



National Covid-19 Testing Action Plan

Pragmatic steps to
reopen our workplaces
and our communities

Foreword to National Covid-19 Testing Action Plan

Covid-19 has infected hundreds of thousands of Americans and affected millions more around the world. Across America, shuttered schools have put 30 million children at risk of going hungry. Closed businesses have left more than 20 million workers without income. And while locking down our economy is crucial for saving lives now, it has tremendous consequences for the poorest among us – as people of color and low-income Americans are disproportionately losing livelihoods, and lives. In the face of an ineffective nationally-coordinated response, insufficient data, and inadequate amounts of protective gear and testing, we need an exit plan.

Testing is our way out of this crisis. Instead of ricocheting between an unsustainable shutdown and a dangerous, uncertain return to normalcy, the United States must mount a sustainable strategy with better tests and contact tracing, and stay the course for as long as it takes to develop a vaccine or cure. Any plan to do so must win the faith of private and public sector leaders across the country, and of individual Americans that they and their loved ones will be safer when we begin to return to daily life.

The Rockefeller Foundation exists to meet moments like this. In the past two weeks we have brought together experts and leaders from science, industry, academia, public policy, and government – across sectors and political ideologies – to create a clear, pragmatic, data-driven, actionable plan to beat back Covid-19 and get Americans back to work more safely.

Our National Covid-19 Testing Action Plan lays out the precise steps necessary to enact robust testing, tracing, and coordination to more safely reopen our economy – starting with a dramatic expansion of testing from 1 million tests per week to initially 3 million per week and then 30 million per week, backed by an Emergency Network for Covid-19 Testing to coordinate and underwrite the testing market, a public-private testing technology accelerator, and

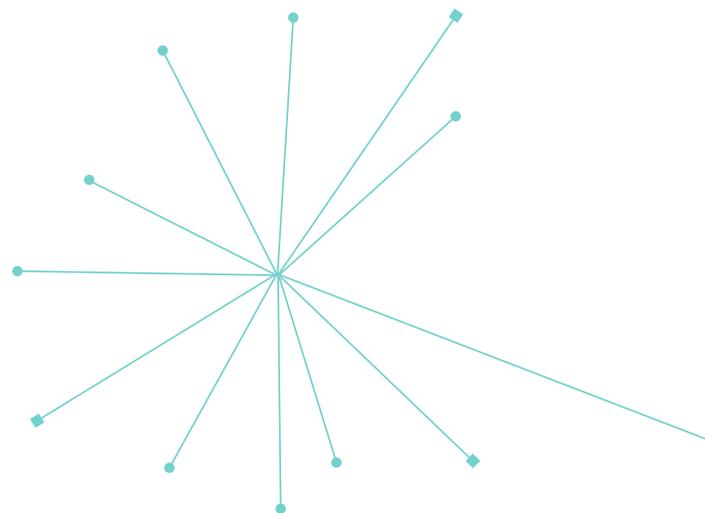
a national initiative to rapidly expand and optimize the use of U.S., university, and local lab capacity. The plan also includes: launching a Covid Community Healthcare Corps so every American can easily get tested with privacy-centric contact tracing; a testing data commons and digital platform to track Covid-19 statuses, resources, and effective treatment protocols across states and be a clearinghouse for data on new technologies; and a Pandemic Testing Board, in line with other recommendations, to bridge divides across governmental jurisdictions and professional fields.

Together, we can do this. This action plan benefits from and builds on prior proposals, current efforts, and the broad participation of experts from so many fields. Enacting it will require strong leadership and collaboration: across states, cities, and federal government, and from businesses, nonprofits, universities, community groups, and individuals.

Though our country's needs are great, so is our ability to meet them. With urgency, action, and partnership, we can channel our energy to respond, recover, and eventually rebuild – together.

Dr. Rajiv J. Shah

President, The Rockefeller Foundation



Action Plan Summary

Pandemics sicken and kill people in three ways:

first by overwhelming patients' immune defenses, then by swamping hospital networks, and eventually by cutting off a community's economic lifeblood. Hence, "saving lives or saving the economy" is a false choice. As of April 19, Covid-19 had directly killed more than 163,000 people worldwide, including nearly 35,000 in the United States. But the indirect effects are still being counted. The Great Recession of 2008, for instance, killed people in the thousands by disrupting healthcare for mothers, children and those with chronic illnesses and increasing a host of deadly mental and social conditions like alcoholism, depression and domestic abuse.

With the first wave of infections from the Covid-19 pandemic cresting in much of the country, American political and business leaders rightly are considering plans to reopen the economy. This Action Plan is intended to serve as a resource guide for that all-important project.

The bad news is that the U.S. is not yet administering enough coronavirus tests each week to adequately monitor the entire U.S. workforce or rapidly detect recurrent Covid-19 outbreaks. Such outbreaks can be expected for the foreseeable future given the low level of population immunity¹ as well as the virus's contagiousness and wide geographic dispersion. The location and size of recurrent outbreaks are difficult to predict. Close monitoring of the medically vulnerable, institutionalized, poor and imprisoned is vital.

The good news is that in the coming weeks the country could have the tools needed to allow governors and other officials to lift the most severe lockdowns and begin a phased reopening of some businesses. The goal is to allow enough economic activity to forestall a full-blown depression while keeping Covid-19 infection rates low enough to prevent hospitals from being overwhelmed and thereby causing a wider and more deadly health crisis.

This will be a delicate balancing act. Adjustment inevitably will need to be made based on close monitoring of the pandemic. Reopening the economy will be most successful if we move decisively to both increase testing capacity and optimally deploy testing supplies.

The goal of the Action Plan is to build a state-led national program of Covid-19 testing that supports reopening the economy through the goals of work-force monitoring, early detection of recurrent outbreaks, and diagnostic and home testing.

This would be the largest public health testing program in American history. Success will depend on the active engagement of the government, business, philanthropy, and the public.

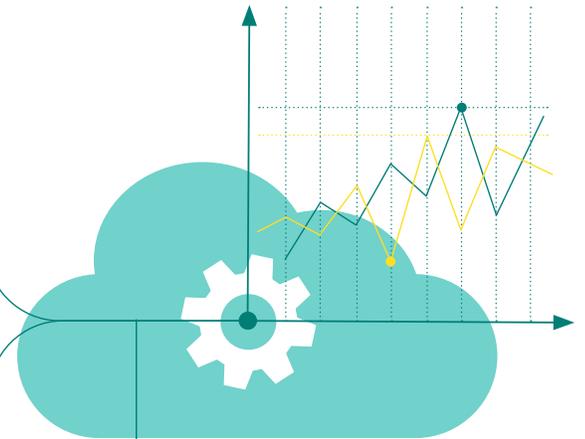
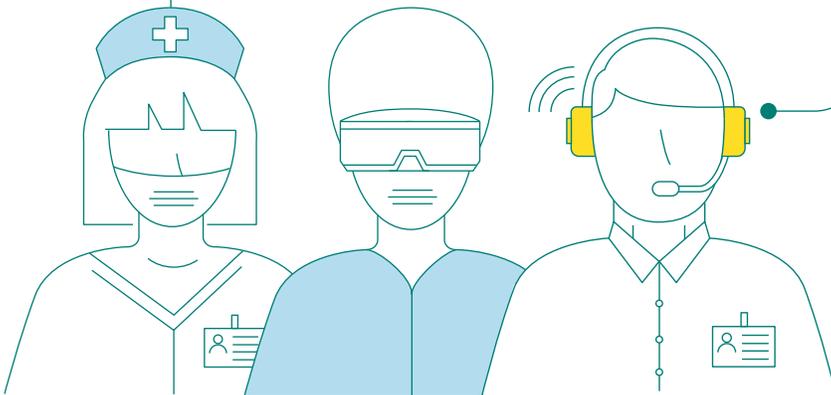
THE ACTION PLAN HAS THREE MAJOR OBJECTIVES

1. Launch a 1-3-30 Plan to Dramatically Expand Covid-19 Testing
2. Launch a Covid Community Healthcare Corps for testing and contact tracing
3. Create a Covid-19 Data Commons and Digital Platform

1 LAUNCH A 1-3-30 PLAN TO DRAMATICALLY EXPAND COVID-19 TESTING



2 LAUNCH A COVID COMMUNITY HEALTHCARE CORPS FOR TESTING AND CONTACT TRACING



3 CREATE A COVID-19 DATA COMMONS AND DIGITAL PLATFORM

1

Launch a 1-3-30 Plan to Dramatically Expand Covid-19 Testing

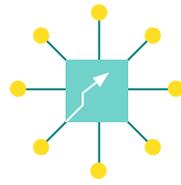
We are proposing our nation come together around the bold, ambitious, but achievable goal of rapidly expanding testing capacity to 30 million tests per week over the next six months. This 1-3-30 Plan would be achieved by: (1) creating an Emergency Network for Covid-19 Testing to coordinate and underwrite the testing market, (2) launching an eight-week National Testing Laboratory Optimization Initiative to increase output to 3 million tests per week from the current one million, and (3) investing in a Testing Technology Accelerator to further grow U.S. testing capacity from 3 million to 30 million tests per week.

The steady increase in U.S. testing that began in late February has now plateaued. During the first two weeks of April, the number of tests per day averaged 143,000 (~ 1 million tests per week) with no appreciable upward trend.² As of April 18, 2020, the U.S. had completed 3,698,534 tests of which 722,182 were positive (19.50%)

This undoubtedly reflects just the tip of the Covid-19 pandemic in the U.S. Current barriers to rapid increases in American test production, supply, distribution and administration include uncertainty over financing and payment; lack of coordination of local, state, and national purchases; uneven distribution of test kits; severe shortages of reagents; regulatory barriers; and a severe lack of staffing.

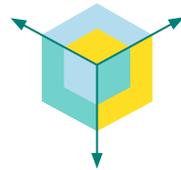
The 1-3-30 Plan aims to overcome these barriers and progressively expand testing from the current one million to three million and then to 30 million tests per week through three action steps.

ACTION STEPS



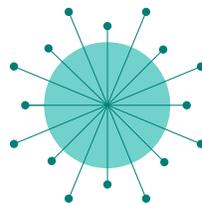
Create an Emergency Network for Covid-19 Testing (ENCT) to coordinate and underwrite the testing market.

To drive rapid scale-up of Covid-19 testing, the ENCT will engage with: producers of testing equipment, reagents, and other lab consumables; national, state and local purchasers; public and private healthcare funders; and financial institutions. The ENCT will also work to identify and resolve choke points in the test supply chain. The ENCT should convene a consensus group of national, state, business, and academic leaders on the use of testing for workplace monitoring and early detection of Covid recurrences. An overarching analysis of the testing supply chain both in the United States and globally should be undertaken immediately.



Launch an eight-week National Testing Laboratory Optimization Initiative to increase current U.S. testing from 1 million to 3 million per week within the next eight weeks.

This will be achieved by unleashing the untapped potential of existing test capacity at national, university, and local labs. Importantly, this program would bolster the capacities and resources of thousands of small laboratories around the country. Supply constraints will be identified and eliminated.



Invest in a public-private Testing Technology Accelerator to further grow U.S. testing capacity from 3 million to 30 million per week within six months.

This increase will depend on realizing and rolling out the best mix of new technologies for higher efficiency laboratory testing, point-of-care office testing, and home-testing. In addition, some of this increase can be achieved through process efficiencies and lab techniques such as batch sampling. The powers of the Defense Production Act may will be need to be invoked given the inherent commercial uncertainties in this 10-fold production increase.

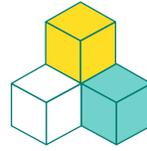
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Launch a Covid Community Healthcare Corps for testing and contact tracing

The taking and preparation of samples, analysis of testing, and human-centered privacy-protected contact tracing will require a massive amount of manpower that can be stood up in the next few weeks by federal, state, and local hiring authorities with funding offered via block grants to states.

The number of tests needed to successfully prevent recurrent outbreaks while allowing some relaxation of social distancing will depend on the vigilance of contact tracing. With the kind of high-precision contact tracing used in South Korea, just 2.5 to 5 million tests per day would be required. With the imprecise tracing of a country like Taiwan, 30 million tests per day would be needed – a level far beyond present capacities.

ACTION STEPS



A Covid Community Healthcare Corps (CCHC) should be launched at state public health departments, an effort that will involve massive investments in manpower and equipment.

At least 100,000 people and perhaps as many as 300,000 must be hired to undertake a vigorous campaign of test administration and contact tracing, and they must be supported by computer systems networked with regional and national viral data-sets and as many electronic health records from local hospital systems as can be provided. The CCHC should designate staff to distribute, administer and oversee testing.



A national system to track Covid-19 status must be created.

Policy makers and the public must find the balance between privacy concerns and infection control to allow the infection status of most Americans to be accessed and validated in a few required settings and many voluntary ones.



Digital apps and privacy-protected tracking software should be widely adopted to enable more complete contact tracing.

Whenever possible, incentives should be used to nudge the voluntary use of these apps rather than require them.

3

Create a Covid-19 Data Commons and Digital Platform

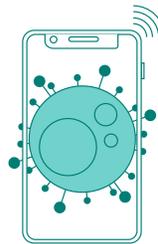
Real-time analyses of resource allocations, disease tracing results and patient medical records will enable policy makers and researchers to make best use of available resources to identify the most promising areas for surges in testing volumes to snuff out Covid-19 recurrent outbreaks and identify the most promising therapeutic treatments and algorithms.

ACTION STEPS



Integrate and expand Federal, state, and private data platforms to cover the full range of data required to monitor the pandemic, deploy resources, and remove bottlenecks.

This effort would support recent Department of Health and Human Services Federal and State collaboration with leading edge data technical firms to develop an integrate, real-time data platform so testing levels can be aligned at regional levels with illness burden. This platform can enhance procurement, distribution and deployment of tests as those tests evolve in quantity and function. It should also enable state and local authorities to track testing results and capacities to identify spot shortages. This will help identify any supply and demand constraints so that testing levels can be aligned at regional levels with illness burdens.



Innovative digital technologies can improve workforce monitoring and early detection of recurrent outbreaks.

When integrated into national and state surveillance systems, such innovations may enable the same level of outbreak detection with fewer tests. Promising techniques include anonymous digital tracking of workforces or population-based resting heart-rate and smart thermometer trends; continually updated epidemiological data modeling; and artificial intelligence projections based on clinical and imaging data.



Digital health records and insurance claims data of hospitalized Covid-19 patients should be used to improve Covid-19 diagnosis and treatment.

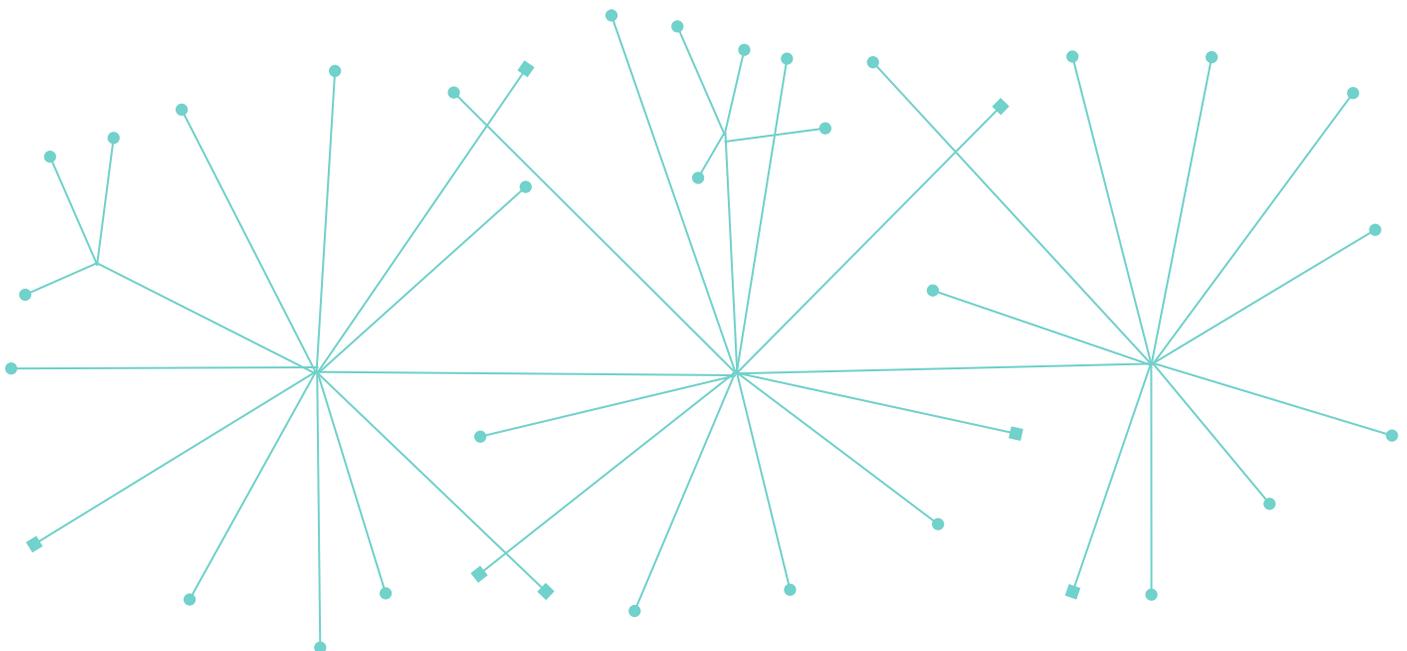
This requires that such data be aggregated and examined, while anonymizing personal identification, to determine optimal treatment paradigms and give leads for structured clinical trials.

The Way Forward

Recent reports from the American Enterprise Institute³, Center for American Progress⁴, Duke Margolis Center⁵, Harvard University Safra Center for Ethics⁶, and Johns Hopkins University⁷ each provide unique, complementary perspectives toward a comprehensive approach for relaxing social distancing and reopening our communities and our economy.

Monitoring the pandemic and adjusting social distancing measures will require launching the largest public health testing program in American history. Successful implementation of a national plan to fast-track Covid-19 testing should allow the country to reopen and respond to recurrent outbreaks. The effort will ultimately grow to billions of dollars per month although innovations in testing technology should eventually drop costs. But with widespread business closures costing the country \$350 billion to \$400 billion each month, the expense will be worth it. This testing infrastructure is intended to tide the country over until a vaccine or therapy is widely available.

Coordination of such a massive program should be treated as a wartime effort, with a public/private bipartisan Pandemic Testing Board established to assist and serve as a bridge between local, state, and federal officials with the logistical, investment and political challenges this operation will inevitably face. Harvard's Edmond J. Safra Center for Ethics has done an excellent job of outlining possible options (Appendix A). We recommend a combination of federal and state appointed members who would actively serve throughout the crisis.

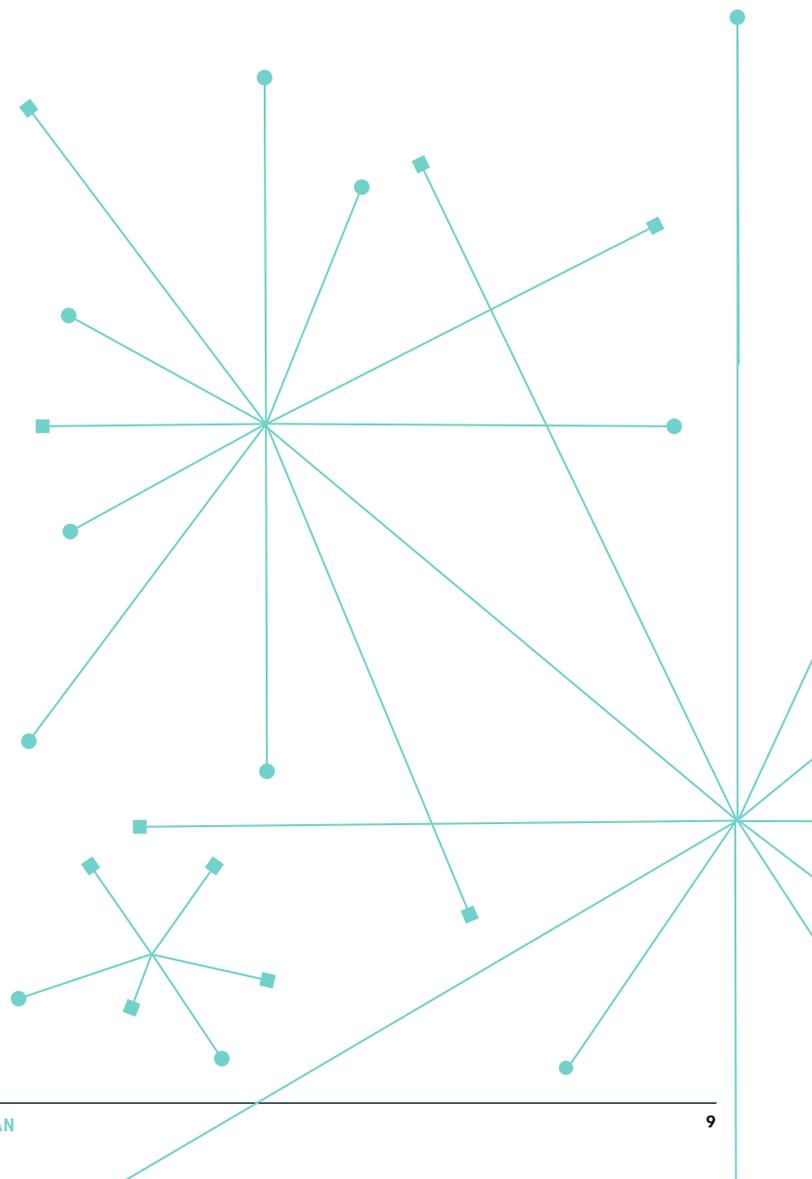


The Covid-19 pandemic caught the United States unprepared, with inadequate emergency stockpiles of protective equipment, ventilators and vital medicines. In addition, the country has little of the industrial capacity needed to manufacture vaccines, antibiotics and other crucial supplies that may go wanting when international borders close.

In some ways, the complaisance that led to this unfortunate vulnerability may have arisen because of a window of viral calm unique in human history. The country's middle-aged leaders are the first generation ever whose parents did not face the bleak terror of polio outbreaks among their children's friends. They were the first to reach puberty without fear that mumps would render them sterile, the first to reach adulthood without fear that cervical cancer would end their or their partners' lives, the first to reach child-bearing age without fear that rubella would cause birth defects in their children and the last generation to be vaccinated against smallpox, history's great viral scourge.

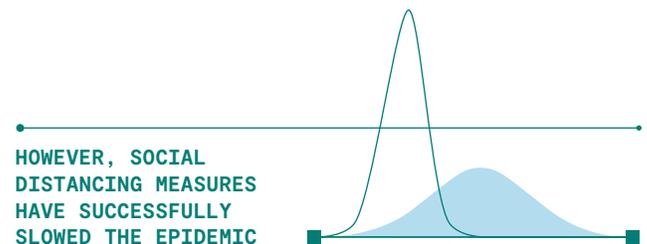
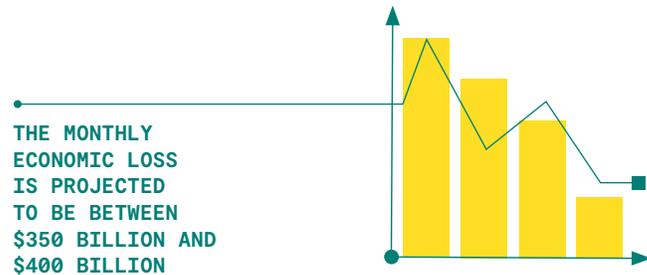
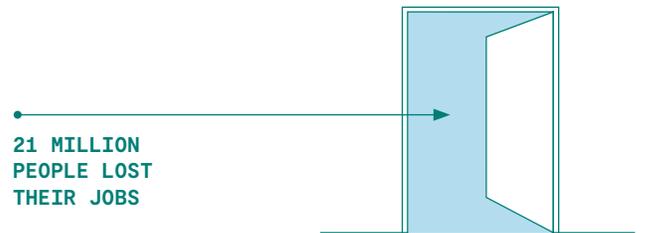
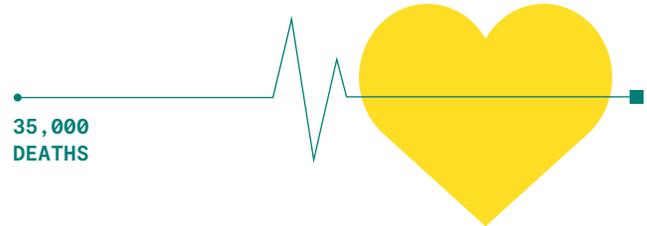
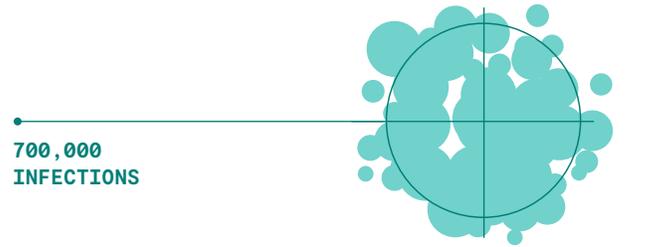
The century-long interval since a viral respiratory pandemic circled the globe with just the right mix of lethality and infectiousness may have led many to stop believing in the inevitability of such a plague. And while HIV/AIDS struck just as many were becoming sexually active, the concentration of infections in the United States among men who have sex with men and people who inject drugs may have increased a sense of invulnerability among those not in those high-risk groups.

But the AIDS epidemic demonstrates why Covid-19's assault could be lengthy and appallingly lethal. Nearly six years passed between the identification of AIDS and the emergence of the first effective treatment, and no meaningfully effective HIV vaccine is on the horizon despite nearly 40 years of diligent scientific effort.



The need for action is urgent. The number of confirmed Covid-19 infections in the country is approaching 700,000, with deaths nearing 35,000. Social distancing measures have successfully slowed the epidemic's implacable march but have led more than 21 million people to lose their jobs. The monthly economic loss is projected to be between \$350 billion and \$400 billion, with the gross domestic product expected to decline by as much as 7 percent in 2020. A growing number of Americans worry that lives are being spared in the immediate term at the cost of a long term economic slowdown rivaling that of the Great Depression. Indeed, what is sometimes lost in the debate between "saving lives" and "saving jobs" is that shutdowns increase alcoholism, depression, domestic abuse and a host of other social woes that together contribute to higher mortality – particularly among the poor. After the market crash of 2008, the United States saw a measurable decline in life expectancy. Depending on the severity and length of the shut-down, we run the risk of losing more lives from the economic downturn than from Covid-19.

Something has to change and fast. But how?

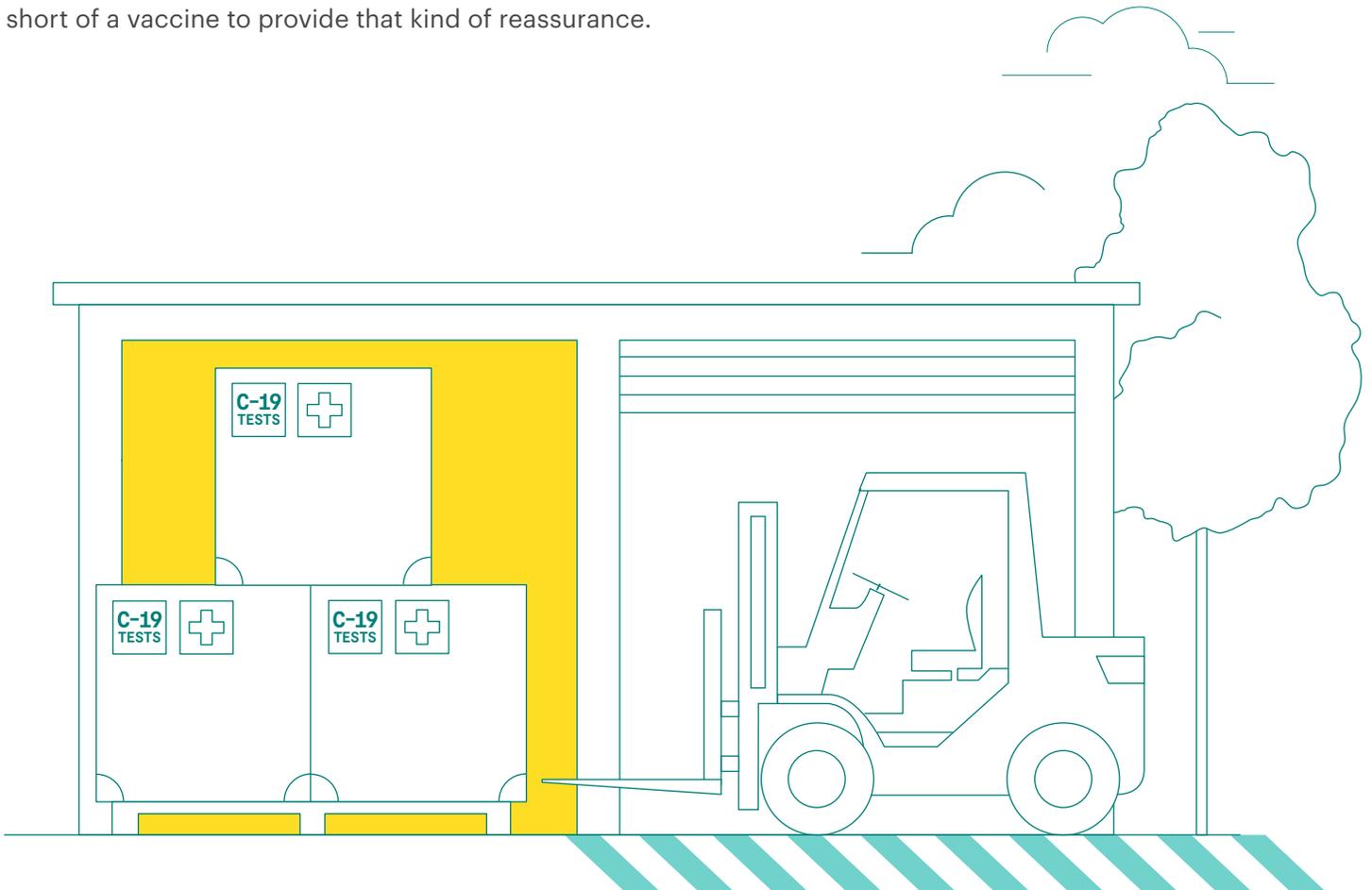


Action Plan

1

Scale Up Covid-19 Testing Capacity

Until Americans feel they can return to work without risking their or their family members' lives, the national economy will remain somewhere between comatose and moribund. Routine Covid-19 diagnostic tests – amplifications of nucleic acid sequences that are signatures of the virus – offer the best chance short of a vaccine to provide that kind of reassurance.



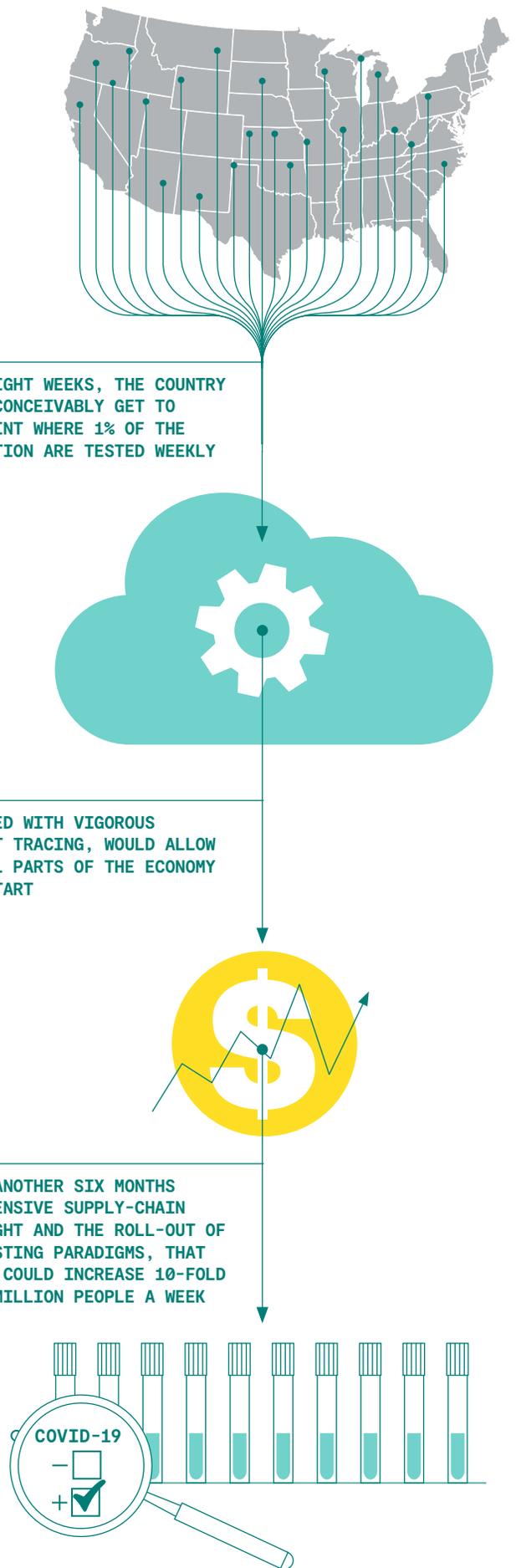
According to some epidemiological analyses, halting the epidemic entirely while allowing nearly everyone to return to work requires testing between 20 million and 30 million people daily. And in most cases, the tests should offer nearly instant results – or at least information quickly enough to allow someone to be tested before re-entering the workplace.

Unfortunately, the country's present Covid-19 testing capacity is less than 1/100th of that goal, and with most results delivered days and sometimes more than a week after being taken. And almost no one with experience in the diagnostic industry believes the epidemiologists' goal is reachable in the next five months with present technologies and infrastructure.

But over the next eight weeks, the country could conceivably get to the point where 3 million people – roughly one percent of the population – are tested weekly. It is a level that, combined with vigorous contact tracing, would allow crucial parts of the economy to restart. After another six months of intensive supply-chain oversight and the roll-out of new testing paradigms, that number could increase 10-fold to 30 million people a week. At least a year will be needed before the nation's labs will be capable of testing 30 million people every day.

Coronavirus Tests:

There are two type of coronavirus tests: molecular tests for SARS-CoV-2 infection and serological blood tests for antibodies. Molecular tests are usually taken with a nasal swab. The focus right now is choosing the right mix of molecular tests: highly accurate high-end PCR (polymerase chain reaction), middle point-of-care diagnostics (POC) and low-end home tests. Finding the optimal mix is important, but will evolve over time as new tests come on the market, with different levels of accuracy and costs. Serological tests are appropriate for population-based surveillance and research projects. Currently available serological tests should not be used for individual assessment of protection from future infection or back-to-work decisions.



Create an Emergency Network for Covid-19 Testing (ENCT) to coordinate and underwrite the testing market.

The Rockefeller Foundation and its finance partners will help create an emergency procurement network, the Emergency Network for Covid-19 Testing, that can leverage public-private credit guarantees, define pooled procurement requirements for critical testing and supplies and negotiate medium term (3-6 month) contracts with suppliers to make sure large volumes of critical supplies are accessible to purchasing cooperatives, health systems, state and local governments, working alone or together, and other buyers. The Foundation will also offer ongoing guidance to these networks.

The aim of the ENCT would be to support and complement the work of Federal and State agencies by engaging with producers of testing equipment, reagents, and other lab consumables; national, state and local purchasers; public and private health-care funders; and financial institutions. The intent is to overcome market, government, logistical, and diagnostic industry challenges that have plagued the dramatic scale up in Covid-19 diagnostic testing required to reopen the economy.

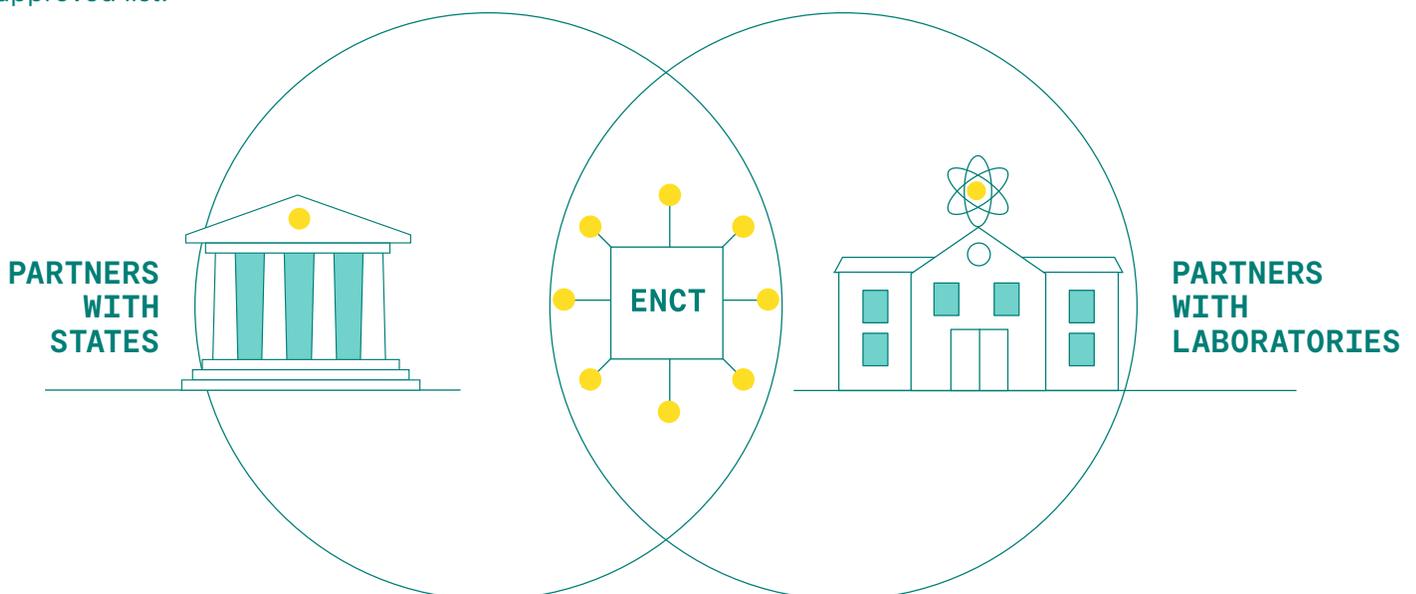


THE EMERGENCY NETWORK FOR COVID-19 TESTING WOULD PARTNER WITH STATES TO:

1. **Optimize the use of existing state and regional purchasing arrangements** and, as needed, work to restructure such arrangements to secure urgently needed Covid-19 testing equipment and supplies.
2. **Support financial guarantees** to equipment manufacturers and lab purchasers
3. **Create state or regional Covid Diagnostic Testing Control Centers** to coordinate lab needs, capacities and financing tools, and to solve problems as they arise.
4. **Offer computer equipment, interfacing, and expertise** to any participating CLIA labs that are not yet able to immediately accept test orders (requisitions) and report test results digitally.
5. **Guarantee a fair market reimbursement** (e.g. \$100) for all Covid-19 assays regardless of testing platform, previously established provider-lab contracts, payor relationships, and with no in-network or out-of-network payer distinctions.
6. **Provide a platform to qualify vendors** and then offer guarantees to labs that order from the approved list.

THE EMERGENCY NETWORK FOR COVID-19 TESTING WOULD PARTNER WITH LABORATORIES TO:

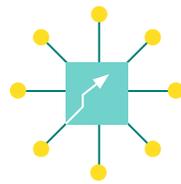
1. **Report all Covid-19 test results to health care providers as well as to state digital platforms** within 24 hours of receiving samples while ensuring HIPAA compliance.
2. **Report daily test volumes** and 5 day forward-looking capacity estimates.
3. **Provide Covid-19 Diagnostic Testing Control Centers specific plans** to increase present Covid-19 test volumes according to the estimated needs of each state.



Diagnostic tests have long been used almost exclusively to identify illnesses and help the sick. In a viral pandemic, testing is used to slow infections, benefiting society as much or more than the individual patient. In most cases, positive tests for Covid-19 do little to change treatment or life decisions for people suspected of having the virus, since treatments are symptom-specific and quarantine recommendations almost universal.

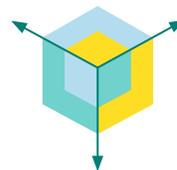
For these reasons, Covid-19 diagnostic tests when still in short supply must largely be reserved for front-line medical, municipal, grocery and other workers in vital sectors since presymptomatic people can become super-spreaders. As more tests become available, they should be distributed according to a detailed hierarchy of economic, medical and social need. Mildly and moderately symptomatic patients should be next on the priority list, since positive results will lead them and many of their family members to self-quarantine. As a result, drive-through and clinic testing programs should be expanded. Among the last on the priority list should be hospitalized patients, since x-rays and other diagnostic tools can effectively suggest a Covid-19 infection and treatment decisions will not change with a test's confirmation until effective treatments become available. Refusing to test the most desperately ill will be difficult for family members and others to accept, but it is the right course.

ACTION: **SCALE UP COVID-19 TESTING CAPACITY**



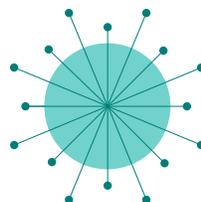
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Expand current U.S. testing from 1 million to 3 million per week within the next eight weeks.

This will be achieved by maximizing the use and throughput of existing testing at national, university, and local labs. Most important, a crash program to bolster the capacities and resources of thousands of small laboratories around the country must be undertaken. Supply constraints would be identified and eliminated.



Grow U.S. testing capacity from 3 million to 30 million per week within six months.

Some of this increase can be achieved through process efficiencies, lab techniques such as batch sampling, and a broad rollout of point-of-care and home-testing. Given the commercial uncertainties inherent in this 10-fold increase in production, however, it is likely that the Defense Production Act will be needed.

2

Establish a COVID Community Healthcare Corp

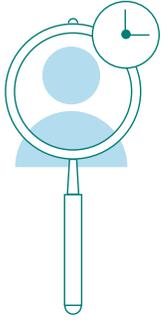
Testing millions of people per week will require hiring a large number of community health workers. The disease is so infectious that reaching and quarantining potential contacts quickly is an urgent priority and maximizes the effectiveness of testing. A human-centered approach to administering tests and contact tracing is labor intensive but does not require specialized skills training and protects privacy. A combination of shoe-leather contact tracing and new digital tools can help target relevant populations for testing while minimizing privacy risks.

South Korea successfully used aggressive contact tracing to target and maximize its own testing capacity to avoid just the sort of rapid spread and subsequent lockdowns that have bedeviled the United States. So contact tracing would seem in order. But the United States has had only limited contact tracing because of constrained resources. There are also heightened concerns about the privacy and the liberty of the infected and their contacts in the U.S..

In addition, such a workforce can be used to provide other services, such as providing meals on wheels and other necessary assistance.

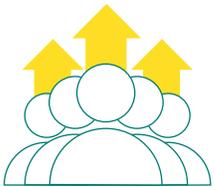


ACTION STEPS



Rapidly hire an additional 100,000 to 300,000 people using existing hiring authorities:

Considering the asymptomatic nature of much of the viral spread, Johns Hopkins University School of Public Health and The Association of State and Territorial Health Officials (ASTHO) estimates that about 100,000 would be needed for contact tracing alone. That is less than half the rate deployed in Wuhan. Testing administration and other services for vulnerable populations who are at-risk or under home isolation or quarantine would require additional workers, with estimates ranging as high as 300,000 needed to provide all essential services. At \$40,000 for wages and benefits per employee per year, the cost could range from \$4 billion to \$12 billion when training and administrative costs are included.



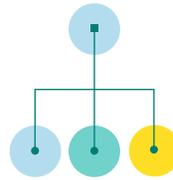
Direct hires, contractors and volunteers:

An “all of the above approach” must be taken to maximize the ease and speed of hiring. Peace Corps Volunteers forced to return from postings early, although limited in number to approximately 7,000, are prime candidates for rapid re-hiring. The Corporation for National and Community Service, the federal agency that oversees Americorps, the Senior Corps and the Volunteer Generation Fund, could be used. The National Guard can fill gaps, and non-profits can provide volunteers. (See Box)



Skills Training:

The skills needed for both test administration and contact tracing are not specialized, and training can be provided virtually through the CDC and their partner organizations such as the National Network of STD Clinical Prevention Training Centers, public health schools, and companies.

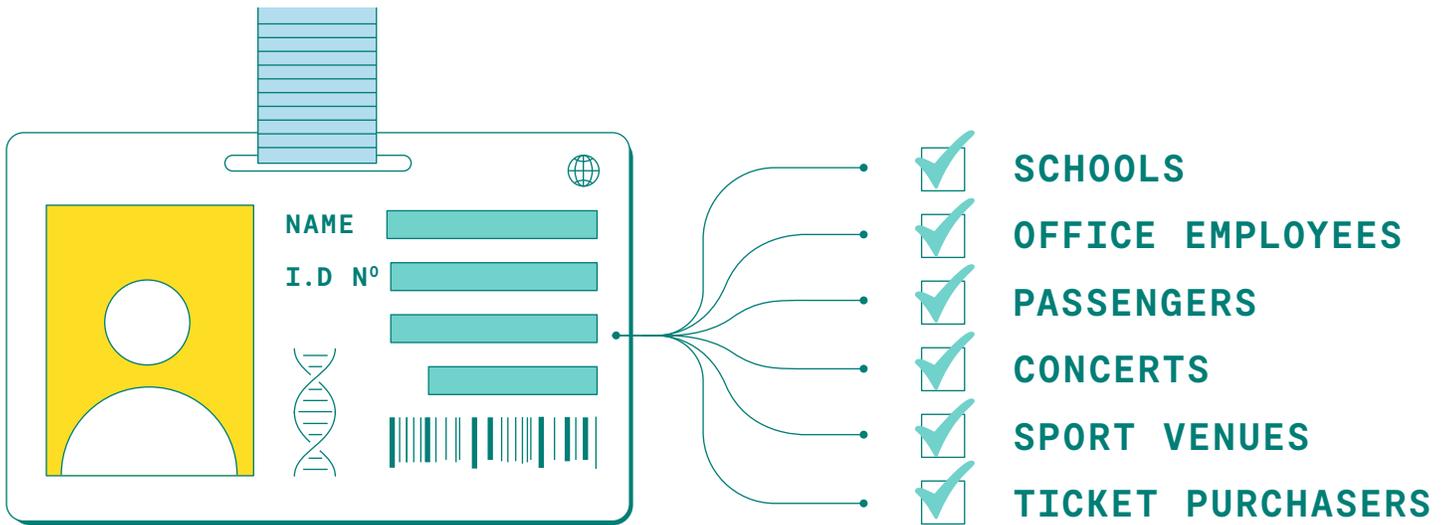


Management and oversight:

Covid-19 responders should be under the management of state and local authorities, particularly for contact tracing. Federal responders should be deployed by invitation and under the authority of governors and mayors. For core public health functions such as contact tracing, there should be a single, coordinated system in each jurisdiction, managed by local authorities.

Some privacy concerns must be set aside for an infectious agent as virulent as Covid-19, allowing the infection status of most Americans to be accessed and validated in a few required settings and many voluntary ones. The loss of privacy engendered by such a system would come at too high of a price if the arrival of a vaccine early next year was a certainty. But vaccine development and manufacture could take years, and when it comes certain populations may be excluded from receiving it for health reasons. In the meantime, infection status must be known for people to participate in many societal functions. Legislation protecting people from being fired over infection status must be passed.

Those screened must be given a unique patient



identification number that would link to information about a patient’s viral, antibody and eventually vaccine status under a system that could easily handshake with other systems to speed the return of normal societal functions. Schools could link this to attendance lists, large office buildings to employee ID cards, TSA to passenger lists and concert and sports venues to ticket purchasers. Such connections should be made in a way that protects personally identifying information whenever possible. For example, accessing the viral and antibody status of an individual can be done by using a cryptographic hash of an individual’s private information without actually sending any personally revealing details.

This infection database must easily interoperate with doctor, hospital and insurance health records in an essential and urgent national program to finally rationalize the disparate and sometimes deliberately isolated electronic medical records systems across the country. Analytics across myriad platforms must be operationalized so that population-level health

information can be used to identify at-risk populations, perform contact tracing, facilitate decision support, and evaluate interventions for effectiveness.

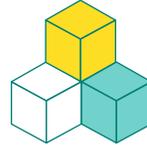
Unfortunately, obtaining the necessary clinical data to bring these powerful analytic tools to bear has been difficult due to information-blocking tactics of electronic health records (EHR) vendors. Among the longtime tactics used by such vendors has been charging unreasonable fees for data access, requiring providers to sign restrictive contracts, and claiming patients’ clinical data is proprietary.

On March 9, the Department of Health and Human Services (HHS) released two long-awaited final rules that would prohibit information blocking in health care and advance more seamless exchange of health care data. But publication in the Federal Register, necessary to activate the rules, has been inexplicably delayed. This delay must end.

The Rockefeller Foundation's Equity and Economic Opportunity and Health Initiatives is piloting a Community Health Workers Corps (CHW's) in Baltimore as a dual response to the pandemic and as a way to create quality employment opportunities for up to 1,000 displaced workers. A public/private partnership composed of the City of Baltimore, State of Maryland, University of Maryland, Johns Hopkins and various private sector partners are all coordinating and collaborating in launching the CHW Corps. Investing in the launch of a health workers corps would allow every community to not only have testing and contact tracing capability but also have a "social distancing/public health workforce." CHW's could undertake everything from sanitizing spaces to enforcing separation to spraying sanitizer on people's hands regularly, particularly where crowds gather. As trusted members of their cities they would also have a close understanding of the community served. Pending some approvals, the target launch is June 1, 2020.

Similarly, The Rockefeller Foundation has been working with The Community Organized Relief Effort (CORE) in Los Angeles to scale up testing in LA County, statewide, and ultimately nationwide through the training of volunteers to administer tests and record results.

ACTION: LAUNCH A COVID COMMUNITY HEALTHCARE CORPS FOR TESTING AND CONTACT TRACING



A Covid Community Healthcare Corps (CCHC) should be launched at state public health departments, an effort that will involve massive investments in manpower and equipment.

At least 100,000 people and perhaps as many as 300,000 must be hired to undertake a vigorous campaign of test administration and contact tracing, and they must be supported by computer systems networked with regional and national viral datasets and as many electronic health records from local hospital systems as can be provided. The CCHC should designate staff to distribute, administer and oversee testing.



A national system to track Covid-19 status must be created.

Policy makers and the public must find the balance between privacy concerns and infection control to allow the infection status of most Americans to be accessed and validated in a few required settings and many voluntary ones.



Digital apps and privacy-protected tracking software should be widely adopted to enable more complete contact tracing.

Whenever possible, incentives should be used to nudge the voluntary use of these apps rather than require them.

3

Create a Data Commons and Digital Platform

Federal, State, and Private Data Platforms

There is a need to develop a real-time common data-sharing platform to better understand available testing capacity. This could take the form of a state-by-state heat map of laboratories to help governors and other elected officials make informed decisions on how to allocate scarce resources. States should be encouraged to use a common platform, as there are multiple competing platforms in place, limiting the effectiveness of existing data. This should be in done in partnership with the National Governors Association. To further encourage the uptake of this data commons, a set of compelling use cases should be put forward for how certain states have optimized data and its impact on curtailing the impact of Covid-19.

Analytical tools can be developed to help anticipate shortages of lab materials and equipment and to ensure efficient ordering and distribution of supplies. And as epidemiological modeling is improved and married with digital tracking information, it can become more predictive and anticipate outbreaks or non-compliance with public health guidance to direct surges in testing capacity. This work will require



careful attention to geographic and racial imbalances in existing data collection procedures so that bias is not baked into models. The integration of diverse data sets from public health systems, social media, and mobility data into a shared platform with open-source modeling tool development and appropriate security and compliance controls will accelerate the experimentation and development of prediction algorithms that power the monitoring and decision-making components of the digital platform.

Marrying much of this information into easy-to-understand dashboards to improve decision-making by both public and private sector leaders will be an ongoing challenge as a flood of data threatens to create a thickening fog of information. Such a platform should allow users to integrate multiple datasets on the fly, model interventions, and track disparate impact on minority communities.

Platforms and apps can be used not only to identify emerging hot spots but also for developing and operating back-to-work predictive models. Such models can help make decisions about which regions at which times should move from shelter-at-home to work, and, as necessary, back to shelter-at-home again.

DOING THIS QUICKLY AND ETHICALLY WILL REQUIRE AN UNPRECEDENTED EFFORT ON THE PART OF GOVERNMENT, INDUSTRY, AND ACADEMIA. THE DEVELOPMENT OF THESE TOOLS SHOULD FOLLOW FOUR PRINCIPLES



Earn public trust for new technologies through ethical action and transparency.

Companies like Apple and Google are leading the way by engaging directly with privacy advocates, allowing individuals to opt-in to new tools, and publishing extensive documentation. Others across the private and public sectors should follow their lead or risk losing buy-in from the populations at large.

Fit-bits, smartphones, smart thermometers and other digital tools can be used to uncover clusters of infections before patients flood local emergency rooms, allowing public health officials to redirect testing resources and rapidly initiate contact tracing. Apple and Google are working on a contact-tracing app to alert people – on an opt-in basis – if they’ve been in touch with someone known to have the novel coronavirus. An active symptom-checker app is in development. Even data such as Google searches for “I can’t smell” help to identify infection localities.



Whenever and wherever possible data should be open.

We know from prior crises that openness creates efficiency and enables collaboration. This will require marshaling not just an army of engineers and scientists but also an army of lawyers to negotiate data sharing agreements.



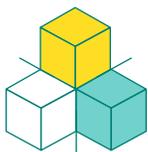
Computer upgrades: Local and state health departments are famously shoestring operations.

These departments will need rapid computer upgrades so they can receive listings of the newly infected directly from laboratory uploads, with contact information included as part of the record.



Focus relentlessly on user needs.

Now is not the time for fancy new features or sophisticated interfaces. Developers must do rapid user research to identify specific decisions and pain points where digital tools can help.

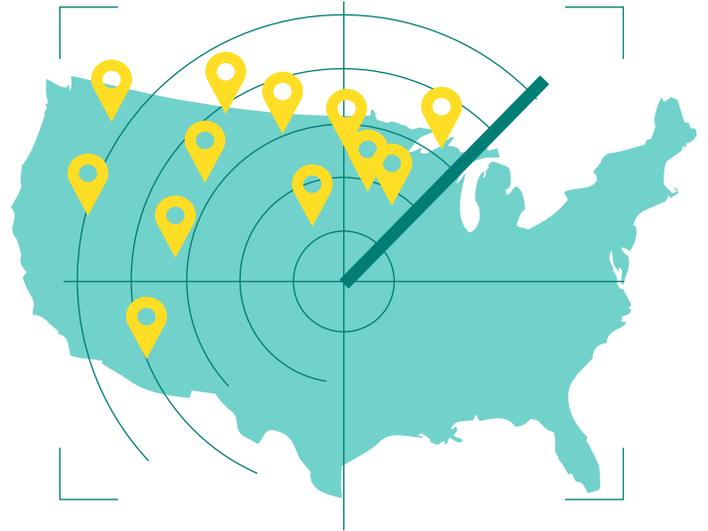


Build for interoperability and modularity.

New tools must play well with existing systems. This means developers should build on existing interoperability standards from the Centers for Medicare and Medicaid Services (CMS) and the Office of the National Coordinator for Health Information Technology (ONC).

Connecting Clinical Research and Digital Technology

Fully controlling the Covid-19 epidemic requires that we test the majority of the population weekly. Since we are far from that kind of capacity, the United States must undertake immediate and intense efforts to invest in new tests and ways of providing near-immediate diagnostic results. We must also invest in research that analyzes the electronic medical records of hospitalized Covid-19 patients to determine best treatment strategies and pathways for clinical trials that must be undertaken immediately.



The reason for both is that this country's gravest test may arrive around Labor Day as students pile into school buses and classrooms with the beginning of the next school year. Children and teens are particularly efficient viral vectors for Covid-19, since they are often asymptomatic and tend to be less careful than adults about social distancing.

Another vital research target is determining whether people who were previously infected with Covid-19 can be infected again. Anecdotal reports from other countries suggest quick re-infection is possible. Research is needed to explore under what circumstances this troubling outcome could occur. This research should also confirm which antibodies and serological tests are truly predictive of past exposure as well as future immunity.

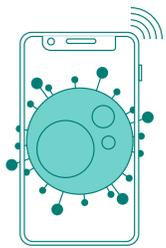
Additionally, much has been posited about the risk to healthy, young people. Therefore, this research program should also determine whether age or underlying health disorders mitigate immunity and complicate the predictive power of antibody assays.

ACTION: CREATE A COVID-19 DATA COMMONS AND DIGITAL PLATFORM



Federal, state, and private data platforms must be expanded to cover the full range of required Covid-19 data.

This will help identify any supply and demand constraints so that testing levels can be aligned at regional levels with illness burdens.



Innovative digital technologies can improve workforce monitoring and early detection of recurrent outbreaks.

When integrated into national and state surveillance systems, such innovations may enable the same level of outbreak detection with fewer tests. Promising techniques include anonymous digital tracking of workforces or population-based resting heart-rate and smart thermometer trends; continually updated epidemiological data modeling; and artificial intelligence projections based on clinical and imaging data.



Digital health records and insurance claims data of hospitalized Covid-19 patients should be used to improve Covid-19 diagnosis and treatment.

This requires that such data be aggregated and examined, while anonymizing personal identification, to determine optimal treatment paradigms and give leads for structured clinical trials.

International and U.S. Covid-19 Testing experiences

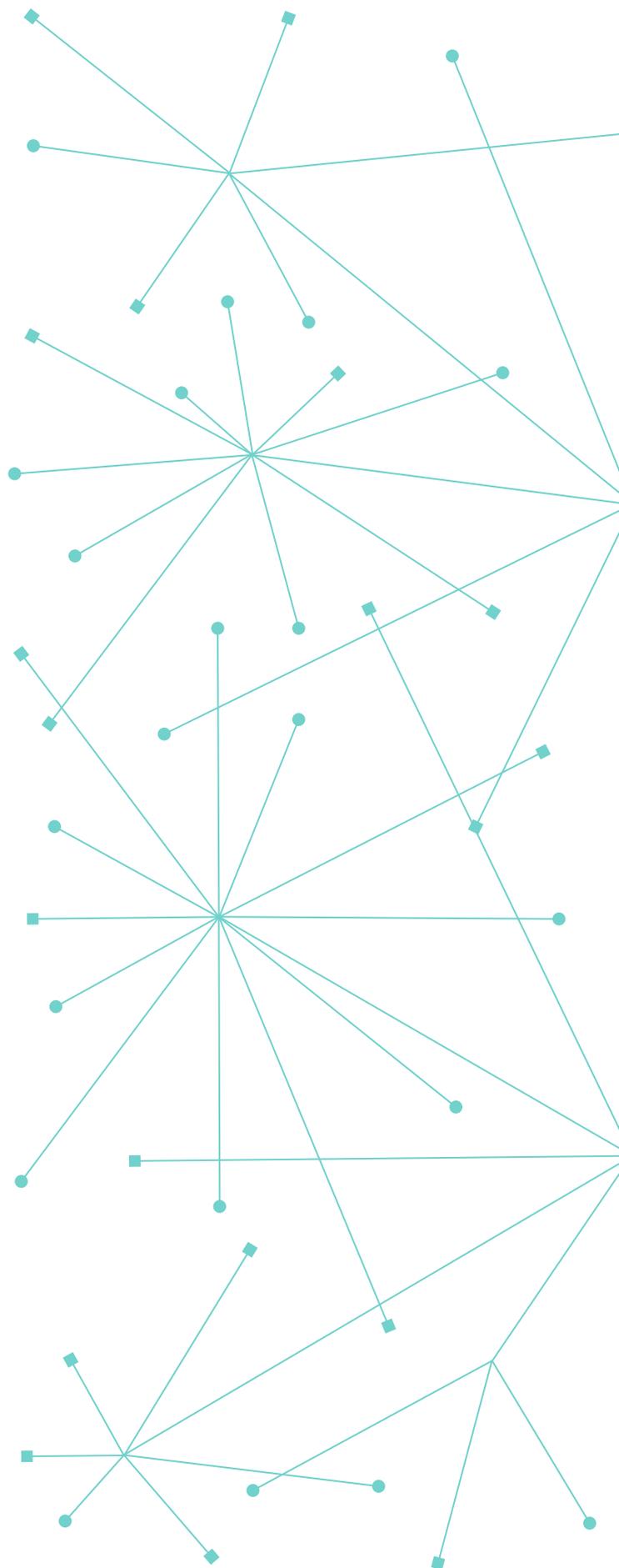
Experiences from countries that are making progress in containing the spread of Covid-19 point to the vital role of an early and aggressive public health response to SARS-CoV-2, the highly contagious virus that causes Covid-19. This includes administering testing on a large scale; isolating and monitoring infected people; and tracing recent contacts who may have been infected and testing them too. This public health response has also appeared to minimize the need for blunt, economically damaging restrictions such as lock-downs to reduce the spread of infections.

A detailed exploration of the exemplar countries and territories, notably South Korea, Singapore, Hong Kong, Iceland, Norway, South Africa, and Ghana, reveal emerging best practices for mounting an early and aggressive public health response to Covid-19: Start as early and quickly as possible, Scale diagnostic testing in at-risk populations, not just those with symptoms, invest in the health workforce, and leverage technology.

South Korea is one of the few countries to experience a serious Covid-19 outbreak and successfully flatten its curve through widespread testing and intensive contact tracing without shuttering its economy or overwhelming the health care system.⁹ South Korea offers a useful point of comparison with the United States, as both countries confirmed their first cases of Covid-19 within a day of each other. However, since then South Korea has registered a Covid-19 mortality rate that is half that of the United States, and South Korea has tested three times as many people for the virus per capita as the United States has.^{10,11} A crucial reason is that the Koreans prioritized quick action on Covid-19 testing.

Less than a week after the country detected its first case, health officials met with medical and pharmaceutical companies to discuss the production and approval of test kits. Within two weeks, even as confirmed cases remained below 100, thousands of test kits were shipping daily.¹² To spare hospitals and clinics from being overwhelmed by increased demand for testing, South Korean officials opened 600 testing centers. At drive-through stations, patients are tested without leaving their cars.¹³ When people test positive for Covid-19 in South Korea, health workers retrace their recent movements to find, test and isolate anyone the person may have had contact with. People ordered into self-quarantine must download an app that alerts officials if a patient leaves isolation.¹⁴

In recent weeks, there have been encouraging signs of a more aggressive and coordinated approach to testing and contract tracing in Massachusetts, Utah and Washington State.^{15,16,17} There have also been new efforts announced by major U.S. technology companies - Apple and Google have announced a joint effort to bolster contact tracing by building software into smartphones that relies on Bluetooth technology to track users' proximity to one another. Facebook is participating in a similar effort led by the Massachusetts Institute of Technology.¹⁸



References

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The Rockefeller Foundation is grateful to the following people who have contributed to this Action Plan through their participation in the video-conference Roundtable on Fast-Track Testing to Restart the Economy (April 9, 2020), through exchanges following the video-conference, or through other collaborations. Some may differ with aspects of it, or have stressed other matters of primary focus. All have contributed with the greatest sense of shared purpose at this time of national need.

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Proposal for a Pandemic Testing Board

Danielle Allen, Julius Krein,
Ganesh Sitaraman, & E. Glen Weyl

While stay-at-home orders are working to slow the spread of the coronavirus, the reopening of the economy and society could be achieved more safely and more swiftly under the following conditions: (1) deployment of a vaccine, which is projected to take 12-18 months, in which time there will be significant costs to the economy and harm to the social well-being of individuals and communities, or (2) a regime of almost universal testing. Widespread testing for both presence of the virus and for antibodies – on the order of millions of tests per day¹ will enable those who have antibodies or are not infected to re-enter the economy. It will also make it possible to quarantine only those who have been infected or who have been in contact with the infected, massively reducing the number of people who are required to stay-at-home.

The problem is that we cannot wait 12-18 months for a vaccine, and we do not have anywhere near the scale or coordination of resources needed to produce or deploy millions of tests per day. Further, travel and commerce will not truly be able to reopen unless there is sufficient global production and deployment of tests and ultimately vaccines. Although the Trump Administration established a **Supply Chain Stabilization Task Force** to source and deploy PPE, ventilators, and other equipment last week, so far as we are aware, there has not been a similar effort around testing.

We therefore propose the creation of a Pandemic Testing Board (PTB), akin to the War Production Board that the United States created in World War II, in order to massively scale up production and deployment of testing. The Pandemic Testing Board would consist of leaders from business, government, academia, and labor and would be tasked with two projects:

(1) Pandemic Testing Supply Initiative.

The PTB's goal would be to develop the scale of testing needed first to stabilize the United States, and then to offer exports to foreign countries that are facing shortages. It would have authority to identify supply chain elements necessary for manufacturing, procuring, scaling, and deploying any items related to testing, the power to procure these materials via contracting with producers and servicers, and the power to mandate production or services, akin to authorities in the Defense Production Act. Contracting firms would be required to follow all existing labor laws, including maintaining collective bargaining agreements.

(2) Pandemic Testing Deployment Initiative.

In order to deploy testing at scale, there will need to be sufficient personnel to test individuals outside of hospitals and doctors' offices. The PTB would:

- Craft recommendations for states to use the national guard to deploy testing in conjunction with business, labor, nonprofits, and academia
- If necessary, be authorized to create a Pandemic Response Corps, comprised of tested civilians, to assist in the testing
- Make recommendations on tracking the spread of the virus
- Before disbanding, craft recommendations on long-term preparedness.

¹ As of April 6 the US has tested at a rate of approximately 5316 tests per million, compared with 9062 per million in South Korea. Both the Center for American Progress and McKinsey recommend testing rates on par with those of South Korea. The American Enterprise Institute proposes raising testing to the level of 750,000 week. These levels of testing would support disease control in conjunction with a likely need for further applications of social distancing orders. Estimates of the level of testing that would be needed to replace collective quarantine orders with voluntary individual quarantine in a sustainable way from the Edmond J. Safra Center for Ethics Study Group (Harvard University) range from 5 million to 20 million tests a day, depending on the accuracy of contact tracing regimes used in support of testing. A serious commitment to testing would require the CDC and Department of Health and Human Services to engage the epidemiological community in full modeling of the possible testing pathways in order to determine the appropriate level to target.

Design of the Pandemic Testing Board

The Pandemic Testing Board could be designed in one of two ways:

- **Nationalist Model:** The board would consist of no more than 9 members, chosen either by the President or the director of the NIAID, and would be required to include members from business, labor, academia, and current government officials.
- **Federalist Model:** Congress would pass a law authorizing the states to create an interstate compact. The lead states would select a board of no more than 9 members including members from business, labor, academia, and government. On this model, the board would serve the states – rather than work through the federal government – but it would be funded by a congressional appropriation.

Transparency, Anti-Corruption and Ethics Measures, and Oversight

To ensure transparency, anti-corruption, and oversight, the PTB would be required to:

- **Transparency Measures**
 - Make immediately public all procurement contracts, including the terms, timing, and delivery
 - Make immediately public its deployment decisions
 - Produce a report to Congress and the American people detailing the PTB's activities and progress, on no less than a monthly basis
- **Anti-Corruption and Ethics Measures**
 - Prohibit contracting firms of raising CEO pay or offering bonuses for contracting years and two years thereafter
 - Prohibit stock buybacks for the contracting years and two years thereafter
 - Prohibit members of the PTB from purchasing stock in any company related to the PTBs activities for the duration of their time on the PTB plus an additional year

- **Oversight**

- The President or director of NIAID (if the nationalist model) or board (if federalist model) shall appoint an inspector general who will be tasked with (a) monitoring contracts for waste, fraud, and abuse, (b) producing a report of the PTB's progress every two months, (c) monitoring the anti-corruption and ethics requirements, and (c) conducting any other relevant oversight of the PTB's activities.

Appropriations

We recommend Congress appropriate sufficient resources to fund the Board and massively scaled up testing production and deployment.

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