic, and will require investing in policies like free or low-cost work retraining programs, cash grants targeted to female-headed households and policies like more job flexibility, more paid sick and parental leave and universal child care, especially in industries where women and Black and Hispanic women are concentrated—service/health sectors like home health aides that currently lack benefits, paid sick leave and are among lowest paid in US. These policies will lower the costs and increase the benefits of reentry into the labor market for women, and especially Black and Hispanic women, that have been disproportionately harmed by the pandemic.

RESPONSE FROM DR. TABARROK TO QUESTIONS FOR THE RECORD SUBMITTED BY REPRESENTATIVE HERRERA BEUTLER

1. What role will small businesses play in our Nations' economic recovery? How can Congress continue to support small businesses in conjunction with the roll out of the vaccine?

The American economy has been surprisingly robust to the pandemic. Business exits in some sectors are higher than normal, but recent work from the Federal Reserve suggests that overall business exits are not unusually high.

"Actual exit is likely to have been lower than widespread expectations from early in the pandemic. Moreover, businesses have recently exhibited notable optimism about their survival prospects."

Thus, I think that the best policy for business is to support an overall strong business climate and economy especially continuing a strong rollout of vaccines. Targeted programs are not needed.

<https://www.federalreserve.gov/econres/feds/business-exit-during-the-covid-19-pandemic.htm>

2. Dr. Tabarrok, could you speak to this argument and if we need to be considering underemployment, as the economy recovers with the vaccine rollout?

There are a variety of ways of measuring unemployment but almost all of them move together over time and so provide similar signals as to the state of the economy. Underemployment, particular of young men, is a challenging issue for the United States but it's a perennial issue that must be addressed by education policy and work programs such as apprenticeship programs that appeal to a wider variety of people than traditional education.

RESPONSE FROM DR. TABARROK TO QUESTION FOR THE RECORD SUBMITTED BY SENATOR CRUZ

The questions are all of the form:

If a vaccine passport or any other type of vaccine credential is required by individual private companies, do you have any concerns with a [educational institution/airline/grocery store ...] refusing service or otherwise discriminating against an individual that:

- (a) chooses not to receive the vaccine?
- (b) is not a suitable candidate to receive the vaccine for medical reasons?

I answer as follows:

During the pandemic it was common for bars and restaurants, churches, gyms, shopping malls, entertainment venues, schools and universities, and even parks and beaches in the United States to be closed for everyone. Similarly, international travel has been severely restricted for everyone. I think it an improvement to move from closed-for-all to open-for-some. Thus vaccine passports represent a lifting of restrictions and an increase in freedom on the path back to normality. Greece, for example, is scheduled to open to anyone with a record of vaccination, negative COVID test, or previous infection. This is good for Greece, which relies on tourist revenues for a significant share of its economy and good for the world who want to visit sunny beaches and ancient ruins.

Moving in stages, from closed-for-all to open-for-some to fully-open, is reasonable. The aim, of course, is to be open-for-all, an achievable aim if a large enough proportion of the population is vaccinated. As we move to normality we should also make it possible for the non-vaccinated to access as many services as possible on reasonable grounds, for example, through the use of testing and masks.

It bears repeating that the best way to avoid these difficult decisions is for as many people as possible to be vaccinated, thus making social life safe for the unvaccinated as well as the vaccinated. For these reasons I have supported free vaccinations, stretching doses to vaccinate more people quickly through policies such as delaying the second dose and testing fractional doses, using single-shot vaccines, and developing nasal and oral vaccines.

ARTICLES SUBMITTED TO SENATOR CRUZ FROM DR. GOUNDER

1. Efficient maternofetal transplacental transfer of anti-SARS-CoV-2 spike antibodies after antenatal SARS-CoV-2 BNT162b2 mRNA vaccination
<https://www.medrxiv.org/content/10.1101/2021.03.11.21253352v1.full.pdf>
2. SARS-CoV-2-specific antibodies in breast milk after COVID-19 vaccination of breastfeeding women
<https://www.medrxiv.org/content/10.1101/2021.03.11.21253352v1.full.pdf>
3. Antibody response to SARS-CoV-2 mRNA vaccines in pregnant women and their neonates
<https://www.biorxiv.org/content/10.1101/2021.04.05.438524v1>
4. Cord blood antibodies following maternal COVID-19 vaccination during pregnancy
[https://www.ajog.org/article/S0002-9378\(21\)00215-5/fulltext](https://www.ajog.org/article/S0002-9378(21)00215-5/fulltext)
5. COVID-19 vaccine response in pregnant and lactating women: a cohort study
[https://www.ajog.org/article/S0002-9378\(21\)00187-3/fulltext](https://www.ajog.org/article/S0002-9378(21)00187-3/fulltext)

DR. TABAROK—SUBMISSIONS FOR THE RECORD FROM SENATOR LEE

1. What are we waiting for?
<https://www.washingtonpost.com/outlook/2021/02/12/first-doses-vaccine-rules-fda/>
2. Safety and efficacy of the BNT162b2 mRNA Covid-19 vaccine
<https://www.nejm.org/doi/full/10.1056/nejmoa2034577>
3. Market design to accelerate COVID-19 vaccine supply
<https://science.sciencemag.org/content/371/6534/1107>
4. NACI rapid response: Extended dose intervals for COVID-19 vaccines to optimize early vaccine rollout and population protection in Canada
<https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci/extended-dose-intervals-covid-19-vaccines-early-rollout-population-protection.html>
5. How to end the COVID-19 pandemic by March 2022
<https://openknowledge.worldbank.org/bitstream/handle/10986/35454/How-to-End-the-COVID-19-Pandemic-by-March-2022.pdf?sequence=1&isAllowed=y>

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