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COVID-19 retrospective: What have we learned and how can we better prepare for future pandemics?

ARIELLE KANE

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EXECUTIVE SUMMARY

While the COVID-19 pandemic is not yet in our rear-view mirror, the worst seems to be behind us. It's not too soon to examine the U.S. policy response to this unprecedented public health emergency — both its successes and failures — so that our country will be better prepared to face similar challenges in the future. The U.S. is closing in on one million COVID-19 deaths since February 2020. COVID-19 is now the third leading cause of death behind heart disease and cancer.¹ When looking at deaths per capita, the U.S. is on par with Poland and Armenia rather than its fellow economic powerhouses like Germany and the United Kingdom, and far behind countries like Australia that took aggressive COVID-19 mitigation measures. Compared to 29 other high-income countries, the U.S. experienced the largest decline in life expectancy. Here, it fell by two years — the largest decline since the data was first collected in 1933.²

In response, federal lawmakers have proposed creating an independent taskforce to review the U.S. response to "fully recognize the lessons of this pandemic," according to bill sponsor Senator Patty Murray (D-Wash.). This paper seeks to contribute to this important inquiry by assessing how the United States responded to the pandemic, examining both our failures and our successes. One note of caution: As essential as this retrospective examination is, it is equally important to underscore that the next pandemic may take a very different form. Instead of planning to win the last war, our national authorities should invest in overall preparedness and resilience against crises we can't predict.

PROBLEMS WITH THE U.S. COVID-19 RESPONSE:

A global pandemic the size of COVID-19 will test the caliber of any nation's political leadership and government capacity. Slip-ups and miscalculations are to be expected given the uncertainty of the first pandemic of this scale in over 100 years. But America had the misfortune to have a political novice in the White House who early on sought to deny the gravity of the threat and failed to use the bully pulpit of the White House to garner a whole of government response. A key reason America led the world in infections and deaths early on was this calamitous failure of leadership.

Former President Donald Trump pressured federal agencies to downplay the severity of the pandemic, spread misinformation, and failed to use the power of the federal government to lead states and localities in their responses on the ground. His own pollster, Tony Fabrizio, released a 27-page report concluding that the poor handling of the pandemic cost him the election.³

His evasion and denial of the gravity of the situation created an environment of politicization, tribalism, and obfuscation that the U.S. is still struggling to recover from two years later. After vaccines were widely available, the super contagious omicron variant emerged to create yet another COVID-19 surge. But this time, the death rate in counties that voted heavily for Donald Trump was more than twice as high as the death rate in counties that went heavily for Joe Biden.⁴ Trump's attitude of dismissing the seriousness of the virus has permeated amongst his fans and has led to preventable disease and death. Public officials struggled to push back against misinformation and a hostile population that proved largely unwilling to adapt to an international health crisis.

However, the life and death consequences of Trump's failed leadership have been explored in depth elsewhere and thus this paper will focus on the federal government's overall response. The U.S. struggled to respond to the rapidly spreading virus on several fronts. The failures were fueled by poor communication, a lack of foresight, limited infrastructure, and underinvestment in data systems.

Poor communication and coordination

The U.S. Centers for Disease Control and Prevention (CDC) strives to balance two roles: first, as a scientific institute conducting world class research, and second, as the nation's leading public health agency. The first part of its mission creates incentives for methodically and deliberately reviewing data to provide scientific tracking and analysis of public health hazards. But the second part — providing guidance on evolving public health hazards — is in contradiction to the slow, methodical analysis it usually conducts. The CDC struggled to adapt to the ambiguous nature of a novel threat to provide actionable guidance on how citizens should protect themselves.

COVID-19 was first detected in Wuhan, China, in December 2019. Within two months of its discovery, it arrived in the United States. In early February 2020, the World Health Organization shipped newly developed COVID-19 tests to 57 countries. But the scientists at the CDC wanted control over testing in the United States and developed a separate test.⁵ However, the agency botched the rollout.⁶ First it made a faulty product that was poorly designed and produced false positive results. Then, because of test shortages, it advised hospitals and doctors to use tests sparingly — only when people had symptoms and had recently travelled from China.

This guidance was based on the CDC's initial assumption that the disease was only contagious when people had symptoms and that there was no community spread in the U.S. Both assumptions turned out to be wrong. The agency's desire to centralize testing at its lab in Atlanta and control who was being tested was incompatible with a fast-moving situation that needed to empower people on the ground to use tests as they saw fit. Furthermore, though local labs could have developed their own tests, when the U.S. declared the public health emergency, the law required an U.S. Food and Drug Administration (FDA) "emergency use approval" for any new tests, hamstringing the diagnostic capacity.⁷ While this rule is intended to protect consumers from companies looking to make a quick buck off of a nervous public, it also was too slow and bureaucratic for the fast moving nature of the crisis at hand.

Communicating guidance to the public on a novel virus that scientists knew little about was always going to be a challenge. And in a vacuum of scientific understanding, misinformation about COVID-19 took off like wildfire. Further compounding the spread of information was the algorithms of many social medica platforms which reward novelty and people's own cognitive biases.⁸ To make matters worse, the early politicization of the pandemic meant that people were looking for information that reflected their partisan loyalties rather than science.

President Trump was the most influential spreader of COVID-19 misinformation. A study of 38 million articles about the pandemic found that Trump contributed to nearly 38% of the misinformation.⁹ The result was that his supporters had a dismissive view of the severity of the virus. A September 2020 survey found that roughly half (48%) of Republicans, compared to 25% of Democrats, believed COVID-19 was no more serious than the flu. The same survey found that 42% of Republicans believed that hydroxychloroquine, typically used to treat malaria, is a safe and effective way to treat COVID-19.¹⁰

The CDC didn't help stem the tide of disinformation by offering varying and sometimes contradictory guidance to the public. When guidance from Washington changed or evolved, it often wasn't explained well to the public. The CDC often put out guidance only to change it days or weeks later - without explaining why it had changed. For example, in March 2020, it advised against using masks unless they were properly fitted N95 masks.¹¹ Later, the agency clarified that it advised against the general public wearing masks because officials were concerned about personal protective equipment (PPE) shortages for health care workers.¹² By July 2020, once cloth masks were widely available and the extent of asymptomatic spread was more clear, the CDC revised its recommendations to include mask wearing for the general public.¹³ It's unclear whether health officials didn't believe masks would be effective or if fears of mask shortages led the government to say they were ineffective, the initial mistake and then the subsequent explanation, eroded trust in public health communication.

Another example of poor communication was the CDC's quarantine guidance as the super contagious omicron variant spread. For example, hospital staffing shortages became acute in December 2021 and the CDC changed its emergency quarantine guidance around testing positive and working in health care settings, saying that health care workers could return to work seven days after testing positive.¹⁴ Not 10 days later, it changed its guidance for the general population saying that they only needed to quarantine for five days after testing positive without explaining how the two fit together.¹⁵ The agency could have better explained the risk calculations it was making, but the silence led many people to believe that industries had lobbied for the change rather than it being based on scientific evidence.¹⁶ When guidance was not well explained or contradictory, it provided a fertile ground for disinformation and conspiracy theories, which has made implementing public health guidance and behavioral changes increasingly difficult.

Limited domestic manufacturing

Supply chain shortages plagued most COVID-19 response efforts preventing Americans, health care providers, and critical first responders from getting the masks, tests, and ventilators they needed.¹⁷ U.S. reliance on foreign manufacturing and shipping meant that the government struggled to procure PPE such as masks and robes for health care providers and ventilators, treatments, and other supplies. The National Strategic Stockpile, which was intended to alleviate supply issues in the case of an emergency, was unprepared because officials failed to restock supplies during the H1N1 outbreak in 2009 and an administrative mix-up that left a ventilator order unfulfilled.^{18,19} When the government sought to order supplies from abroad, other countries limited exports to meet their own needs. The lack of domestic manufacturing capabilities led to long delays and competition between localities, driving up the cost for basic medical supplies.²⁰ All in all, the lack of domestic manufacturing capacity left the U.S. underprepared to adapt to a fast moving crisis.

Poor data infrastructure

The pandemic exposed outdated data systems not up to handling large volumes of data in real time — data often must be entered manually, labs results are slow to be returned, and a shrinking number of public health workers are on the ground doing the work.²¹ Furthermore, there is no standard data collection format so the CDC had to reconcile various data collection formats from all the localities on the ground.²²

To make clinical and policy decisions, the CDC repeatedly relied on data coming out of Israel and the U.K.²³ But the dependence on international data means that Americans don't get real-time data on how the virus is spreading, evading vaccines here, or impacting various American populations. The slow data has real world impact: Delayed data led to an intergovernment disagreement on boosters. The White House wanted everyone to start getting boosters at the end of the summer, but the FDA and CDC were initially hesitant to endorse a widespread booster effort because they wanted better data. Though ultimately, the CDC did endorse boosters, the delay meant that only a small percentage of the population had received a third dose when the omicron variant burst on the scene, spreading throughout the holidays - leading to preventable hospitalizations and deaths.

SUCCESSES WITH THE U.S. COVID-19 RESPONSE:

When learning the lessons from the COVID-19 pandemic, it's also important to note what the U.S. did right. Over the past two years, the United States made large improvements to its emergency care delivery systems, developed three effective vaccines based on innovative, new technology, kept the U.S. economy from imploding and prevented millions of unemployed Americans from falling into poverty during a time of unprecedented economic upheaval and uncertainty.

Shoring up the health care system

The United States health care system was in peril at the beginning of the COVID-19 pandemic. Not only were certain regions overwhelmed with COVID-19 patients, but due to stay-at-home advisories, other parts of the health care system were cash strapped and waiting for the inevitable COVID-19 patient surges. To mitigate the damage, in the spring of 2020, the government quickly passed the Provider Relief Act, the Paycheck Protection Program, and enhanced payments for Medicaid and Medicare patients to bolster the health care sector. These emergency relief bills were largely effective at shoring up the health care system to help it whether the surges of COVID-19 and the lulls as many people delayed elective procedures.

Most hospitals were able to keep staff, though there were moments when hospital beds were filled and staff were overwhelmed. National health expenditure data showed that hospital and doctor expenditures largely remained constant in 2020 thanks to federal assistance to health care providers through the Provider Relief Fund (\$122 billion) and the Paycheck Protection Program (\$53 billion). Even while health care utilization was down, hospital expenditures increased 6.4% in 2020, similar to the 6.3% growth rate in 2019.²⁴ Physician and clinical service expenditures increased 5.4%, more than a percentage point higher than the 4.2% growth in 2019.²⁵

During COVID-19 surges, hospitals delayed nonemergency procedures to preserve capacity, but there were still some areas of the country that were overwhelmed and unable to treat all COVID-19 patients or other emergency patients as they usually would. Excess deaths, the difference between the number deaths and the expected numbers of deaths, show that COVID-19 contributed to more deaths because of overburdened health care systems. Excess deaths during the first two years of the pandemic surpassed 1 million, with COVID-19 accounting for most deaths, but other diseases also contributing.²⁶

Medicaid and the Affordable Care Act (ACA) served as a safety net as many people lost jobs. Though the pandemic led to huge economic and employment downturns, the number of uninsured people declined by 0.6 million, or 1.9%.²⁷ This was in stark contrast to the Great Recession of 2008-2009 when 9.3 million people lost their jobs and health insurance. This time, safety net programs like Medicaid and subsidies available through the ACA kept people from losing health care coverage during a public health emergency. Medicaid and CHIP enrollment increased to 83.2 million, up nearly 18% since February of 2020.²⁸



Funding for vaccines and expediting the approval process

Once the Trump administration finally acknowledged that the pandemic was not going to "disappear," it quickly assembled Operation Warp Speed to mobilize all branches of government necessary to develop, manufacture and distribute new COVID-19 vaccines.

The \$18 billion-plus effort had some hiccups but overall was a success. Pfizer-BioNTech. Moderna, and Johnson & Johnson produced safe, effective vaccines in just under a calendar year.²⁹ The administration partnered with many private companies and invoked the Defense Production Act times to procure supplies for the effort. The federal government also provided generous contracts for vaccine development and manufacturing to mitigate the risk on individual companies. The use of federal authority to catalyze and assist but not manage private industry efforts was integral to developing the COVID vaccine in record time. Without the investment, the process would have taken much longer and increased the death toll of COVID-19.

Traditional vaccine development can take 10 years or longer. But given the urgency of the pandemic, the FDA issued guidance to accelerate vaccine development.³⁰ Typically, each stage of vaccine development is done sequentially to reduce the financial risk — if a product proves unsafe or ineffective, companies haven't spent large sums on clinical trials. But because the government had mitigated some of the financial risk for the COVID-19 vaccine companies, they conducted some of the phases concurrently. Additionally, some vaccine companies were able to share data from other vaccines to further expedite the process.

Community mitigation and Congressional action

Non-pharmaceutical interventions (NPIs) are actions, apart from getting vaccinated and taking medicine, that people take to help slow the spread communicable disease. In early 2020, wide-spread shelter-in-place orders and the shutdowns of schools, restaurants, gyms, and workplaces slowed the spread of COVID-19. Congress supported these shutdowns by providing stimulus payments and enhanced unemployment checks to people out of work because of the economic upheaval. Congress also passed the American Rescue Plan which, among many things, expanded the child tax credit and reduced the poverty rate among children from about 16% to 12% - keeping 3 million children out of poverty.³¹ It also boosted health coverage by expanding subsidies for those buying insurance through the ACA marketplaces.

Once the initial surge subsided, communities began opening so called non-essential businesses with mask mandates and social distancing guidance. Many of these NPIs were novel ideas based on scientific theory not yet having an opportunity for real-world evaluation at this scale. Subsequent studies found that school closures and shelter-in-place orders reduced the spread of disease and prevented the early surges from overwhelming health care systems.³²

But as time went on and vaccines became widely available, NPIs became more political — on one side there were people denying the threat of the virus, and on the other people dug into shelter-in-place orders, not wanting to return to regular operations. These fights meant that some people were refusing to get readily

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available vaccines — increasing unnecessary disease and deaths, while others prolonged school closures beyond what was necessary and will have continued effects on the mental health and academic performance of schoolaged children.

RECOMMENDATIONS:

Learning from the weakness of the COVID-19 response and building on the clear successes, the U.S. needs to invest in pandemic preparedness now to be better prepared when the next threat emerges. Here we have six pragmatic recommendations policymakers can take now to help the U.S. be better prepared and more resilient to pandemic, health, or biologic threats in the future.

Better communication and coordination across government

COVID-19 communication was politicized very early on, but public health officials didn't do themselves any favors by releasing often confusing, contradictory, academic, dismissive, and sometimes patronizing guidance. While communicating about an uncertain and evolving situation will always be difficult, public health officials need to tailor their messages to individual audiences and be humble about what they do and do not know.

The CDC and the FDA have clearly defined lanes: The CDC tracks outbreaks of disease and makes public health recommendations for state and local health departments but lacks regulatory authority. The FDA reviews clinical trial data to decide whether a drug is safe and effective and can reach the market. The FDA works with the private sector while the CDC works with health care officials on the ground. But the process of the FDA approving products and then the CDC providing guidance proved challenging and confusing when it came to tests and COVID-19 booster shots. The agencies should have their respective advisory panels work together to release clear and timely information to the public and the CDC should have ultimate authority over how and went vaccines are used. It's clear that how agencies communicate with the public in an evolving and uncertain situation did not work and making reforms to improve communication should be a top priority.

Bolstering U.S. supply chain manufacturing

Few saw the COVID-19 pandemic coming, and it's impossible to predict what form the next health care emergency might take. All we know for sure is that there will be one. It might be respiratory, or waterborne, or spread by mosquitoes. Therefore, planning and stockpiling the relevant supplies will be difficult. For these reasons, we must invest in medical manufacturing capacity domestically.

When a new pathogen emerges, the government will need to work with industry to manufacture needed materials such as personal protective equipment, medical supplies, and pharmaceutical products rather than being reliant on international supply chains. Maintaining the medical supply infrastructure domestically will be a key component of pandemic resiliency. Even though the federal government and states should keep some medical stockpile reserves, it won't be efficient or effective to try and stockpile goods for every possible type of pandemic.

Representatives Josh Gottheimer (D-N.J.) and Richard Hudson (R-N.C.) introduced the Medical and Health Stockpile Accountability Act which seeks to shore up medical supply chains in the U.S. It would establish new tracking mechanisms for supplies like masks, gowns and ventilators for states and the federal government.³³ It would also establish a new HHS program to connect health care providers with medical vendors. Gottheimer said that "because of the lack of understanding of what products were actually available and where, there was excessive purchasing of products, disingenuous and fraudulent vendors, and hoarding — which created shortages for others" during the COVID-19 pandemic — a problem he hopes to rectify.

Improving data infrastructure

Because the U.S. has a decentralized health care system, data is collected on the local level and then given to the CDC for analysis. This has proved problematic throughout the pandemic. Not only is much of the data held back from public view because of quality concerns, but the U.S. was making policy decisions from data coming out of Israel because it had better, timelier, information. The CDC needs the authority to standardize, automate, and centralize public health data. This means ensuring various jurisdictions are collecting demographic information in the same way and collecting the information in a format that can be easily, and automatically, integrated into centralized repositories. There were reports of CDC officials entering data by hand due to of data being collected in incompatible formats. Without figuring out the data piece, public health agencies will always be hamstringed in their response to crises.

Top Senate HELP members Patty Murray (D-Wash.) and Richard Burr (R-N.C.) have championed a pandemic preparedness bill that is a solid first step to addressing some of the weakness exposed by COVID-19.³⁴ The legislation would improve public health data systems and invest in the public health workforce.

Investing in R&D and pandemic preparedness

The shining success of America's COVID-19 response was the rapid development and deployment of vaccines. The U.S. should use the lessons learned from vaccines to expedite the development needed for COVID-19 treatments and other therapies. This could mean lessening the risk for companies investing in research for national priority areas - antibiotics, for example - and sharing data across companies when appropriate. For example, if an Alzheimer's drug clinical trial fails, the FDA could share the lessons learned beyond the company enrolled in the trial. Most companies won't run concurrent stage 2 and 3 clinical trials because of cost of the trials and the financial risk running a stage 3 trial would be before knowing if a stage 2 was successful. But if a therapy shows early promise, the FDA should make it easier to expedite the clinical trial progress to get the new drugs to market.

Public health and pandemic funding often comes in spurts and fits in the aftermath of a pandemic scare. H1N1, Ebola, and Zika outbreaks were all followed with a burst of funding.³⁵ But without sustained funding and program investment, public health inevitably falls by the wayside in the face of other policy priorities leaving the U.S. unprepared for the next inevitable outbreak. The U.S. needs to invest in pandemic preparedness as a matter of national security - infrastructure, planning, and long-term investment are vital to long-term success. A top priority of the Biden administration has been the push for the establishment of a new federal research agency, Advanced Research Projects Agency for Health (ARPA-H), to improve and drive biomedical research on cancer, infectious diseases and Alzheimer's disease.³⁶ There has been some disagreement over whether it should be a part

of or separate from National Institutes of Health (NIH) but the initial \$1 billion startup funding was approved by Congress.

Population health

The U.S. has poor overall population health, which is one of many reasons why it had a high death rate with the onset of the COVID-19 pandemic. Investing in a society that supports wellbeing will be an integral part of making the population more resilient in the future. Health status is a product of more than health insurance and medical care - things like safety, housing, education, transportation, and nutrition all impact a person's health outcomes.³⁷ Federal agencies like the Departments of Education, Health, and Housing should collaborate to address social determinants of health, including housing, education, and other things that health outcomes depend on. States should be given more authority to spend Medicaid dollars on housing and other social determinants that can reduce health care expenditures.

Infrastructure

Federal, state, and local government officials should support genomic surveillance, including monitoring of wastewater and air quality, and develop ways to signal severity, like storm warnings, of emerging pathogens or variants. Some localities in the U.S. and abroad have been able to use wastewater surveillance to measure the virus's prevalence in a community. Wastewater surveillance gives communities real time information about the spread of a pathogen and help prepare health care systems for surges in demand.

CONCLUSION

The legislation lawmakers have introduced to address the weaknesses in the United States' pandemic preparedness is a good first step. However, without building resilient infrastructure, nimble manufacturing, and fast responding government, we risk being prepared for the last pandemic rather than the next one. With so much uncertainty surrounding pandemics, it will be paramount that the government works to partner with industry to be more agile in evolving situations.

COVID-19 exposed many weaknesses in U.S. pandemic preparedness. To be more resilient, the government needs better data, better communication, and to invest in long-term strategies that will improve health outcomes. Standardizing data collection, coordinating across agencies, and investing in public health initiatives that make the population more resilient to communicable diseases will improve pandemic preparedness.

But the next pandemic is unlikely to look like COVID-19. This is why it is important that the government invest in strategies and infrastructure that will allow for a more nimble response. The federal government alone cannot respond to a fast-moving pathogen and needs the relationships and programs to partner with states and companies to react on the ground. Investing in R&D, domestic medical supply chains, and public health infrastructure will better prepare the U.S. for future pandemics.



ABOUT THE AUTHOR

Arielle Kane is the director of Health Policy at the Progressive Policy Institute. Her research focuses on what comes next for health policy in order to expand access, reduce costs and improve quality.



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PROGRESSIVE POLICY INSTITUTE 1156 15th Street NW Ste 400 Washington, D.C. 20005

Tel 202.525.3926 **Fax** 202.525.3941

info@ppionline.org progressivepolicy.org