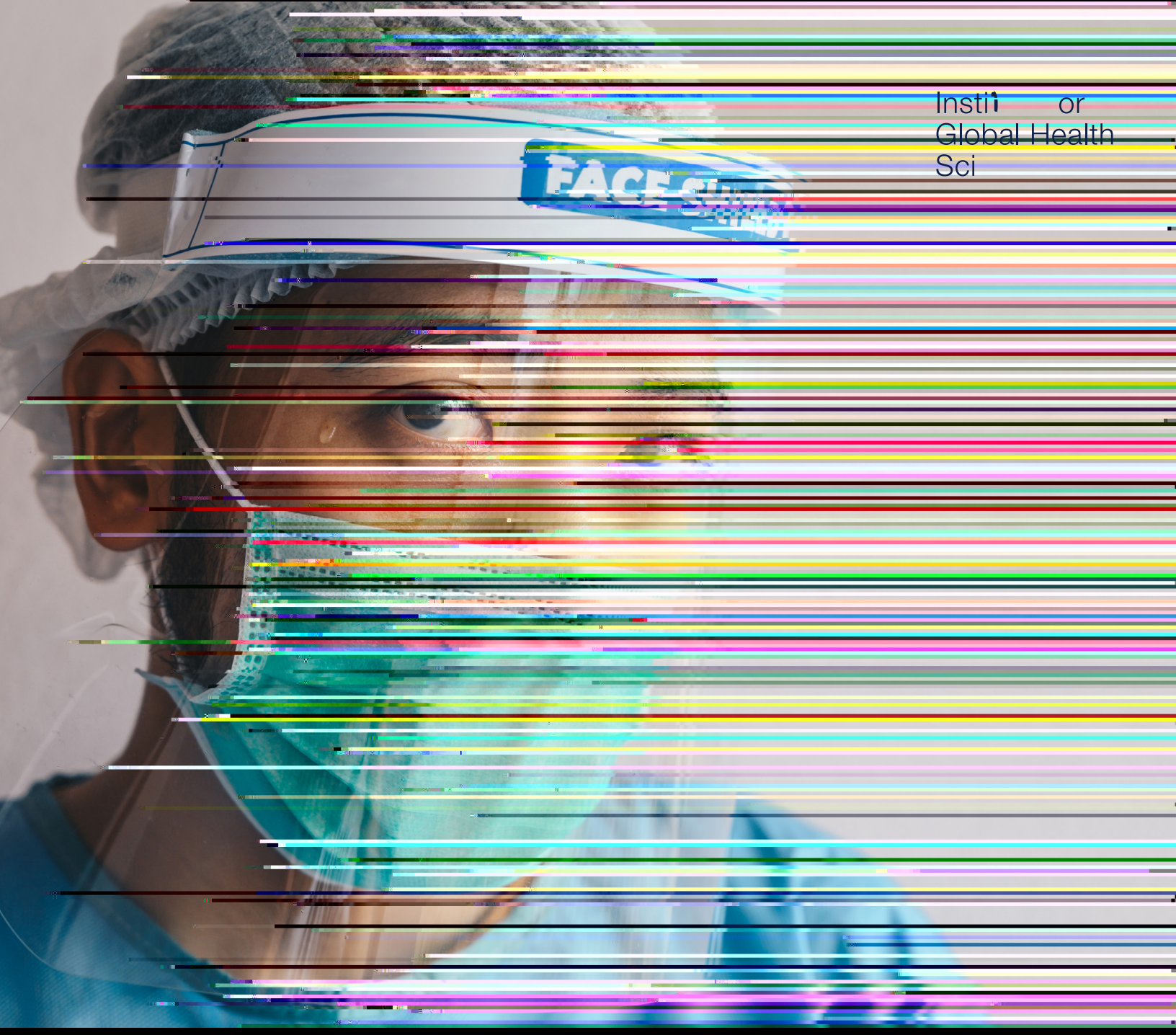

Institute for Global Health Sciences

The United States' Response to COVID-19: A Case Study

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Preface

One year ago, the WHO declared COVID-19 a pandemic. History will surely consider 2020 as the most calamitous year in health since 1918, when influenza swept the globe. It will also be remembered as the worst economic crisis since the Great Depression. The social consequences of this pandemic will be felt for a long time to come.

The pandemic has affected everyone on the planet, directly or indirectly. So far over 10% of the global population has been infected. With over 10,000 deaths per week, COVID-19 is now the third main cause of death globally; and an estimated 4 million deaths from this pathogen are expected by July of this year. These numbers are likely to be a significant underestimate of the morbidity and mortality and caused during this disease.

Not all regions of the world have been similarly affected. Some countries have performed much better than others. Understanding what elements made a difference and what lessons can be derived is the object of our case study.

Abbreviations

ACA	Affordable Care Act
AI/AN	American Indians and Alaska Natives
BARDA	Biomedical Advanced Research and Development Authority
CARES	Coronavirus Aid, Relief, and Economic Security Act
CDC	Centers for Disease Control and Prevention
CMS	Centers for Medicare and Medicaid
EU	European Union
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
GDP	Gross Domestic Product
HHS	Health and Human Services
ICU	Intensive Care Unit
IHR	International Health Regulations
IHS	Indian Health Services
IPPR	Independent Panel for Pandemic Preparedness and Response
JHE	Joint External Evaluation
LTCF	Long-term Care Facilities
MERS	Middle East Respiratory Syndrome
mRNA	Messenger Ribonucleic Acid
NGO	Non-governmental Organization
NIH	National Institutes for Health
NPI	Non-pharmaceutical Interventions
NSC	National Security Council
OECD	Organization for Economic Co-operation and Development
OWS	Operation Warp Speed
PCR	Polymerase Chain Reaction
PPE	Personal Protective Equipment
RCEP14	Regional Comprehensive Economic Partnership 14
SARS	Severe Acute Respiratory Syndrome
SPAR	Self-Assessment Annual Reporting
U.K.	United Kingdom
U.S.	United States
USCIS	U.S. Citizenship and Immigration Service
WHO	World Health Organization

Conclusion #1

The United States lacked effective political leadership in its COVID-19 response at the federal level. Leadership at sub-national levels was highly variable.

Conclusion #2

The U.S. failed to act early and decisively in combating the virus. Critical delays and poorly executed basic public health interventions, compounded by chronic underinvestment in public health, were key contributors to the staggering number of cases and deaths.

The underinvestment in public health continued in 2020 with only 1.6% of Congressional emergency appropriations targeted to public health agencies for epidemic control.

Recommendations

Response: For COVID-19	Preparedness: For the Next One
• Effective collaboration between federal, state and local levels, with clearly defined roles and responsibilities. • Fully staffed National Security Council Directorate for Global Health Security and Biodefense.	• Legislation granting emergency powers and funding to mobilize a rapid, coordinated, federally-led response during public health emergencies. • An apolitical architecture for key public health institutions such as the Centers for Disease Control and Prevention and the Food and Drug Administration. Consider Federal Reserve model.
• Substantial additional federal monies for pandemic control, including for widespread community surveillance, rapid antigen testing, supported isolation and quarantine, genotypic surveillance, and vaccine roll-out. • Robust testing infrastructure to scale-up public health surveillance. Consider public-private testing consortium modeled on Canada. • Expanded mask mandates and public education to promote importance of mask wearing. • Investments in safe reopening of schools and childcare facilities, including federal funding for infrastructure improvements, and for rapid testing and priority vaccination of teachers and staff. • Investments in supported isolation and quarantine programs, which provide financial and social support to those who are infected or have been in contact with an infected person. Include options for conditional cash transfers, paid institutitnsrperson. Itiono	

Conclusion #3

Immigrant, Black, Latinx, American Indian/Alaska Native populations, and those living in poverty, have suffered disproportionately from the COVID-19 pandemic.

Recommendations

Response: For COVID-19

Preparedness: For the Next One

Conclusion #6

U.S. commitment to vaccine development has been a defining success. Slow initial rollout and the absence of

Recommendations

Response: For COVID-19 **Preparedness: For the Next One**

require transformational leadership, with swift and competent execution of sound policies, backed by significant investments.

This case study of the U.S. response to the COVID-19 pandemic was commissioned by the World Health

4/24/20 **50,000 U.S. Deaths Confirmed**

5/15/20 Operation Warp Speed is launched to begin development of vaccines for SARS-CoV-2.[40]

5/27/20 **100,000 U.S. Deaths Confirmed**

7/9/20 WHO announces COVID-19 can be airborne after more than 200 scientists sign a letter urging the organization to

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7/15/20 The White House requires all hospitals to bypass CDC and send COVID-19 data to Health and Human Services (HHS).[43]

7/20 – 8/20 Advance purchase agreements are signed with Pfizer, BioNTech, and Moderna for large supplies of vaccines, contingent on successful Phase 3 trials.[44,45]

8/7-16/20 Large rally of motorcyclists in Sturgis, North Dakota becomes “superspreader” event.[46]

8/25/20 CDC issues guidelines recommending exposed people who are asymptomatic do not need testing. CDC's scientific review process later reverses this guidance.[47,48]

9/14/20 U.S. airports are instructed to stop redirecting passengers from certain ‘hotspots’ and to stop screening international travelers.[49]

9/22/20 **200,000 U.S. Deaths Confirmed**

9/26/20 White House Rose Garden gathering for new Supreme Court justice becomes a superspreader event.[50]

10/2/20 President Donald J. Trump tests positive for COVID-19 and receives an array of advanced treatments, includ-ing monoclonal antibodies, remdesivir, oxygen and steroids.[51]

10/5/20 President Trump is discharged from the hospital. In subsequent days, he reassures the American public saying, “Don’t be afraid of COVID”, and “You catch it, you get better, and you’re immune.”[52,53]

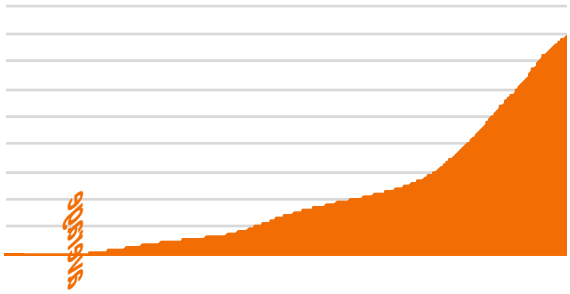
10/28/20 White house announces free future COVID-19 vaccines for U.S. citizens.[54]

12/11/20 Emergency use authorization is granted for Pfizer-BioNTech vaccine.

Figure 1C shows the 7-day rolling average for incident cases in the three geographic regions. Following spring surges in both the U.S. and EU, the EU was able to control transmission during the summer months, while the U.S. continued to experience high transmission rates throughout the summer. While both regions suffered major surges in the fall and winter, the U.S. surge was much greater. By contrast, having contained community spread early in the pandemic, the RCEP14 had consistently low case incidence rates throughout the year.

As Figures 1A–D illustrates, while the U.S. performed somewhat worse than the EU in 2020, it performed dramatically worse than the RCEP14. This is remarkable given the extreme diversity of RCEP14 countries, from Laos to Japan, and Australia to the Philippines. As discussed in this report, these large differences do not stem from the fundamental biology of the virus or its human victims, but from the critical nexus of leadership, policy, execution, and compliance.[58] These differences in performance are not merely of scientific interest – they translate into hundreds of thousands of human lives saved or lost. If the U.S. had the same cumulative deaths/million as the RCEP14 over the last year, a staggering 428,000 American lives would have been saved by the end of January 2021.

Figure 1. Regional analysis United States, European Union, RCEP 14



Testing in the United States

Testing is important both to understand the scale of the

Figure 3. State analysis for Arizona, California, and Washington

A: Cumulative COVID-19 cases per million

B: Cumulative COVID-19 deaths per million

C: Daily new COVID-19 cases per million, rolling 7-day average

D: Daily new COVID-19 deaths per million, rolling 7-day average

While California and Washington managed to slow transmission during the summer months, Arizona experienced a summer peak followed by an even higher winter peak, which rose to more than 1300 cases/million per day (Figure 3C).

These patterns indicate starkly different outcomes between states by the end of 2020, translating into many lives saved or lost, and pointing to major differences in the performance of state governments and agencies.

COVID-19 has exploited existing disparities in health outcomes in people of color, immigrants and low-income individuals. These historical disparities are multifactorial and rooted in systemic racism, including lower education attainment, fewer employment opportunities, and unequal access to health coverage and medical care.[66,67,68] Almost a quarter of Black and Latinx Americans live in multigenerational homes with crowded conditions efficiently fueling viral transmission.[69] Poverty and occupational hazards are also more pronounced in these communities, with many employed at low paying essential jobs, such as factory work or grocery stores, placing them at higher risk of infection. Lacking employment benefits and protections, isolating and quarantining is often financially infeasible. For example, only 46% of Latinx workers have employer paid sick leave, compared to 67% of White workers.[70,71] In addition, disadvantaged communities experience higher rates of comorbidities, placing them at additional risk for severe COVID-19.[72,73]

Despite higher demand for testing in minority communities due to higher infection rates, one study found that these communities tended to live in "testing deserts."[74] Zip codes where the population is 75% or more White, had an average of one test site per 14,500 people; whereas zip codes with 75% of residents who are people of color, had one test site per 23,300 people.[74]

When adjusted for age, differences in outcomes for Black, Latinx, and American Indian and Alaska Native communities are pronounced (Table 1). Members of these communities were 3.7 to 4.1 times as likely to be hospitalized as White Americans, and between 2.6 to 2.8 times more likely to die from COVID-19.[75] With a history of disenfranchisement, American Indian and Alaska Native communities in particular have experienced poor outcomes (Box 1).[75]

Table 1. Age adjusted COVID-19 cases, hospitalizations, and deaths, by race/ethnicity, January 2021[7]

Rate ratios compared to White, Non-Hispanic persons	American Indian or Alaska Native, Non-Hispanic	Hispanic or Latino	Black or African American, Non-Hispanic
Cases	1.8 x	1.7 x	1.4 x
Hospitalizations	4 x	4.1 x	3.7 x
Death	2.6 x	2.8 x	2.8 x

Modeling suggests that the long-term consequences of this epidemic will be devastating for disadvantaged communities, widening gaps in life expectancy.[76] A recent study estimates that reductions in life expectancy in 2020 in Black and Latinx populations are likely up to four times those in White populations (Figure 5).[4]

Figure 5. Projected trends in life expectancy by population[4]

American Indians and Alaska Natives (AI/AN) have suffered greatly in this pandemic.[77] Though leadership of many tribal communities was strong and proactive, baseline disparities in healthcare embedded in histories of neglect, erasure, under counting, and structural

Chapter 3: Leadership

Countries that successfully controlled cases and

On January 29, 2020, a White House Coronavirus Task Force was created with political appointees at its helm, first the Secretary for HHS and, a month later, the Vice President. This sent a clear signal that the Trump administration would lead the COVID-19 response, not public health experts at the Centers for Disease Control and Prevention (CDC).

Despite the need to act quickly, the Task Force did not produce a national plan until March 11, by which time community transmission was well established, and New York was in the midst of a deadly outbreak.[109] Despite evidence from other coronavirus outbreaks (SARS and MERS), the national plan was adapted from an influenza pandemic strategy, which did not account for potential differences in transmission and clinical sequelae of these very different viruses.

The Trump administration, however, abdicated this responsibility and passed it to state governors.[123] The dangers of this approach were quickly apparent in extreme shortages in supplies from reagents and vials for test kits, to PPE to safeguard health workers. Governors were instructed to fend for themselves, leaving states to compete with each other on global markets.[124] For example, as the U.S. struggled to produce sufficient test kits in late April, Maryland's Republican first lady brokered a deal with her native South Korea to secure 500,000 test kits and had them flown directly to Maryland in "Operation Enduring Freedom." Remarkably, the Federal Emergency Management Agency (FEMA) also began competing with states on the global market, confiscating PPE ordered by states, and creating what was dubbed a "war" for medical supplies.[125] It was not until the end of March, over two months into the U.S. epidemic, that the Defense Production Act was finally invoked.[126]

Without clear federal guidance, states developed individual strategies which, in the midst of a deeply polarized national political environment, seemed to coalesce along partisan lines.[127,128,129] Some states took a lead in implementing shelter-in-place or 'lock-down' strategies that closed businesses, shut schools,

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Since viruses don’t respect boundaries, national governments must work to create more robust systems of global governance that can enhance and support national responses to increasingly frequent global threats. This requires going beyond international collaboration and moving towards greater financial and leadership commitment to strengthen international early warning and response structures.

Two things are clear. First, a new global architecture is needed to respond to and prepare for pandemics. Some would argue for a reformed and more focused

Chapter 4: Economics and Finance

Politicians in the United States presented the American people with a false choice between keeping the public safe and healthy, and keeping the economy open. The

preventing many business failures.[148] However, when some of the support measures from the CARES Act ended in August 2020, an estimated additional 8 million were people plunged into poverty.[149]

As large as the stimulus packages were, they were insufficient to compensate for a chronically weak social safety net. As 2020 ended, the American Policy Institute reported that almost 27 million Americans were either unemployed, under-employed or had dropped out of the workforce.[150] Food insecurity doubled overall and nearly tripled for families with children. Black (36%) and Hispanic (32%) households were hit much harder than White households (18%), reflecting chronic inequities in access to food.[151]

Americans Are Not Suffering Equally

Small firms, which account for 99% of all businesses in the U.S. and employ almost half of private sector workers, were hit particularly hard by the many lockdowns imposed to control viral spread.[152] Sectors most affected by COVID-19 lockdowns, including accommodations, food services, education, arts and entertainment, and recreation, comprise a high proportion of small businesses and employ a disproportionate share of low-wage workers whose livelihoods were most severely disrupted.[153]

While White and Black households suffered a similar fall in median income during the Great Recession, White households recovered faster, increasing wealth by 1% between 2010 and 2013, while wealth for Black households continued to fall, exacerbating already high wealth inequality. This left Black households more vulnerable to the income shocks of the COVID-19 crisis.[154]

As Figure 7 illustrates, lower income workers, many with few employment protections, disproportionately bore the economic pain of the pandemic. Forty percent of Black and 43% of Hispanic adults reported having to use their retirement or savings to cover basic household expenses, compared to 29% of White adults. A third of all Black adults said they had to resort to a food bank to feed themselves and their families, 150

In June 2020, Congressmen Castro (Democrat–Texas) and Beyer (Democrat–Virginia) released a Joint Economic Committee report evaluating the impact of the pandemic on immigrants, finding that this population experienced higher rates of job loss in 2020 than native-born workers. Between February and April, employment fell 21%, from 28 million to 22 million for foreign-born workers in the U.S., with losses mainly in the education, hospitality, and healthcare sectors.[159]

Under the CARES Act passed by Congress in March 2020, the Migration Policy Institute estimates that 14.4 million immigrants and their families were ineligible for the Economic Impact Payments (Figure 9).[160] The Congressional Joint Economic Committee places this estimate higher, at 15.4 million immigrants ineligible for payments.[159] For households filing taxes jointly, if any family member used an Internal Revenue Service-1mi ds 5Idinvi9mi g neligible

Targeting the Virus

While the income support to households and businesses was unprecedented, the amount of additional monies allocated to controlling the virus itself, was a mere 1.6% of new Congressional appropriations. The Kaiser Family Foundation estimates that only about $61 billion of the $3.7 trillion in the stimulus packages was targeted for public health activities, including surveillance, testing, contact tracing, epidemiology, vaccine distribution, and other mitigation strategies. More than 60% of these monies were stipulated as pass-throughs from the CDC to states, localities, territories, and territorial and tribal public health departments (The appendix contains details of the public health specific appropriations in 2020) and includes references: (The appendix contains details of the public health specific appropriations in 2020 and includes references).

The low level of spending focused on public health was

through providing financial support to interested states wishing to take isolation seriously, and second through a large-scale pilot effort at the national level.

To illustrate what might be achieved, we provide illustrative estimates of the costs and benefits of an expanded testing and supported isolation program in the U.S. Drawing from Chen et al, the numbers conveyed are for a full national program in a time of high transmission and are illustrative and approximate.[175] Based on 10 million cases (approximately the number of cases reported in January 2021), a full-scale program would require expenditures of $26 billion per month ($7 billion/month for testing using cost estimates from Mina;[177] $4 billion per month for support of home-based isolation; and $15 billion/month for institutional isolation).[178]

These expenditures would translate to roughly $5000 per infection averted and $1 million per death averted. We assume conservatively a case fatality ratio of .5% and that each isolation would avert one new infection. We also assume a 40% participation rejection rate. As a point of reference, the value of a statistical life is estimated at $10 million, consistent with U.S. Office of Management and Budget guidelines for public sector investment evaluation.[179] Hence, the benefit to cost ratio would be on the order of 10 to 1. More importantly, a program at this scale could avert several million new cases per month preventing the potential for considerable longer-term disability.

Supported isolation at this scale, together with mask mandates and social distancing, could readily replace lockdown measures, with significant economic benefits helping to defray or outweigh the costs of the program. The relevance of an ambitious supported isolation program in a time of aggressive vaccine roll-out remains to be determined, but is worth pursuing, particularly for cases with confirmed infection by a variant for which current vaccines may have lower efficacy.pio o]rsuCOVID- ca D (pi4)]TJ Tc 22.5mngm,m ( )]TJ0 -1.2

Citizenship and Immigration Service (USCIS) issued a public charge rule stating that immigration status and path to citizenship may be jeopardized if an immigrant receives public benefits, including health care, long-term care, cash assistance programs, and nutrition and housing services.[192] While emergency Medicaid enrollment was exempt from this ruling during the pandemic, little effort was made to communicate this amendment to immigrant communities.

Chapter 5: Public Health Measures

> "When something like this happens, you're moving quickly. By early February, we should have triggered a series of actions, precisely zero of which were taken."
>
> – *Ronald Klain, former White House Ebola Response Coordinator*[10]

A popular narrative in the public health profession and in media commentary, is that the main cause of the weak response to COVID-19 in the U.S. was poor government leadership and political interference at federal and state levels. In this chapter we draw attention to missteps by public health agencies that contributed to the severity of the COVID-19 epidemic in the U.S.

At the earliest signs of a potential epidemic, it is critical to isolate and characterize the pathogen, rapidly develop and deploy diagnostic tests, and implement large-scale surveillance to track the spread of both asymptomatic and symptomatic cases. The U.S. had ample warning of the virus before it was first detected on its shores. On December 31, 2020, the WHO became aware of unusual pneumonia cases in China. Chinese scientists isolated the virus 8 days later, followed by a published SARS-CoV-2 genome on January 11.[193,194195]

On January 3, the director of China CDC called his counterpart in the U.S., to warn him of a rapidly spreading pathogen. A few days later, CDC scientists based in Thailand notified their U.S. colleagues they had deployed a diagnostic test to track infections.[196] Yet more than a month passed before the CDC was able to widely distribute a functional test to track transmission in the U.S.[197] During these crucial weeks, the virus had spread undetected. For reasons that have been elaborated by several sources, the CDC failed to adopt existing tests and chose instead to create its own test kits, which were later found to be contaminated (Box 3).[196]

The first reported infection was identified in Seattle on January 20, 2020.[12] In February, due to problems with CDC test kits, the University of Washington created its own assay, obtained FDA approval, and was able to quickly identify community spread. Initially the CDC required that all samples be sent to its Atlanta headquarters, creating bottlenecks in testing and results reporting. Initial testing guidelines restricted testing to those with symptoms who had traveled from China, which allowed the virus to silently spread through communities. The CDC also stopped reporting the number of tests performed on March 1.[196] By March 11, the U.S. had tested only 23 people/million while South Korea had tested over 3600/million.[198] And while test results in South Korea were available within 24 hours,[199] test results in the U.S. often took more than 7 days, limiting their utility for transmission control.[200]

The failure in testing and surveillance may have contributed to the severity of the first major epidemic in New York in March,[204] during which nearly 17,000 people died in six weeks.[224] As COVID-19 spread unmitigated, shelter-in-place orders or “lockdowns” as they were called, were implemented across the U.S., which led to large-scale closures of non-essential businesses and of schools (Box 4). hl.2 Tj20na,734.7181 Tme

Even within the same state there was considerable county-level variation in whether lockdowns were implemented, how long they were in place, and what they included, as the map of Texas shows (

Quarantine orders are also legally enforceable and are mandatory for a minimum of 14 days for all suspected COVID-19 patients. They may be ended only when permitted by the public health office.[239,240]

Employers are required to pay for up to six weeks of mandatory isolation or quarantine. State governments reimburse employers for any payments made to employees while employees were under isolation or quarantine, and unable to work.[243] Self-employed and gig workers who aren't allowed to work while under mandatory isolation or quarantine, can apply for compensation directly from the state, with payments to these individuals based on prior year tax returns.[244]

was done. The initial unequivocal rejection of mask usage caused public confusion and a subsequent partisan divide on the issue. Mask requirements became a rallying cry for some Americans who claimed civil liberty violations, rather than simply accepting masks as a useful tool for controlling transmission.

Fortunately, many state, county and local public health departments diverged from federal guidelines and instituted mandatory mask policies early in the pandemic. This allowed a natural experiment, which showed measurable differences in COVID-19 case rates in states with mandatory mask orders versus those without them.[265,266,267]

Banning Large Gatherings and Events

Crowding indoors, particularly in poorly ventilated spaces, creates the ideal scenario for COVID-19 transmission. Interaction between people is the most important facilitator of COVID-19 spread, with close exposure to respiratory droplets or aerosols as the driving mechanism. Studies indicate that it is likely that 10%–20% of people are responsible for over 80% of cases.[268] Unfortunately, these "super-spreaders" can be pre-symptomatic or asymptomatic and are therefore more likely to be out of their homes and interacting with the public than symptomatic patients.

Sporting events, conferences, church services, concerts, university dormitories and political rallies provide perfect settings for viral spread. Restricting such gatherings and events is a basic measure for COVID-19 control and has been widely adopted by countries that have successfully limited transmission. In Germany, an early ban on large gatherings is estimated to have reduced transmission by as much as 40%.[269] Failure to impose national restrictions on gatherings led to a number of now notorious super-spreader events such as the Sturgis Motorcycle Rally, a choir practice in Washington State, and a funeral in Georgia.[270]

The U.S. track record in this area is mixed. The CDC recommended rescheduling large gatherings during the initial national lockdown in March 2020.[271] Since then, it has published a list of "considerations for events and gatherings"[272] for local authorities to review and has developed a tool for evaluating preparedness for gatherings. This guidance stops well short of recommending bans on events and gatherings. Some states have allowed large public gatherings to continue unrestricted, while others have not placed limits on the number of people who can gather but require event organizers to enforce social distancing practices.[273] Yet other states and counties have adopted strict controls on gatherings and events. For example, as cases rose in California, San Francisco prohibited gatherings with anyone outside of one's household. From November to December, Washington State restricted outdoor gatherings to 5 people, and prohibited indoor gatherings unless attendees had quarantined for 14 days prior.[273]

Research shows that obeying social distancing rules is a partisan issue, with COVID-19 risk perceptions dependent on political affiliation.[274,275] Gollwitzer et al used geotracking used geotracking data from 15 million cell phones per day in 3,025 counties to show that counties that voted for then candidate Trump in 2016 engaged in 14% less physical distancing than those that voted for Hillary Clinton.[276] The study also showed correlations between consumption of conservative media and decreased physical distancing. These partisan differences in social distancing were reflected in cases, with 'right' leaning counties experiencing higher rates of COVID-19 infections.[276]

Border Control Policies

Modeling suggests that early travel bans, in conjunction with local public health measures, may have been effective in slowing community spread in China.[277] Early and rigorous travel bans, combined with strict quarantines of incoming travelers and measures to track and isolate positive cases, have contributed to COVID-19 control in a number of countries.

The U.S. implemented travel restrictions for people originating in China on January 31, 2020. Despite this, nearly 40,000 passengers from China entered the U.S. between February 2 and April 4.[278] In March, the U.S. also restricted travel from Iran, the European Schengen area, Ireland, the United Kingdom, and Brazil, and suspended issuing routine visas for these countries at all U.S. embassies and consulates.[279] These measures may have been useful if implemented early in the pandemic or between U.S. states when the disease appeared to be largely restricted to the Northeast region.

While many Asian and African countries implemented early screening at airports, the U.S. never consistently instituted these policies as part of a comprehensive public health response.[280] With new more transmissible strains emerging in many parts of the world, implementing strong border checks now may be effective in reducing or slowing the spread of new variants. On January 12, 2021 the CDC issued an order requiring all international travelers to show a negative pre-departure test for the virus or proof of recovery from a previous infection.[281]

Regular genomic sequencing for surveillance of SARS-

the likelihood there will be mutations that confer evolutionary advantages to the virus. Robust genomic sequencing and epidemiology programs can ensure that new variants, particularly ones that can escape vaccine immunity, do not spread undetected through the U.S.

Despite having the largest COVID-19 outbreak in the world, the U.S. has not invested in a strong SARS-CoV-2 genomic surveillance program. In May, the CDC created the National Open Genomics Consortium (SPHERES)[282] in conjunction with academia and industry, but never built a national infrastructure for large-scale sequencing.[214,215] As of January 2021, the U.S. ranked 38th out of 130 countries on national genomic sequencing.[214] Informed by experience with prior infectious disease outbreaks, many less wealthy countries like Gambia, Equatorial Guinea and Sierra Leone have higher sequencing rates than the U.S.[215] Admittedly, these countries have had fewer reported cases than the U.S., but they also have considerably more constrained laboratory capacity. Recent data show that until January 15, the U.S. had sequenced as few as 0.3% of COVID-19 infections[214] compared to nearly 5% for the U.K., 12% for Denmark, and 60% for Australia.[283]

Without dramatically increased surveillance of emerging variants, the U.S. may soon find itself where it was a year ago during the initial emergence of SARS-CoV-2 – "flying blind."[214]

The response to COVID-19 has been impeded by a historically siloed approach to emerging infectious disease threats, with insufficient collaboration across disciplines and stakeholders. Rather than focus solely on human-specific public health preparedness and responses, future efforts must be reoriented to emphasize disease prevention, leveraging a multi-disciplinary One Health approach that focuses on bio-surveillance at the human-animal interface. Using lessons learned from this pandemic, roadmaps for a One Health approach should be developed with local and state public health actors. Efforts at national and international levels, should focus on designing plans to engender trust across sectors, and among public and private entities.

Chapter 6: Communications, Trust and Engagement

Due to the rapidly spreading nature of a pandemic, mitigation measures to stop transmission require strong trust between the government and the people. The public must believe that the government will act in their best interest to prevent unnecessary mortality, morbidity and economic distress. Clear and reliable information, in conjunction with medical, economic and social protections, serve as a foundation for public trust in government during emergencies. A trust deficit in the U.S. had been identified in 2019 as a risk factor that could lead to a poor pandemic response. Despite being ranked #1 on the Global Health Security Index[284] for overall pandemic preparedness, the U.S. received the lowest possible score for public confidence in government. In March 2020, the Pew Research Center reported that almost 60% of Americans surveyed did not have confidence in the U.S. government to effectively respond to a public health emergency.[285] During the COVID-19 pandemic, research has shown (Figure 14) that low government trust was associated with higher cumulative COVID-19 death rates.[286]

Figure 14. A comparison of government trust and cumulative COVID-19 death rates[286]

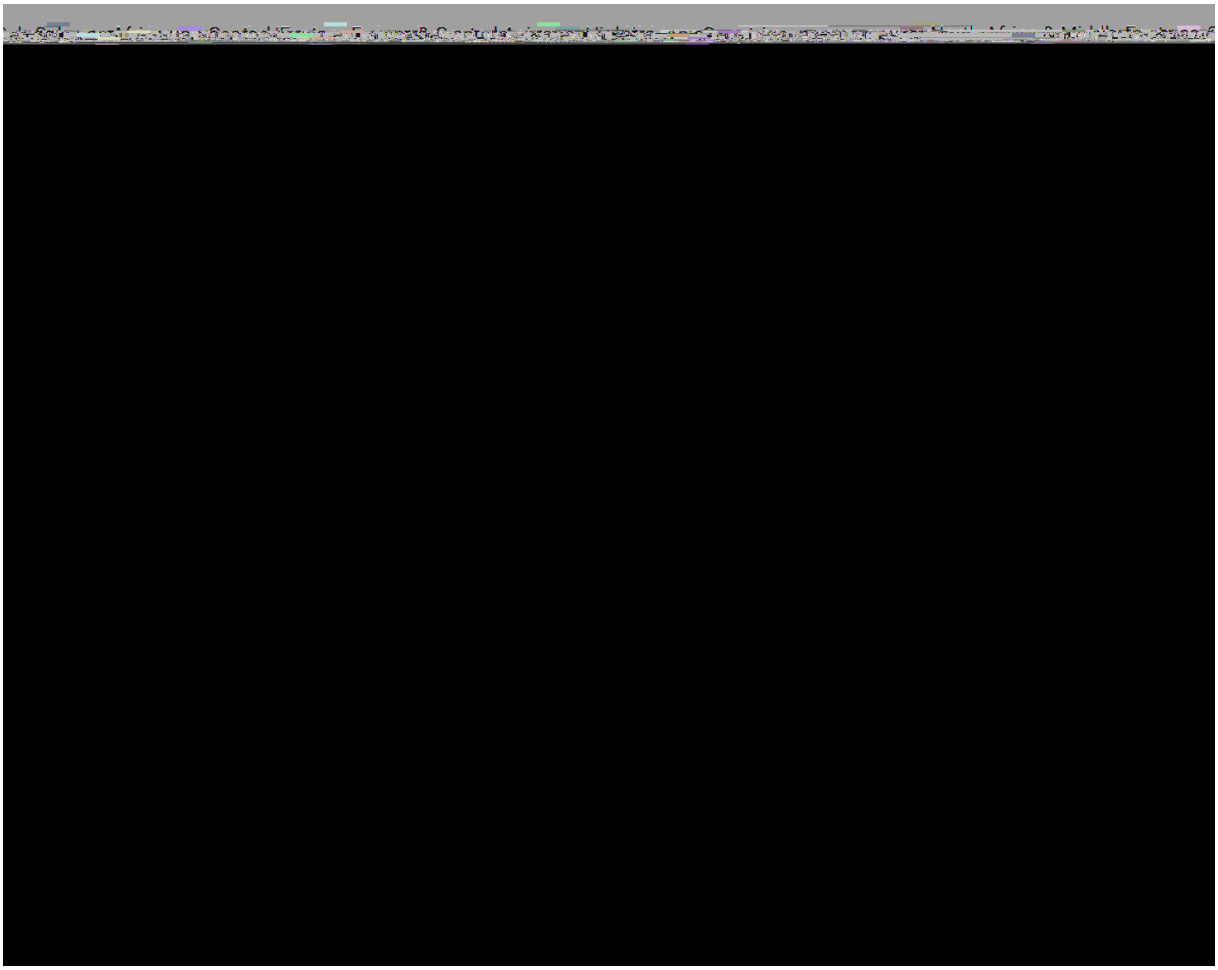


Figure 15. Approval of President Trump's response varies widely by party[287]

Numerous U.S. surveys and polls have shown that confidence in government is highly correlated with political affiliation. While 60% of Americans disapproved of former President Trump's COVID-19 response,[287] significant differences emerged when responses were disaggregated by political affiliation: 75.6% of Republicans approved of the Trump administration's management of the pandemic, compared to 35.6% of independents and 8.2% of Democrats (Figure 15).[287]

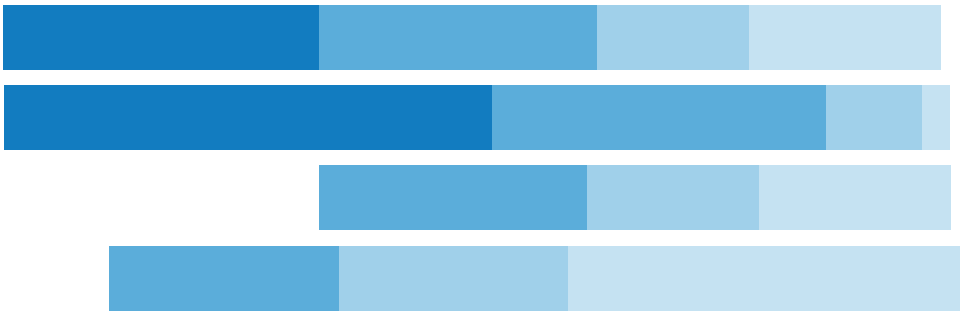
A recent survey regarding public trust in reliable vaccine information showed that 73% of respondents had trust in the CDC overall;[288] when disaggregated by political affiliation, however, 88% of Democrats and only 57% of Republicans trusted the Agency. Surveys also suggest that political affiliation is more predictive of vaccine hesitancy than any other factor, with 42% of self-identified Republicans reporting they would not get vaccinated.[288] Building and repairing government trust will be essential to improving adherence to public health measures and supporting stronger public engagement for COVID-19 control.

> "COVID will be used someday as the worst example of risk communication in the modern era."
>
> – *David Rejeski, Former Director, Wilson Center Science and Technology Innovation Program*[289]

As mentioned previously, reliable, clear, and consistent communication is an essential response tool in public health emergencies. Sharing information in a timely manner, and using language that is accurate, transparent and empathetic, is the foundation of strong health communication strategies. Kim and Kreps note that the "role of government [communication is] to unify and motivate public groups during national emergencies to promote health risk prevention, response, and recovery from severe damage."[290] Effective communication is necessary for building public trust and ensuring cooperation and adherence to public health measures. There is no doubt that conflicting messages from national leaders, state governors and public health experts sowed considerable confusion in the minds of the American people.[138]

Messages from Heads of State are amplified during times of crisis. While medical and scientific experts were raising the alarm that COVID-19 was spreading through the U.S., the White House presented the narrative that the virus was a minimal risk to Americans. Early in the pandemic former President Trump repeatedly remarked that COVID-19 "was under control" and "just like the flu,"[291] despite admitting later on, "I wanted to always play it down. I still like playing it down. Because I don't want to create a panic."[292] Even when he announced federal recommendations for U.S. citizens to wear masks in early April, he immediately undermined the advice by adding "I am choosing not to do it."[293] He also made scientifically unsound and sometimes dangerous comments that had real world implications. For example, during an April press briefing former President Trump raised the possibility of inhaling or ingesting bleach to treat COVID-19. Calls to Poison Control centers for disinfectant ingestions increased

How worried are you, if at all, that the U.S. FDA will rush to approve a coronavirus vaccine without making sure that it is safe and effective due to political pressure from the Trump Administration?



Source: KFF Health Tracking Poll (conducted Aug 26–Sep 3, 2020). See topline for full question wording.

Medical professionals were also on the receiving end of former President Trump's misinformation. In October, the President accused doctors and hospitals of filling their own coffers and diagnosing patients incorrectly with COVID-19 to increase case numbers.[296]

In early fall, the former President suggested that he might pressure the FDA to authorize vaccines on an accelerated timeline. Following this announcement, a survey showed that 62% (Figure 16) of Americans were concerned that the administration would rush approval of a vaccine without ensuring its safety.[297,298]

Messaging by the Public Health Experts

> "The urgent issues confronting society require a knowledgeable public able to make choices base on unbiased information – not fear, compulsion or conspiracy theories. Every institution must play its part in restoring facts to their rightful place."
>
> – *Richard Edelman, CEO of Edelman*[300]

With the White House controlling the COVID-19 narrative, the CDC was sidelined from its typical role of official public health communications hub for epidemics and pandemics. During the 2009 H1N1 influenza pandemic, the CDC held 32 out of 35 press conferences in the first 3 months.[301] By contrast, from March to June, the former President led approximately three-fourths of all press briefings on COVID-19.[302]

Chapter 7: Health System Resilience

"Since the coronavirus first appeared in the United States a year ago, our overwhelmed healthcare system and workers have been stressed to the breaking point. Still, they have worked tirelessly to care for victims of the disease and shown resilience."

– *Lewis Nelson, Clinical Chair of Emergency Medicine, Rutgers New Jersey Medical School*[316]

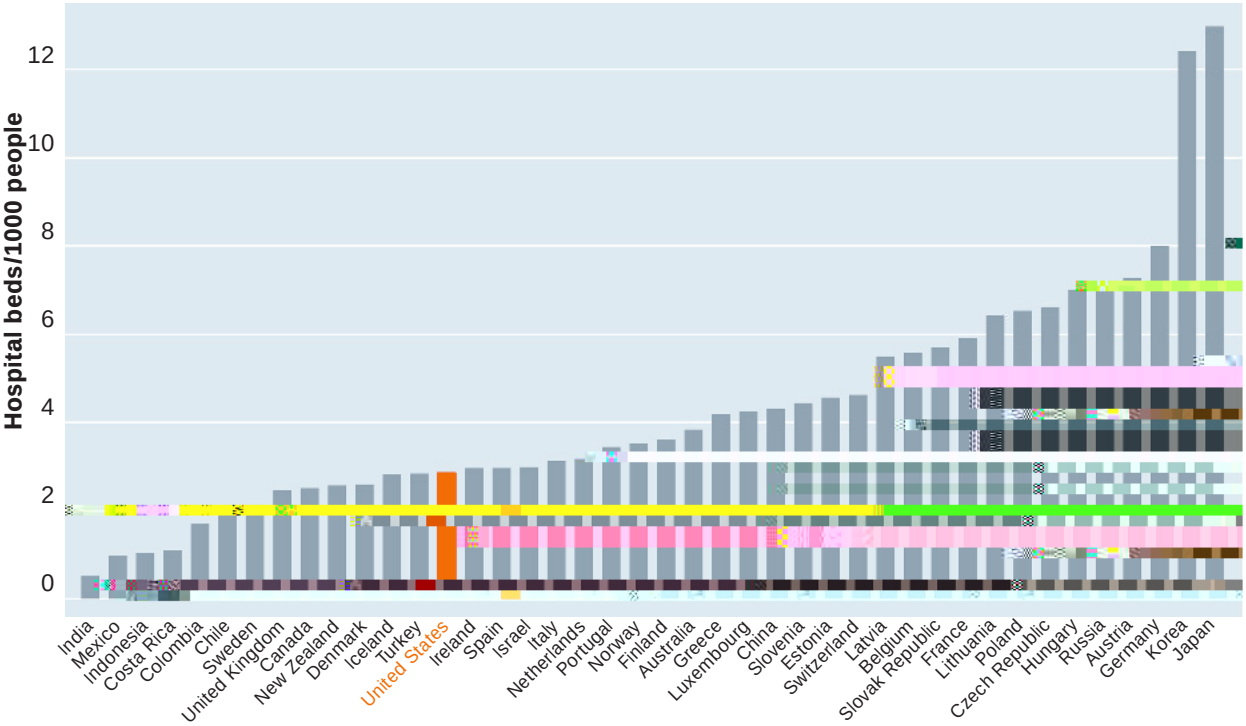
A responsive and resilient healthcare system is critical for effective public health emergency response. Although U.S. hospitals have significant technological and intellectual medical capacity, COVID-19 surges have repeatedly stressed local hospitals and clinics, diminishing health system resiliency. Pressure points have included low bed capacity, a strained workforce, and limited availability of personal protective equipment, medications and oxygen. In this section, we analyze the U.S. healthcare services response to COVID-19 across four domains: healthcare system capacity, human resources, supplies, and vaccine delivery.

Hospitals Pushed to the Brink

"Pandemics are global, but the battle against them is won and lost in local trenches."

– *Council on Foreign Relations*[317]

Figure 17. Hospital beds/1000 people in OECD countries[318]



Despite having the highest health sector spending per capita in the world, the U.S. entered this pandemic with fewer hospital beds per thousand (2.9) than most Organization for Economic Co-operation and Development (OECD) countries (Figure 17). At various times in the pandemic, U.S. hospitals and clinics have faced critical shortages in intensive care unit (ICU) and acute care bed capacity, and the supplies needed to care for patients, including severe shortages in PPE, ventilators, and testing supplies (e.g. swabs, cartridges, reagents).[319]

While hospitals are required to have emergency preparedness and response plans to meet U.S. Joint Commission Accreditation Standards, historically they have received limited funding from the government to bolster their response plans.[320,321] Disaster plans have focused on responding to pandemic influenza and other natural disasters, and not novel pathogens. Hospitals have consistently reported limitations in their ability to respond to emergencies even in areas with

Before the pandemic, 83 million Americans lived in

“I remember a young woman who had a cough in early 2020. Despite feeling ill, she kept caring for her elderly

At the start of the U.S. epidemic, the country struggled to ensure adequate supplies. The Strategic National Stockpile, which contains the emergency supplies to be used by states during epidemics was depleted during the 2009 H1N1 influenza pandemic and never replenished. The stockpile, which once held more than a hundred million N95 masks, only had twelve to thirty million masks for the first surge of the pandemic.[317] Early in the pandemic, the Speaker of the House and president of the American Medical Association called unsuccessfully for invocation of the Defense Production Act,[367,368,369] which would force and incentivize private companies to scale up production of medical supplies. As mentioned above, this Act was not invoked by the President until mid-March, and responsibility for distribution and procurement of PPE was delegated to the states and the private sector, without federal guidance or coordination.[370]

The PPE shortage unmasked U.S. over-dependence on globally sourced PPE. As the world's single largest importer of face masks (33.8% of global supply in 2019), the U.S. was hit particularly hard when China stopped exporting PPE and instead started purchasing from the global supply, initiating a cascade of export restrictions across many countries.[371] This increased the price of surgical masks six-fold and the price of N95 masks three-fold.[372] In the meantime, due to poor coordination, the U.S. continued to export its PPE despite known in-country needs, exacerbating domestic shortages.[371] In certain parts of the country, creative strategies to accelerate alternate production, such as technology companies using 3D printing of masks, helped soften the blow of shortages (Box 10).[373] Despite these efforts supply-demand mismatches continued until the late fall.

The COVID-19 Healthcare Coalition is a U.S.-based private sector platform that leverages technology companies, private healthcare, nonprofit organizations, academics and start-ups to support the COVID-19 response. The coalition has over 900 member organizations, including Amazon, Box, Deloitte, Google, Microsoft, Salesforce, Tableau, Acumen, MIT, Teladoc, Boston Medical Center, and many others. The Coalition's work spans multiple projects, including support for improved supply chains and development of demand allocation models for PPE; support for new PPE technologies; real-time tracking of statewide non-pharmaceutical intervention (NPI) implementation; creation of a policy decision support dashboard; and development of data-driven clinical insights and protocols.[374]

Despite incredible success in vaccine development (described in the following chapter), inadequate logistical planning and a lack of financial support for states beleaguered the initial COVID-19 vaccination campaign, leading to sluggish delivery and inequitable distribution.

Operation Warp Speed (OWS), through the U.S. Department of Defense, was tasked with supporting both development and rapid deployment of vaccines.[375] In September 2020, the Trump administration promised to have 100 million vaccination doses distributed by the end of the year with at least 20 million people vaccinated.[376] By December 31, 2020, only 14 million doses had been distributed and 2.8 million people had been vaccinated, well short of promises.[218]

Operation Warp Speed limited its obligations to acquiring and allocating vaccines, leaving states to develop their own delivery mechanisms.[377] Monies allocated for vaccine distribution were also clearly inadequate at only 2.3% of total OWS funding (Figure 20).[378]

State and local governments, many lacking money and operational capacity, were under-resourced and unequipped to administer a population wide vaccination campaign.[379] This resulted in reliance on hospitals, clinics and private pharmacies to deliver vaccinations. Initial CDC prioritization guidance was overly complicated, with a tiered system that involved multiple layers and phases and was difficult, if not impossible, for most states to implement. States responded by defining their own priority groupings, causing considerable confusion among the public.[380] The hundreds of public and private organizations tasked with vaccine distribution developed widely discordant and often inequitable distribution plans,[381] leading to large inequities by race and ethnic group.[382]

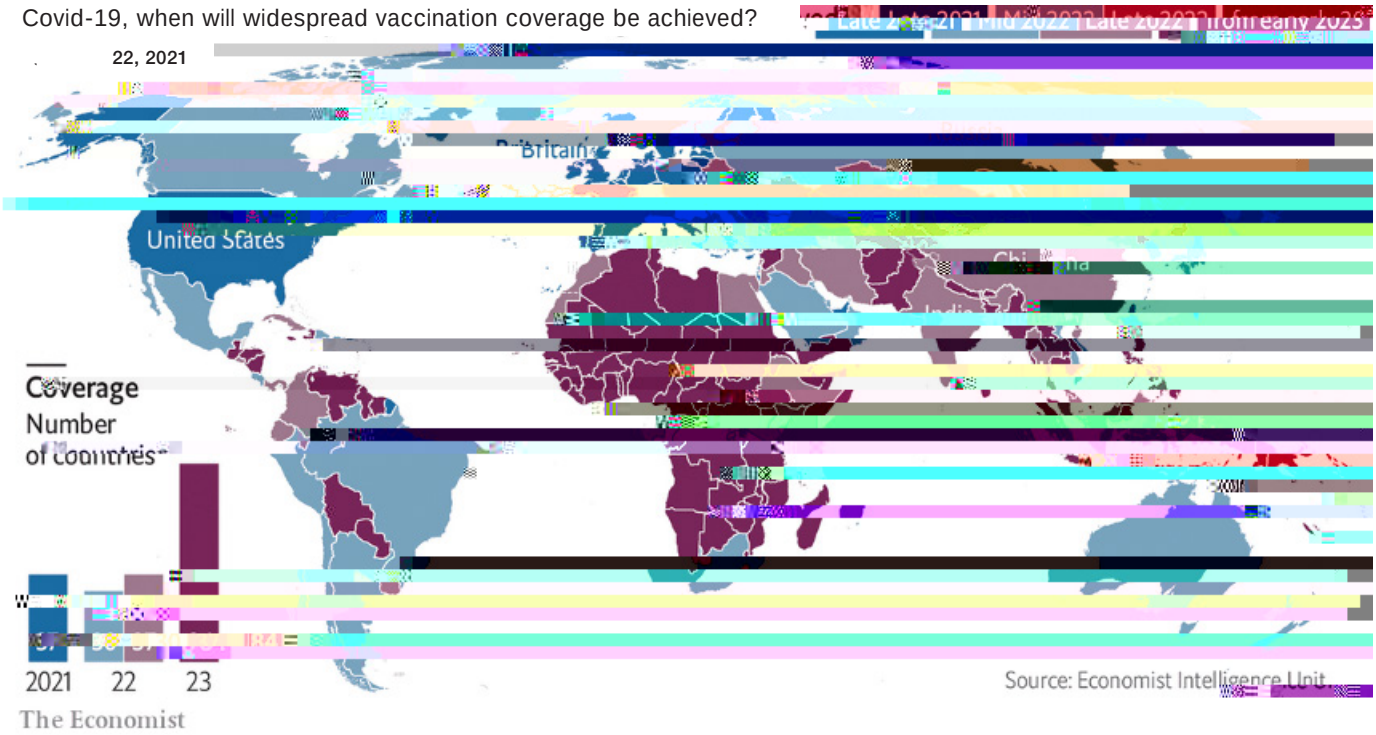
There remains a lack of clarity for the public around how, when and where to get vaccinated. Scheduling vaccine appointments has been difficult in most states, with poorly designed online and phone scheduling systems and long waiting times.[387] A successful vaccination campaign also requires public trust and a willingness to receive the vaccine. In the context of historical injustices by the U.S. medical community, vaccine hesitancy among marginalized groups remains high, with 35% of Black Americans saying they would definitely not or probably not get vaccinated.[288] Surveys of Latinx communities indicate similar, though slightly lower, levels of vaccine hesitancy, with many voicing concerns that the vaccine is unsafe or ineffective.[388] With minimal data on immigrant populations, there are concerns that undocumented immigrants will avoid vaccination out of fear of deportation.[389] Public health leaders have called for greater investment in communication and trust-building in these communities to improve vaccination rates.[390] This includes community engagement by prominent Black and Latinx physicians and scientists such as Dr. Kizzmekia Corbett. Dr. Corbett, a Black immunologist who was involved in Moderna vaccine development, has been a prominent advocate for building trust within the Black community.[391]

At the time of writing, the Biden administration has pledged billions of dollars for vaccine supply and rollout plans, with an initial 200 million doses procured on behalf of states on January 26, 2021, and states reporting dramatic improvements in delivery.[392]

> "The coming year could be a story of two worlds undermining each other. Certain countries will approach herd immunity by vaccinating almost every citizen. Other countries could see mass casualties and catastrophic waves of reinfection—potentially with variants that evolved in response to the immunity conferred by the very vaccines to which these populations do not have access. In the process, these hot spots themselves will facilitate rapid evolution, giving rise to even more variants that could make the vaccinated populations susceptible to disease once again. In a recursive loop, the virus could come back to haunt the vaccinated, leading to new surges and lockdowns in coming years. The countries that hoard the vaccine without a plan to help others do so at their own peril."
>
> – *James Hamblin, journalist & physician*[393]

The U.S. will not be safe from COVID-19 until all countries are safe. The pandemic represents a global security threat that requires a global commitment to immunologic equity. The WHO has proposed plans for equitable global distribution through flexible governance, adequate financing, and evidence-based, collaborative distribution plans.[58,394,395] Howeverd[(4s npulaturnamce,)25 ( )]-11.1

Figure 22. Predicted vaccination coverage by country[397]



“I think we can see light at the end of the tunnel. I believe [the COVID-19 vaccine] is likely the most significant medical advance in the last 100 years, if you count the impact this will have in public health [and the] global economy.”

–

The FDA, the federal agency responsible for approval of vaccine and drug candidates in the U.S., has played a key role in accelerating COVID-19 vaccine authorization. Despite political interference, with pressure from the administration to authorize a vaccine quickly, the FDA maintained stringent requirements to ensure safety and efficacy of vaccine candidates and conducted its own analysis of the entire data set from clinical trials.[413] Although the scientific and regulatory processes required to authorize and approve novel drugs and vaccines can take years, the FDA was able to rapidly evaluate the vaccines using concurrent assessments by FDA scientists and an independent advisory panel. The advisory panel deliberations were live-streamed online, ensuring full transparency of the evaluation process. This assessment of the trial data led to quick consensus on safety and efficacy, with endorsement by the independent advisory panel expediting Emergency Use Authorization by the FDA.[414,415]

Therapeutics: an Ongoing Need

With thousands of daily infections, new therapeutics are urgently needed for COVID-19 treatment and prophylaxis.[416] By October 31, Operation Warp Speed had only committed $2.8 billion to therapeutics compared to $13.3 billion for vaccines.[378]

These investments have largely supported private sector research on a select number of highly technical therapeutic agents, notably monoclonal antibodies, immune globulin and convalescent plasma.[417] Overall, there has been a noticeable lack of early investment in novel antivirals, outside of a handful of private sector U.S. companies.[418]

Private pharmaceutical companies, rather than government labs, have developed most of the advanced novel drugs currently in the research and development pipeline, including small molecule agents and monoclonal antibodies.[419] Additionally, in collaboration with academic institutions, hundreds of private companies are screening therapeutic compound libraries and conducting clinical trials to identify potential new agents to treat COVID-19.[418,420] For example, remdesivir, an antiviral drug developed by Gilead Sciences for Ebola, was repurposed for COVID-19 after promising in vitro studies and has shown positive effect in large randomized controlled trials in the United States.[420]

The absence of a large coordinated national clinical trial infrastructure for COVID-19 in the U.S. has posed challenges to the rapid evaluation of repurposed drugs and novel therapeutics. Despite hundreds of ongoing clinical trials at various academic centers, hospitals, clinics and long-term care facilities across the country, many trials are not adequately designed or powered, and have therefore produced few actionable results. And despite millions of COVID-19 patients across the U.S., many clinical trials have struggled to recruit enough subjects as the pandemic has waxed and waned in individual regions.[421]

Diagnostic Technology

The early CDC diagnostic testing failure is described elsewhere in this report. However, private laboratories, industry, and academic researchers across the U.S. have led extensive efforts to develop new assays and platforms, a testament to American innovation. It was not until February 28, when severe national test kit shortages and data backlogs became apparent, that the FDA permitted academic and private laboratories to begin producing COVID-19 test kits.[422] These groups have now developed a variety of serologic, molecular and antigen tests, including the rapid diagnostic tests and new home-based antigen tests.[411,423] Additionally, BARDA's Medical Countermeasure Portfolio has supported a number of private-public partnerships for diagnostic test development.[417] Similarly, the National Institutes for Health (NIH) invested approximately $250 million dollars in industry for new testing technology through its RADx initiative.[424]

Unfortunately, the rapid approval of some diagnostic tests has led to poor quality control. In March 2020, the FDA allowed test developers to market and sell validated serological test kits without Emergency Use Authorization. The developer was required to submit details on their test to the FDA and to alert patients that the test had not been formally approved by the FDA. While this was intended to facilitate access to serological testing, poorly developed tests flooded the market and many companies failed to indicate test limitations to patients. Since March, the FDA has received notice of numerous violations of FDA policy, and 225 listings of new tests have been removed from their website.[425]

&

As COVID-19 emerged in the U.S., the scientific and medical communities activated to leverage pre-existing cross-country collaborations. Industry, government, academic and community scientists and clinicians developed informal online networks for information sharing,[426,427,428] accelerating COVID-19 basic science and clinical research internationally and domestically.[429]

documents and social media platforms to disseminate and discuss new research, clinical cases, infection prevention and control measures and epidemiologic trends.[431] Academic institutions developed open-source websites, such as the Brigham and Women's Hospital's covidprotocols.org and the UC San Francisco opencriticalcare.org, established to ensure physicians in non-academic and rural hospitals had access to synthesized research and clinical recommendations.[432,433] Many academic centers have also committed to broadly sharing expertise through virtual conferences and presentations[434,435] and have developed free COVID-19 training programs to support clinician education.[436]

U.S. scientists have been at the forefront of research on emerging pathogens with pandemic potential. The CDC's Division of High-Consequence Pathogens and Pathology, the National Science Foundation's Global Health Security program, U.S. Department of Agriculture animal disease monitoring programs, and academic researchers and non-profit organizations have contributed to vast amounts of knowledge on emerging infectious disease threats.

A majority of novel emerging diseases in the twenty-first century are zoonotic.[437] Rapid population growth coupled with human encroachment on animal habitats will inevitably lead to new epidemics. The United States Agency for International Development Emerging Pandemic Threats program has supported global research on emerging pathogens, particularly through the PREDICT project, a government-academic partnership that focuses on leveraging collaborations to detect, diagnose, and respond to epidemic threats.[437] Utilizing a One Health approach that highlights the link between human and animal health in the context of a shared environment, PREDICT aims to strengthen surveillance for and identification of viruses emerging at high-risk human-animal interfaces.[438] Across a network of partners in 36 countries, PREDICT has trained a One Health workforce of over 6,000 professionals in more than 30 countries, strengthened zoonotic disease detection capabilities in 67 laboratories, and sampled more than 160,000 animals and humans to conduct surveillance for spillover of zoonotic viruses.[439] Through this process, over 1,100 unique viruses have been detected, including 177 coronaviruses, 64 of which were known and 113 of which were previously unknown.[439] The second five-year funding cycle for PREDICT ended in September 2019, with the project slated to conclude in March of 2020. In light of the pandemic, and with a $2.26 million project extension, PREDICT teams worldwide responded to SARS-CoV-2, assisting with diagnostic and technical support, surveillance and contact tracing, training, and provision of PPE and materials.[439]

Unfortunately, cuts to global health and pandemic prevention research have been particularly severe in recent years.[440,441] As climate change accelerates and new zoonotic diseases emerge, ongoing research is critical to prevent future epidemics and pandemics.[442] A recent study notes that emergence of SARS-CoV-1 and 2 may have been a consequence of shifting bat ecosystems resulting from global climate change.[443]

Chapter 10: Conclusions and Recommendations

"It's time for boldness, for there is so much to do."

– *President Joe Biden, January 20, 2021*[444]

In this chapter we highlight eight key conclusions and associated recommendations, to address the COVID-19 pandemic, and to ensure that the U.S. is better prepared for the next one.

#1

The United States lacked effective political leadership in its COVID-19 response at the federal level. Leadership at subnational levels was highly variable.

Leadership is essential to mobilize and coordinate a massive response to a public health emergency, to gain popular acceptance of government policies and recommendations, and to inform and motivate individual behavior. Leadership failures can result either from weak and ineffectual leadership, or from leadership that is strong and influential but counterproductive. The U.S. experienced both.

The Trump administration made decisions that undermined the U.S. response, including articulating misinformation, repeatedly minimizing the seriousness of the pandemic and undermining science, while sidelining experts at public health and scientific agencies. It promoted a false choice between protecting the economy or saving lives, encouraging state leaders to relax control measures without strong prevention plans in place.

Many leaders flaunted their disregard for common sense public health interventions such as mask wearing and social distancing, thereby politicizing highly effective, low-cost measures that could have saved thousands of lives.

Key Recommendations

-1

- The federal government should promote effective collaboration between federal, state and local agencies, clearly defining roles and responsibilities at each level.
- The federal government should ensure there is a fully staffed National Security Council Directorate for Global Health Security and Biodefense.

- Congress should enact legislation to authorize emergency powers to mobilize a rapid, coordinated

The lack of national public health leadership in this pandemic allowed states, counties, and cities to pursue widely divergent approaches, creating a patchwork of conflicting policies and guidance. The absence of clear public health strategies and messaging led to public confusion and allowed an info-demic of dis- and misinformation.

Coupled with the issues noted above, systemic under-investment in the public health infrastructure, including linked data systems and standards, crippled state and local surveillance, and implementation of public health interventions. Public health underfunding was not adequately addressed in the large relief packages, with only 1.6% of Congressional appropriations in 2020 targeted for public health activities.

Key Recommendations

- Congress should appropriate substantial additional monies for pandemic control, including for widespread community surveillance, rapid antigen testing, supportive isolation and quarantine, genotypic surveillance, and vaccine roll-out.
- The federal government should create a robust testing infrastructure with targets and strategies to rapidly scale-up public health surveillance of the virus. A public-private testing consortium, such as that used in Canada, should be evaluated for deployment in the U.S.
- Working with state and local governments, mask mandates should be expanded, accompanied by public health messaging to promote the importance of mask wearing.
- The U.S. should prioritize investments in safe reopening of schools and childcare facilities. Regular surveillance testing in schools should be operationalized by implementing centralized purchasing, building improved data systems, and instituting comprehensive weekly or biweekly antigen testing. Teachers and staff should be given priority for vaccinations. The government should also allocate funding for infrastructure improvements, including for effective ventilation systems in these facilities.
- The U.S. should invest in supportive isolation and quarantine programs which provide financial and social support to those who are infected or have been in contact with an infected person. These should include options for conditional cash transfers as needed, paid institutional isolation, and direct economic relief for workers lacking employment protections.
- The federal government should invest in a Public Health Infrastructure Fund to:
  - » Modernize the public health information technology infrastructure at federal, state, tribal, and local levels, enabling a coordinated, rapid response in public health emergencies. Partnerships with the private sector should be pursued to implement these much-needed upgrades to the public health infrastructure.
  - » Strengthen public health capacity to develop and deploy basic public health measures at scale, including testing, contact tracing, supported isolation and quarantine, guidance on non-pharmaceutical interventions, and genomic surveillance.
- The U.S. should launch a public messaging campaign to prepare the American people for the possibility of another pandemic during their lifetime. This should include public education on the need for emergency powers that may impact individual freedoms, and the importance of compliance during public health emergencies.

#3

Immigrant, Black, Latinx, American Indian and Alaska Native communities, and those living in poverty, have suffered disproportionately from the COVID-19 pandemic.

Longstanding social, health and economic inequities, fueled by systemic underinvestment and racism, have been exacerbated by the virus. Historically disadvantaged communities have experienced higher incidence and worse health outcomes from COVID-19, with mortality rates in American Indians/Alaska Natives, Black and Latinx Americans between 2.6 and 2.8 times higher than White Americans. Minority communities experience high rates of comorbid conditions due to health and social disparities, also worsening COVID-19 outcomes. Many live in crowded multigenerational homes, which efficiently fuel viral transmission.

Poverty and occupational hazards are also more pronounced in people of color and immigrant communities, with many employed at low paying essential jobs, such as factory work or grocery stores, placing them at higher risk of infection. Lacking employment benefits and protections, isolating and quarantining become financially infeasible.

Primary care access has been reduced in many areas, with limited availability for in-person appointments, lack of follow-up for chronic illnesses, and delayed childhood immunizations. Medicare and commercial insurers have attempted to address these issues by allowing reimbursement of telehealth consultations, ameliorating access problems for some Americans.

Key Recommendations

- The federal government should provide emergency subsidies for federally qualified health centers and under-resourced hospitals, particularly those in rural areas that are buckling under the financial strain caused by the COVID-19 pandemic.

- The federal government should continually replenish the Strategic National Stockpile, and expand inventory lists to ensure rapid response to novel pathogens.
- Domestic supply chains should be strengthened with better coordination among states to prevent competition for critical supplies. The federal government, on behalf of states, should leverage its significant buying power to negotiate with suppliers for essential medical supplies.
- The federal government should invoke the Defense Production Act early in any potential public health emergency.
- Accreditation and licensure agencies should require robust disaster contingency planning for worst case novel pathogen scenarios for hospitals and health facilities.

#

The United States commitment to vaccine development has been a defining success. Slow initial rollout and the absence of a coordinated national vaccination strategy threatened to overshadow this singular achievement.

The U.S. excelled in its investment to develop novel vaccines and therapeutics for COVID-19. Operation Warp Speed, an $18 billion dollar public-private partnership led by the Department of Health and Human Services, supported development and manufacturing of multiple vaccine candidates and R&D for therapeutic agents and diagnostic tests. It also acted as the framework for advance purchase agreements with vaccine producers.

Despite incredible success in vaccine development,
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including funding for state and local governments, health coverage, unemployment insurance, and sick leave.

Key Recommendations

-1

- The federal government should continue to provide targeted relief to small businesses and individuals who have experienced economic hardship as a result of the pandemic.
- The federal government should provide financial support to state and local governments to ensure continued employment of teachers, public health professionals, police, corrections officers, and other public servants.

- The U.S. should develop a clear long-term agenda to strengthen its social safety net.
- The federal government should support reducing the variability among states and ethnic groups in access to basic health and social services

#

The United States will not be safe from COVID-19 until all countries are safe. A pandemic represents a global security threat that requires a global commitment to immunologic equity. To prevent the scale of suffering that this pandemic has inflicted, the world needs a strengthened global architecture for pandemic preparedness and response.

SARS-CoV-2 variants are emerging and proliferating worldwide. Despite travel restrictions, porous borders mean the rapid spread of new variants. Vaccine resistant or more lethal forms of SARS-CoV-2 may emerge without effective mitigation strategies to control them. Containing the pandemic will require multilateral collaboration and a commitment from wealthy countries to support less wealthy nations in eliminating COVID-19.

While Russia and China have made their vaccines available to lower income countries, vaccine nationalism has been on display across the U.S., U.K. and Europe, which bought large supplies of vaccines through advance purchase agreements. Because of advance purchases by wealthy countries, even a nation such as Argentina, which was a clinical trial site for Pfizer, is unable to procure the Pfizer vaccine for its population.[445] According to the WHO, as of January 21, Guinea had vaccinated only 25 people compared to almost 28 million in the U.S.[446]

Collaboration and trust among countries is a necessary condition for success in fighting this pandemic and preparing for the next one. This might appear to be a major stumbling block in today's geopolitical environment. However, the devastating impact of COVID-19 on all communities and all countries, and the universal commitment to never let this happen again, provides a shared purpose and agenda for transformational change in global collective action.

Key Recommendations

-1

- The U.S. must commit to global immunologic equity with active participation and commensurate funding. This includes supporting the creation of a vaccine infrastructure for developing, manufacturing and delivering easy-to-use vaccines in low resource settings. The U.S. should provide ongoing financial commitments to the Access to COVID-19 Tools Accelerator (ACT-A) COVAX initiative to ensure adequate vaccine supply for low and lower-middle income countries.
- The U.S. government should invest in the other ACT-A pillars, including therapeutics and diagnostics, to support multi-pronged country responses around the world.

- The U.S. should actively participate in developing and funding a strengthened global health architecture for pandemic preparedness and response. The new U.S. administration has a once in a generation opportunity to seize this moment and work with other countries to create a new era of global health security.
- The U.S. should provide funding for a multidisciplinary One Health approach, including bio-surveillance at the human-animal interface. Integrated efforts are needed at the international and national levels, including guidance on how to restructure systems and plans to engender trust across countries, sectors, and public and private entities.

Post-Script: The Biden-Harris National Strategy

On January 21, 2021, the Biden administration proposed a $1.9 trillion dollar stimulus to support a unified National Strategy for the COVID-19 Response and Pandemic Preparedness. Here we highlight salient points from the strategy's seven main outlined goals:[447]

I. **Trust:** Establish clear lines of public communication and decision-making driven by evidence and create publicly available shared data to allow real-time information available for the public and for policymakers.

II. **Vaccination:** Ensure free immunizations for everyone in the U.S., regardless of citizenship status. Establish a national vaccination campaign

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HHS Office of the Secretary, Public Health Social Services Emergency Fund (PHSSEF)	$22.4 billion • of which $19.11 billion is for State, local and Territorial Health Departments • of which $790 million is for the Indian Health Service • of which $2.5 billion is for high-risk and underserved populations, including racial and ethnic minority populations	"For an additional amount for "Public Health and Social Services Emergency Fund", $22,400,000,000, to remain available until September 30, 2022, to prevent, prepare for, and respond to coronavirus, domestically or internationally, which shall be for necessary expenses for testing, contact tracing, surveillance, containment, and mitigation to monitor and suppress COVID-19, including tests for both active infection and prior exposure, including molecular, antigen, and serological tests, the manufacturing, procurement and distribution of tests, testing equipment and testing supplies, including personal protective equipment needed for administering tests, the development and validation of rapid, molecular point of-care tests, and other tests, support for workforce, epidemiology, to scale up academic, commercial, public health, and hospital laboratories, to conduct surveillance and contact tracing, support development of COVID-19 testing plans, and other related activities related to COVID-19 testing and mitigation: • Provided, That amounts appropriated under this paragraph in this Act shall be for States, localities, territories, tribes, tribal organizations, urban Indian health organizations, or health service providers to tribes for necessary expenses for testing, contact tracing, surveillance, containment, and mitigation, including support for workforce, epidemiology, use by employers, elementary and secondary schools, child care facilities, institutions of higher education, long-term care facilities, or in other settings, scale up of testing by public health, academic, commercial, and hospital laboratories, and community-based testing sites, mobile testing units, health care facilities, and other entities engaged in COVID-19 testing, and other related activities related to COVID-19 testing, contact tracing, surveillance, containment, and mitigation which may include interstate compacts or other mutual aid agreements for such purposes; • Provided further, That of the amount appropriated under this

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