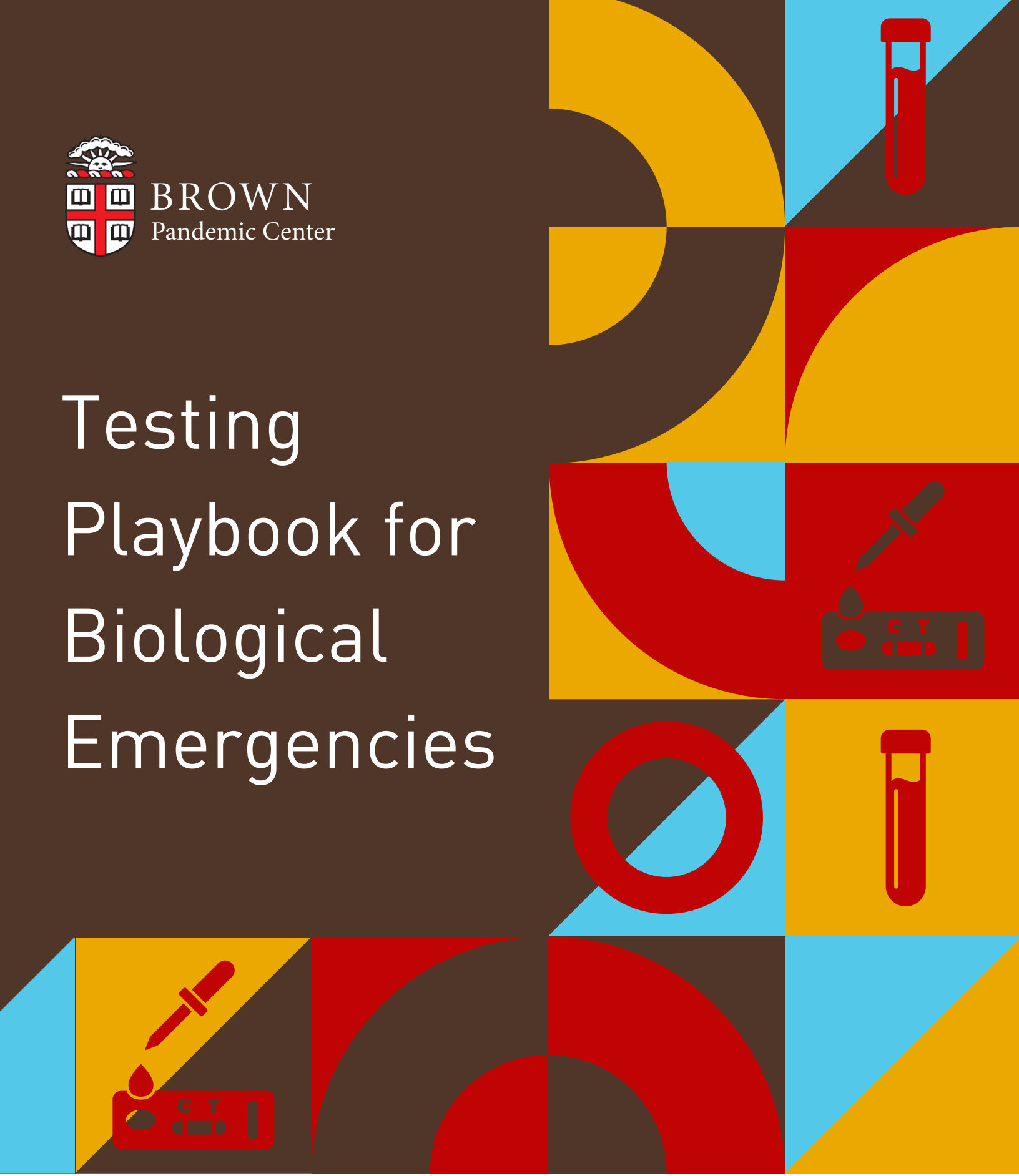
BROWN
Pandemic Center

Testing Playbook for Biological Emergencies



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About this Report

This analysis was authored jointly by experts based at the Brown University School of Public Health Pandemic Center, the Association of Public Health Laboratories (APHL), Arizona State University's College of Health Solutions, and the STAT Public Health Network at the Brown University School of Public Health. All views, positions, and conclusions expressed in this publication should be understood to be solely those of the Core Project Team. This document presents a summary of key themes that emerged in the literature and during interviews, but it does not necessarily represent unanimous consensus or endorsement by the participants and their organizations.


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Testing Playbook for Biological Emergencies

Preface

Testing is the foundation of biological response

The devastation caused by COVID-19 will not soon be forgotten. As we look back, there is one thing on which everyone can agree – we need to do better next time. And there will be a next time. Fundamental to doing better is having a plan for a targeted, rapid response that is based on accurate and timely information – information that can only be garnered through widespread testing.

See Page 39 for Calls-to-Action

While every disease outbreak will unfold differently, testing will always be at the center of response to an outbreak involving a contagious pathogen. In particular:

- Diagnostic testing supports patient care and informs healthcare provider treatment decisions;
- Rapid testing informs personal health decisions and public health disease control efforts; and
- Surveillance testing is essential for tracking the geographic spread of the pathogen.

The purpose of this Testing Playbook is to provide executive leaders with a guide to easy-to-use information that will inform their planning on how equitable access to accurate testing can quickly be provided to all communities during an emerging biological event involving an unexpected, contagious pathogen and how the data from testing can inform emergency decisions at each stage of a crisis.

We consider testing broadly from diagnostic testing for individuals, to public health surveillance testing, to wastewater surveillance.

The Playbook is ambitious, but pragmatic

The Testing Playbook aligns with the bold vision and targets outlined within the 2022 National Biodefense Strategy. Notably, the testing targets in that document are focused on pressing for pathogen-agnostic tests, followed by U.S. Food and Drug

Administration (FDA)-authorized pathogen-specific tests within no more than 30 days and point-of-need tests deploying the first available FDA-authorized test to the Public Health Laboratory (PHL)/Laboratory within 90 days. Our Playbook is consistent with, but pushes the envelope, on these targets, in line with U.S. challenges and best global practices for testing during the COVID-19 pandemic. Specifically, while we recognize that widespread use of a pathogen-specific test might not be available within the first 7 days, we strongly recommend one week as the ideal timeline for the Laboratory Response Network (LRN) laboratories. Best practices for preparedness should include the development of flexible testing platforms that are rapidly adaptable for the detection of new pathogens.

The Testing Playbook was written with the purpose of improving the US response to a biological emergency involving a contagious pathogen that could happen tomorrow. To that end, we consider the current state of play and how it could be improved and pushed toward greater effectiveness. While we call out actions that should be taken now–ahead of a new biological emergency–that would improve the US response to future threats, we also recognize that some visions for testing are not yet feasible. For example, while there is strong recognition that commercial laboratories should be quickly integrated into the US response to a biological emergency, the Playbook recognizes that it could take some time to bring these entities on-line in a crisis. In light of that, governmental laboratories, such as the Laboratory Response Network, will play an important role in supporting the initial US response.

The Playbook is informed by expert interviews from across the United States

This Playbook was developed collaboratively by subject matter experts at the Pandemic Center at the Brown University School of Public Health, Arizona State University's College of Health Solutions, the Association of Public Health Laboratories, and the STAT Public Health Network at the Brown University School of Public Health, with funding from the Peterson Foundation.

Importantly, more than 40 public health leaders were consulted to inform its creation from across federal agencies, state and local governments, commercial and hospital laboratories, academic medical centers, and diagnostic manufacturers. These experts were interviewed and asked to contribute their wisdom to ensure that the Playbook is both comprehensive in terms of the information obtained, and also diverse in encompassing a wide range of pandemic experiences. **The Playbook developers are grateful to these experts for their time, expertise, and commitment to making things better.**

This is a Living Document – we want your feedback

This Testing Playbook for Biological Emergencies is very much a living document. The developers

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envisage that it will be edited over time as we derive more knowledge. It also can be adapted for use in state and local government as well as for large employers by asking questions pertinent to regional administrations. To facilitate broad access to the Playbook, and to foster edits, additions, and future versions, Brown University School of Public Health has established a website at www.bettertestingnow.org where the document and additional information can be accessed.

Playbook Organization

The Playbook is divided into six sequential phases of a biological emergency, as defined in the National Biodefense Strategy.

- **Phase One** begins when a novel pathogen is first detected globally, outside the United States.
- **Phase Two** starts with introduction of the pathogen into this country.
- **Phase Three** follows the rapid early spread of infections.
- **Phase Four** looks at the broad acceleration phase.
- **Phase Five** describes sustained high levels of cases nation-wide.
- **Phase Six** occurs when the outbreak has been brought under control, and case numbers are declining.

The Playbook is constructed using a phase-specific series of questions, the answers to which will be essential information for making a plan for testing to support mitigation of the biological emergency.


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Purpose: **We seek to significantly speed access to testing in order to stop the spread of infectious disease and save lives in an outbreak in the United States**

The goal of this Testing Playbook (the Playbook) is to provide US decision-makers at the federal, state, and local levels with a clear and evidence-based guide for making rapid and effective decisions regarding the development, implementation, and scale-up of diagnostic testing in an infectious disease emergency. Experience during previous biological emergencies in the US has shown that a variety of testing approaches is necessary and will change as the scale of the emergency evolves. This rapidly changing environment has resulted in uncertainty for decision-makers, as well as members of the public. The Playbook is explicitly designed to decrease uncertainty by illustrating the steps to be taken at each stage, while consistently enabling rapid and equitable access to testing.

Achieving effective outbreak testing requires the following steps as early as possible and throughout a disease emergency:

1. **Public health laboratories (PHLs),** as first responders, must have access to accurate test kits and necessary reagents immediately (in a "ready state") to quickly identify new health threats and perform testing.

2. As quickly as possible, testing must be scaled in **hospitals, academic medical centers, and commercial laboratories.**

3. **Healthcare providers, their patients, and other individuals** must consistently have broad access to all testing modalities to detect infection, stop transmission, and support treatment and recovery.

4. Each of these sectors provides unique and critical capabilities to stop disease spread and save lives (see Table 1). **National coordination of these sectors is essential to optimize capacities and contributions.**

The Playbook is envisioned as a living document to be amended as knowledge grows and as different emergencies arise. While the current version of the Playbook is focused on use by the federal government, the concept and structure can be adapted for other situations, for example, state and local governments, as well as educational institutions or large businesses.

Table 1. Strengths and roles of the laboratory sectors during a biological emergency.

Laboratory Sector	Strengths	Roles
Centers for Disease Control and Prevention	National surveillance, test development and validation, reference and confirmatory testing, data gathering and analysis, public health guidance for all sectors	Surveillance and early testing response, long-term public health guidance
PHLs including LRN	Regional surveillance and reference testing, test development and validation (some), moderate testing throughput, genomic surveillance	Early testing response and initial surge, long-term regional testing & public health guidance
Other Federal Laboratories	Test development and validation, moderate throughput; usually serve particular populations e.g., VA network	Initial and sustained testing in specific populations
Hospital Laboratory	Clinical laboratories serving in-patients and their hospital network, low to moderate throughput, short TAT (but limited data systems)	Initial response in high-risk areas, ongoing care of patients in hospital network
Academic Medical Center Hospital	Advanced clinical laboratories serving in-patients, their hospital network and regional hospitals, test development and validation, moderate throughput, short TAT	Initial response in high-risk areas, ongoing care of patients, best practice dissemination
Commercial	Test development, high throughput, high automation, national network for specimen collection, electronic reporting; can work in coordination with remote collection sites	Expanded and sustained surge testing
Academia / Research Institute	Advances in diagnostic technology, validation of treatments, clinical research provides information on course of disease	Clinical research and scientific advances throughout the emergency

Laboratory Sector	Strengths	Roles
Point-of-care Testing Sites	Improved access to vulnerable populations, ease of operation, short time to results	Likely not available early in outbreak; great value in rural and vulnerable populations
Home-use	Close-to-person, improved access to vulnerable populations, real-time TAT to results, useful for screening and to guide individual decision-making	Individual control of health information
Diagnostic Manufacturers and Suppliers	Development and manufacture of laboratory instruments and supplies, laboratory assays, point-of-care instruments and home-use tests	Development, manufacture and distribution of assays and testing platforms
Professional Organizations	Provides data and information to support work of members of the organization and communicates with partner organizations	Coordination and communication throughout the outbreak

Fundamental Principles upon which the Playbook is based:

1. Infectious disease emergencies, including new pandemics, will regularly impact the United States and the world.

2. Testing for both diagnosis and surveillance will be critical to save lives and to understand, monitor, and contain the outbreak.

3. Testing should be available and accessible to all healthcare providers, public health officials, patients, and populations.

4. All laboratory sectors and diagnostic manufacturers should be actively involved in planning and implementing outbreak strategies including data collection. A standing Testing Readiness Commission[1] (TRC) should be established to coordinate and facilitate this. The commission should build on the Pandemic Testing Board concept and strengthen and sustain capabilities enabled in 2021 to be ready, at any time, for a wartime footing on testing so that our nation is prepared for any emerging outbreak.

5. The US should work now, during the inter-pandemic period ("peacetime"), to ensure that a variety of testing modalities is available during future pandemics in medical and non-medical testing sites.

1 A Testing Readiness Commission (TRC) would be a federal advisory commission composed of key non-governmental testing partners (e.g., the laboratory testing community, diagnostic manufacturers, public health officials, supply chain representatives, etc.). The commission does not currently exist but should build on the concept of a Pandemic Testing Board, creating an enduring capability that will prepare our nation to act faster for any emerging outbreak and support routine health services.

Roles for Laboratory Sectors during a Biological Emergency:

It is important to clarify the roles of the different laboratory sectors as they are discussed throughout the Playbook. Currently, the US does not have an integrated national laboratory system, although the COVID-19 pandemic illustrated that greater connectivity and coordination among the different sectors would have been of considerable benefit. Developing that connectivity and coordination is one of the goals of this Playbook. Laboratory sector involvement staging is briefly described below. Decision-makers must keep in mind that each emergency is different and staging of the sectors may change, or stages may occur in parallel, depending on how an outbreak evolves and how much early warning the public health system has.

I. Ready State

- **A ready, resourced, modern Laboratory Response Network (LRN).** At all times, national, state, and local public health laboratories (PHLs), including a subset of PHLs that are members of the LRN, must be resourced and ready to respond to any biological emergency. The LRN is a network of 130 governmental laboratories charged with maintaining preparedness for biological emergencies, including outbreaks resulting from either naturally occurring or intentionally dispersed pathogens (e.g., "bioterrorism"). LRN laboratories maintain standardized detection equipment, secure facilities, and trained personnel. Federal funding provided for public health departments and PHLs for the last several decades has built a network that can be deployed in future outbreaks and pandemics. The LRN was not activated by the Centers for

Disease Control during the COVID-19 pandemic since the network's portfolio of tests was limited to potential agents of bioterrorism, but it is an asset that could have been utilized, and should be utilized in the future, if the LRN had a broader mission and capabilities. PHLs receive test kits and testing guidance from a number of CDC programs, but utilizing a common, emergency response-focused, mechanism, such as the LRN would be advantageous. Consideration should also be given to expanding the LRN to include commercial and academic laboratories or at least increasing communications with them. In addition to the existing LRN infrastructure, the PHL "first responder" role is facilitated by the following:

1. LRN tests have traditionally been designed and validated by the CDC, specifically for use on the instruments that the PHL and LRN laboratories maintain and routinely use. This allows for immediate availability of tests in the LRN portfolio and expedites the availability of new tests developed by the CDC for use on known PHL instruments.

2. Public funding of LRN members obligates them to maintain a state of readiness by conducting regular proficiency testing for the high consequence pathogens, developing plans for dealing with surging test demand, and participating in periodic preparedness exercises.

3. LRN members have close ties to hospital and clinical laboratories in their jurisdictions ("sentinel laboratories"), which ensures an up-to-date inventory of available clinical resources and facilitates transfer of knowledge on protocols for rarely detected pathogens.

- **Wastewater Surveillance for Early Warning.** The establishment, standardization, and maintenance of a national wastewater surveillance testing network is critically important for early detection and characterization of an emerging pathogen. Toward that end, wastewater testing networks (such as the National Wastewater Surveillance System) that have been established for previous public health emergencies should continue to be supported. Maintaining these networks during peacetime is essential to ensure they can be adapted to detect and monitor new pathogen threats as they arise.

II. Parallel Capabilities

In addition to the vital role of PHLs, laboratory activities in other sectors should occur in parallel, rather than sequentially. If the pathogen is unknown, and no US test is available, a globally available test should be urgently pursued and quickly adapted to PHL and LRN platforms. Hospitals, designated academic medical centers, and commercial laboratories should pursue test adaptation and new test development, at least through design and validation stages, if not through FDA-authorization and manufacture. The first quality test that is developed within the United States, or globally should be used to establish FDA-authorized testing at public health and clinical laboratories. FDA's role in pre-vetting laboratories via the Pre-Emergency Use Authorization (PEUA) process will be valuable in expediting test availability.

III. Scale with Speed

While public health laboratories may be the first to establish testing, the US also has other sectors that should be harnessed to help establish and scale testing. This includes academic medical centers, commercial, and other clinical laboratories. Each of these sectors has different strengths (see Table 1) and, consequently, abilities to contribute to national testing needs. Coordination and clearly defined testing goals are needed to ensure that each sector is able to optimally participate in US testing efforts.

Testing approaches should be defined not only by current testing needs, but also by possible future demands. For example, if testing is primarily needed to diagnose and treat infection, that will likely involve different technologies and partners than if there is also a need to conduct widespread population testing to rule out contagiousness.

Establishing testing in **academic medical centers, other hospitals, and commercial clinical laboratories** is important even if there is sufficient "first response" PHL capacity, in order to avoid potentially costly delays in coordination and transport of specimens. If sufficient, quality government-developed test kits are available, and laboratories in a high-risk region have the appropriate instrumentation, kits should be provided to those facilities. If selected facilities in high-risk areas do not have the required instrumentation, then rapid adaptation and validation on hospital instrument platforms should be performed. An alternate approach would be to enroll and fund representative regional hospital laboratories in the LRN program so that they also have the common instrumentation.

- **Hospital laboratories** must have access to testing as soon as possible in an outbreak since, in the early stages of an outbreak, infected patients may first present at a hospital emergency department and may be the most severely ill. Access to testing must include a requirement for reporting results to public health authorities.

- **Academic medical centers** can be important test developers and will likely be called upon to provide initial diagnoses of patients and provide clinically relevant information about patient management (see below).

- **Commercial clinical laboratories** have the capacity and capability to perform high-volume tests of varying complexity, often leveraging **high-throughput, automated instrumentation. This sector generally needs some time to develop or adapt a test to work on their instruments and have it FDA-authorized. Commercial laboratories may not choose to ramp up their capacity to surge testing until a market is assured, and funds or reimbursement mechanisms to support commercial testing are in place.**

- **In a public health emergency, any laboratory sector with test development capabilities should not be prohibited from developing and using these tests, but rather, encouraged to do so.**

The COVID-19 pandemic has accelerated the development, and use, of **home-use** tests. These diagnostic tests are FDA-authorized for self-testing at home or in other non-medical settings. This means that individuals collect their own sample, perform the test, and read the result, without the need to send a sample to a laboratory. Home-use tests have supported the needs of rural and frontier communities with limited access to a reference laboratory or point-of-care (POC) testing site; employers who wanted their employees to be regularly tested; individuals at high risk of infection, and other individuals who need to understand whether they are infected. Many K-12 schools found that distributing these home-use tests was an effective way to reduce COVID risk by not having to conduct testing or sample taking during the school day on premises.

The federal government programs providing free tests, such as https://www.covid.gov/tests, greatly facilitated this adoption. Undoubtedly home-use tests will play an important role in future outbreaks, especially as the technologies improve for test sensitivity, data collection, and cost. The use of home-use tests, however, can erode surveillance capabilities unless alternative surveillance testing plans are implemented.

The authors recommend that the Testing Readiness Commission (TRC) specifically recommend surveillance testing protocols that supplement home-use testing, such as wastewater testing and representative survey-based or sentinel testing. The TRC should also consult with test manufacturers to determine if there are technological solutions that allow data to be captured from home-use testing that minimize bias and balances the need for individuals' confidentiality and the need for public information.

Bottom-line: When high capacity and use of multiple-testing modalities are required, all of these resources should be provided as soon and as broadly as possible ***when there is potential for a widespread outbreak.*** *Waiting for evidence of widespread transmission to scale testing will result in consequential delays.*

How should the Playbook be used?

The Playbook is structured around six sequential phases of an emerging biological crisis.

These are:

1. The first 48 hours when the pathogen has been detected anywhere in the world but has not yet been detected in the United States
2. The first 48 hours when the pathogen has been detected inside the US
3. Week one
4. Month one
5. 6-12 months/continuing response
6. Deceleration

In addition, this Playbook also describes a "Ready State"–that is, actions that must be taken in advance of a biological crisis to ensure an effective response in each of the above six phases.

Each section of the Playbook contains a short description of the phase, including the testing sector(s) involved and the priority actions that must be taken by the intended decision-makers.

Additionally, in envisaging the Playbook, the authors have aimed to make the scenarios and proposed actions relevant to a range of pathogens with different characteristics. Since it is not possible to accurately predict what the next pathogen may be, the authors wrote the Playbook to support future responses to "a novel pathogen with potential to cause a significant biological event of national or international concern" as described in the National Biodefense Strategy. Experience with the COVID-19 pandemic has influenced thinking about these notional scenarios and recommended actions contained in the Playbook. The details and outcomes of future events may also further influence this Playbook. For this reason, the Playbook is intended to be a living document that helps jumpstart planning and responses to novel scenarios.

While the Playbook describes actions to take, and questions to ask, when a new biological emergency may be about to enter the United States, there are certain essential functions, described below, that need to be developed now, in "peacetime," and maintained in readiness. The authors of the Playbook have made the assumption that these functions (1) will be in place, (2) have been shown to be functional (3) are regularly exercised, and (4) can be rapidly activated when the emergency event occurs.

Ready State:
Structures and functions for testing that should be in place prior to a biological emergency

[see calls to action on page 39 for more detail]

1. **Establish a permanent National Testing Lead within the White House now.** This function should be embedded as part of the Office of Pandemic Preparedness and Response Policy (OPPRP) and the existing White House National Security Council Directorate on Global Health Security and Biodefense.
2. **Establish a sustained (federal) Testing Readiness Commission now,** building on the Pandemic Testing Board concept, that can rapidly integrate the private sector into the response to emerging outbreaks and advise the federal government about new diagnostic technologies.

3. **Sustain and exercise a network for regular testing operational discussions among state, local, tribal, and territorial (SLTT) governments and federal operational officials responsible for testing.** The federal government should sustain a permanent communication network that links the National Testing Lead and other federal officials with oversight over testing with designated individuals who have operational responsibilities across all SLTTs. This effort should build on existing efforts, such as the STAT Public Health Network, which was launched with philanthropic resources from The Rockefeller Foundation, and continues through Brown University School of Public Health, to serve as a peer-to-peer network during the pandemic.

4. **Establish a national "ready state" that is prepared at all times to rapidly detect an emerging biological threat by bolstering and modernizing the biological arm of the LRN.** The Centers for Disease Control and Prevention (CDC) should work with public health laboratories (PHLs) to fulfill the mission of the Laboratory Response Network for Biological Threats (LRN-B), as well as expand its capability and capacity.

5. **Strongly encourage the Food and Drug Administration (FDA) to develop a portfolio of pre-vetted test protocols to speed regulatory test approval in an emerging biological crisis, including by promoting the use of FDA's Pre-Emergency Use Authorization (PEUA) test submission under Section 564 of the Federal Food, Drug, and Cosmetic Act (FD&C Act).** It is essential that laboratories are able to access quality test kits as quickly as possible when a new outbreak arises. Laboratories and test manufacturers should solicit a proactive FDA review and feedback (via a PEUA submission) of test designs, protocols, and accompanying validation plans prior to a health emergency.

6. **Promote the rapid use of effective point-of-care, including home-use, testing devices.** The COVID-19 pandemic has demonstrated that point-of-care and home-use testing devices can both provide major public health benefits and meet FDA quality standards. This can be accomplished by: (1) expanding access to point-of-care testing in

non-medical testing sites by using the Clinical Laboratory Improvements Amendment (CLIA) waiver process, and (2) expanding access to free home-use tests by promoting their use for equitable public health benefit and providing clear guidance for optimal test selection and use in different settings. This will allow individuals to make timely personal decisions regarding their own health and the safety of those with whom they may come into contact.

7. **Make quality testing data accessible and useful to the American people,** including by expanding wastewater surveillance, providing easy-to-use analyses and maps, and sustaining and bolstering the Center for Forecasting and Outbreak Analytics (CFA) and the Data Modernization Initiative (DMI).

8. **Purchase standing federal testing capacity with designated commercial laboratories, academic medical centers, and test manufacturers.** The federal government should establish advanced purchase agreements to surge and scale testing by buying standing capability within commercial and academic laboratories that can rapidly expand testing capacity during pandemic crises and seasonal outbreaks alike. The federal government should establish routine contracts with diagnostic manufacturers and with commercial and academic laboratories, which will be regularly available for emergencies in all regions of the United States to surge and scale testing capacity when a health emergency occurs.

9. **Establish a permanent program for moving tests into communities quickly during health emergencies and seasonal outbreaks, to enhance awareness, choice, and equitable access.** Early testing enhances equity by ensuring that individuals have the information needed to make informed decisions, gives clinicians and citizens the tools they need to make choices, and allows healthcare facilities to best prepare. The federal government should convert initiatives like Increasing Community Access to Testing (ICATT) into permanent programs.

10. **Involve the private sector early, and closely, in responding to biological emergencies.** Test manufacturers and suppliers, commercial laboratories, and pharmacies were instrumental in surging testing to health laboratories, clinicians, hospital systems, community health clinics, tribal healthcare providers, and people at home. Prior to the next biological crisis, the proposed Testing Readiness Commission will be instrumental in ensuring that all relevant testing sectors are tapped to their fullest potential during an emergency.

11. **Prioritize testing readiness within pre-existing emergency funding mechanisms.** Pre-existing emergency funding mechanisms, including the Public Health Emergency Fund, the Infectious Diseases Rapid Response Reserve Fund, the Disaster Response Fund, and the Hospital Preparedness Program, should contain sufficient reserves to support widespread testing until additional emergency funding becomes available through Congress.

Phase 1: The first 48 hours after a novel pathogen has been detected anywhere in the world

Scenario during this phase

This phase starts when global surveillance networks have identified, in Country X, a novel pathogen and/or an unusual cluster of disease that appears to be infectious and has a reasonable likelihood of being highly transmissible human-to-human. No cases of disease have yet been identified in the United States; however, an introduction into the United States should be considered highly probable.

Information that should be obtained

1. **Has the President of the United States indicated to the White House OPPRP that a state of emergency may be declared in the near future?** A state of emergency is declared when public health or the economic stability of a community is threatened and extraordinary measures of control may be needed. Examples include a disease outbreak in people (public health) or animals (economic stability, food security). https://training.fema.gov/emiweb/downloads/is111_unit%204.pdf

2. **Has the White House testing lead alerted all federal and state government, academic, hospital, and private-sector laboratories to the potential for an emergency declaration?** The White House testing lead should begin to utilize two-way communication channels to disseminate to laboratories information about a potential emergency and to obtain from laboratories operational information about their abilities to meet testing expectations. This communication will be important to support the development of a national testing strategy

3. **Is the White House testing lead working closely with the Department of Health and Human Services (HHS) and CDC?** The HHS Secretary is authorized to take measures to prevent the entry and spread of communicable disease from foreign countries into the US and between states. The authority for carrying out these functions daily has been delegated to HHS/CDC (see Section 361 of the Public Health Service Act (42 U.S.C. § 264) and 42 Code of Federal Regulations (CFR) 70 and 71).

4. **What is known about the pathogen?** The White House should immediately request information from CDC about the pathogen and early access to specimens and sequence information to support test development. This should include active lines of communication and coordination across global health agencies, US government agencies, diagnostic manufacturers, suppliers and laboratories in all sectors (public, hospital, commercial). This information should guide the national testing strategy–i.e., define who will need to be tested, what testing is likely to be needed for diagnosis, screening, and/or public health surveillance, what testing technologies are most likely to be effective, etc. This information must continually be reassessed and the testing strategy modified as appropriate.

    a. Is this a novel pathogen that has not been seen before, or is it related to a known pathogen?

    b. Where is the outbreak? Has it spread to other countries?

    c. Is there evidence that the pathogen is easily transmitted to contacts?

    d. Is there evidence that a particular population is more vulnerable (young, elderly, healthcare workers, socioeconomic groups, specific workforces, gender, etc.)?

    e. Has the pathogen been sequenced? Is the sequence available to the US?

    f. Can the US obtain specimens from individuals infected by the pathogen?

    g. Are there global agreements in place to receive, and to share pathogen information with public health authorities in other countries?

    h. Are there diplomatic and academic relationships between US officials, researchers, and global experts that can rapidly provide information? Can the Department of State, HHS, and others make these calls quickly?

5. **Is the pathogen already present in the US?** The

White House should use all available resources, modes of communication, technologies, and surveillance methods to determine if the pathogen is already in the US. The White House should move to Phase 2 (The first 48 hours after a novel pathogen has been detected in the United States) immediately if the pathogen appears to be highly transmissible, especially if respiratory.

a. Are there any reports of unusual illness in individuals presenting to hospital emergency departments or urgent care centers in the US?

b. Has metagenomic sequencing of wastewater samples detected the presence of a novel pathogen anywhere in the US?

c. Has the CDC sent a Health Alert Network (HAN) update to clinical providers asking them to watch for unusual illness that cannot be attributed to a known pathogen? Have efforts been made to ensure that clinical providers who do not receive HAN updates are aware of an unusual illness?

6. **Is there an appropriate diagnostic test available? If so, how long will it take for a version of the test to become available to the LRN, and more broadly to healthcare providers (in affected areas and nationally) and the general public?** The White House testing lead, working with HHS, should identify whether any relevant FDA-authorized or approved diagnostic test already exists in the US and has already been deployed to the LRN. As an example, while there was not an FDA-approved test specific for the mpox West African strain that caused the 2022 outbreak, a less specific but already approved LRN test for non-variola orthopoxviruses, was used to detect mpox.

   a. What stocks of the pre-existing test kit are available and what is the testing capacity of the CDC and LRN laboratories that have them?

   b. Has the test been evaluated at the CDC and FDA for accuracy, specificity, and sensitivity, for its ability to detect the novel pathogen? Is there value in using the available test as an interim test? If the existing test is considered accurate and specific and appropriate for widespread use, the production of test kits should be expanded by activating pre-existing US government-private industry contracts.

   c. Has a test been developed by global health agencies such as the World Health Organization (WHO)? Is the protocol available? If no FDA-authorized test is available in the US, and a global test has been CE marked, then this test should be urgently developed, validated, manufactured and submitted to the FDA. (CE marking indicates that a product has been assessed by the manufacturer and deemed to meet European Union (EU) safety, health, and environmental protection requirements.)

   d. If no test is available in the US, or a globally developed test is not considered adequate, then the design and development of a more accurate test should be expedited.

7. **If a new test must be developed, who should design, develop, and validate the test?** If a suitable test doesn't already exist, initial design and development of a new test for public health and diagnostic use should occur at the CDC and at previously designated and funded Advanced LRN laboratories. Test development could also occur at high-functioning private laboratories, in readiness, in case high-volume testing is required. The test design should be based on the globally available pathogen sequence and use synthetic control reagents for validation if human specimens are not available. The new test should be designed for a range of automated testing platforms to cover different degrees of laboratory capacity.

   a. What type of test will be needed to find cases

in the early phases of the outbreak e.g., laboratory-based, POC, or home-use?

b. What will be the best specimen type e.g., nasal, back of throat, saliva, urine, breath, blood, etc.?

c. What kind of technology is necessary e.g., PCR, antigen, clinical chemistry, imaging, or serology?

d. When testing for one pathogen, what other relevant pathogens with similar symptoms should labs be testing for in a "rule out" capacity?

e. Which laboratories have used the FDA PEUA process for pre-review of protocols and validation plans?

8. **What capacity for testing exists in all sectors of US laboratories?** The White House testing lead should update and confirm accuracy of the data available on laboratory testing capacity for the most likely test technology and instrument platforms, of all sectors within the national laboratory system (government, hospital, academic, and commercial). This information will be required at all stages of the outbreak, as the need for expanded testing evolves. The group should also update and finalize a national test kit deployment plan. The specifics of the plan will depend on what tests are available, what tests may have been reviewed through the PEUA mechanism, when they will be manufactured and FDA-authorized, and what laboratories are authorized to use the test and have the instruments capable of supporting the test.

a. Are federal databases up to date (e.g., Centers for Medicare & Medicaid Services (CMS) and CDC) on information about laboratory capacity for testing?

b. Do federal databases contain correct contact information, including laboratory license holder and address, for laboratories? This will be important information for deploying test kits and for resolving logistical challenges at the local level.

Phase 2: The first 48 hours after a novel pathogen has been detected in the United States

Scenario during this phase

In this phase, a novel pathogen has been detected in wastewater (which usually precedes the appearance of human cases) or has been reported in humans in the US in at least one location (e.g., a sick patient who presented at a hospital emergency department). The symptoms seen in patients fit the description of cases seen elsewhere in the world. Minimal information is currently available on pathogen characteristics, including modes of transmission, the period when an individual is infectious, and whether the disease can spread asymptomatically.

During this phase, the first available FDA-authorized test kit should be rapidly distributed to the PHLs and the LRN, and also to hospital laboratories and commercial laboratories in high-risk areas, unless there are severe limitations on the supply chain. It is likely that this first test will be a molecular (PCR-based) test as these are usually the most sensitive. It is conceivable that diagnosis of some emerging pathogens may require another methodology including serology or mass spectroscopy. Initially, the test will be needed for confirming a diagnosis in patients with symptoms, establishing surveillance to identify and track where and how the pathogen is circulating, and to guide efforts to slow or stop its spread. Knowledge of available laboratory supplies, including sample collection supplies, is key.

In this phase, speed and clear public communication of what is known and what is not known, as well as coordination of all activities, is critical. The White House testing lead should have regular updates on all available information, in coordination with CDC, the HHS Administration for Strategic Preparedness and Response (ASPR), the DHS Federal Emergency Management Agency (FEMA), and other relevant departments and agencies.

Information that should be obtained

1. **How can the White House testing lead anticipate, and plan for multiple possible outbreak scenarios, with different demands and modalities of testing this early in the outbreak?** Outbreak modeling, at CDC and at academic research institutions, based on multiple possible scenarios, should be a continuous activity and will inform the need for testing capacity and associated supplies.

   a. Based on how quickly the outbreak has spread globally, can modeling estimate what testing capacity will be needed at this stage?

   b. What does wastewater surveillance and/or disease in humans indicate about the degree and speed of transmission in the US?

   c. Is there sufficient testing capacity within the PHL/LRN laboratories to support the need for testing at this early stage?

   d. Should hospital and commercial laboratories be activated to test, to enable broader access for healthcare providers, or is it too soon?

   e. If testing capacity and/or supplies are limited, is there a national plan for distributing testing supplies to high-risk areas?

   f. What is the worst-case scenario for testing needs?

2. **What information do we need to decide which hospitals and/or select commercial laboratories, if any, should be provided the first-approved test in addition to public health laboratories?**

   a. How many high-complexity hospital laboratories exist in the targeted high-risk region? Should one hospital laboratory serve as a regional hub?

   b. How many public health laboratories exist in the target high-risk region? What is the total testing capacity of these laboratories?

   c. How far away from the target area is the public health or hospital laboratory so that specimen transport time and routes can be calculated?

   d. What is the density and size of the population the target region hospitals serve?

   e. Do the hospitals have a centralized high-complexity laboratory?

   f. Do they have emergency departments or off-site urgent care centers?

   g. Do the hospital laboratories have the appropriate instrument systems to support the first available test?

   h. Do the hospital laboratories have the ability to aggregate test results to submit to the federal government?

3. **Given limits on availability and supply, what criteria should be used to determine which individuals should be tested in this phase when testing may be limited?** The FDA, in coordination with CDC, SLTT health authorities and subject matter expert (SME) clinicians should rapidly develop initial criteria for approval of testing using the first available FDA-authorized test. Example criteria that have been used in the past include: specific symptoms, direct contact with a positive case, recent travel history and/or demographics, if a particular age group is thought to be more vulnerable.

   a. Is there sufficient information available for the CDC to make a decision about the need to test asymptomatic people?

   b. Based on epidemiological information and modeling, will the US government target tests

to address the highest likelihood areas/regions first?

4. **Beyond ensuring access to testing for healthcare providers and public health officials through the LRN, hospital labs, and commercial labs, when should testing be expanded to enable widespread access for individuals in this phase?** If neither supplies nor test kits are limiting, then, within the FDA's intended use requirements, diagnostic and surveillance testing should be as broadly available as possible. Broad testing will support efforts to estimate the spread of the pathogen and determine whether asymptomatic individuals may be infected and able to transmit the pathogen. Surveillance testing in congregate living and other high-density areas would also be of value. Broad testing will allow infected persons and their contacts to be isolated/quarantined to limit further transmission. Broad surveillance testing using established regional programs that perform wastewater testing will also give the US government a first approximation of how far the outbreak has already spread. Once testing criteria are formally established and available on the CDC website, the state health departments' process to approve requests for testing should be simple, accessible, and efficient.

5. **What individual data elements should be collected in this phase?** The TRC should work with the FDA, CMS, and CDC to determine if the previously defined minimal essential set of meta-data that needs to be collected when laboratories test for this pathogen is sufficient and appropriate for this pathogen. This minimal data set should be uniformly used by all laboratories performing testing in order to support analysis to inform public health action.

6. **When should additional tests be created by commercial laboratories and diagnostic manufacturers?** All relevant pathogen information should be supplied by the TRC to commercial laboratories and diagnostic manufacturers to support test design, in parallel to government laboratories. If the outbreak spreads, and a market has developed as well as availability of funding, the commercial sectors are likely to create and manufacture their own test or adapt the one developed by government laboratories to their own platforms.

7. **How will further development of tests be supported in the US?** The further development of tests by commercial laboratories or diagnostic manufacturers may be dependent on federal government action in determining (1) the existence of a public health emergency under section 319 of the Public Health Service (PHS) Act, and (2) the issuance of an Emergency Use Authorization (EUA) declaration under section 564 of the FD&C Act. The latter declaration enables the issuance of EUAs. Federal funding or guarantees of insurance reimbursement will also be required.

8. **When should the kits of the new test be deployed?** As soon as the new kits have been manufactured at pre-designated and funded facilities with good manufacturing practices (GMP), the kits should be deployed to all LRN laboratories, public health laboratories, and designated hospital laboratories while awaiting FDA approval/authorization for use. This pre-deployment will save time once the test has been authorized.

9. **What federal funding will support reimbursement for testing in this phase?** The OPPRP should use available federal emergency-designated reserve funds to support free testing at both public health laboratories, and hospital laboratories when necessary, and initiate US government discussions regarding the need for long-term funding to support universal testing, especially at commercial laboratories.

a. Does outbreak severity, or potential severity, qualify for a Stafford Act declaration by the President, which would trigger FEMA assistance?

b. Does access to reserve funds require a Declaration of Emergency via the Stafford Act?

10. **How important is it to involve diagnostic manufacturers at this stage?** Manufacturers may want to wait before developing new platforms, or adapting existing platforms, until it is clear how large the outbreak will become. Nonetheless, this sector should be kept fully informed by the TRC. In addition, discussions should occur regarding expanding funding to the National Institutes of Health (NIH) Rapid Acceleration of Diagnostics (RADx) initiative which has provided a structure and incentives for the private sector to innovate and develop new testing approaches.

11. **If the outbreak spreads, and testing needs expand, supplies may become limited. How can this risk be minimized?** The TRC should activate pre-existing US government contracts with private partners. It will be essential to use modeling data to anticipate and get ahead of supply constraints by alerting private manufacturers to the coming need for scale-up. In addition, the TRC should recommend that laboratories employ multiple testing platforms so that testing does not rely on one set of reagents and supplies.

12. **Having accurate data for monitoring the outbreak, and for modeling, will become very important if the outbreak expands. How can this need be met?** Building on the national infrastructure created by the Data Modernization Initiative, the TRC should anticipate (1) the need for sharing of testing data (2) plan solutions for challenges, including solutions developed in private industry and (3) communicate regularly with testing laboratories and diagnostics manufacturers. As far as possible, laboratories should base test requisitions and result reporting on common data elements.

13. **How can the work of researchers at academic institutions and private companies be used as a resource during an outbreak?** The TRC should develop a subgroup specifically charged with evaluating innovative solutions developed in academia and/or private industry to address challenges posed by the outbreak. The NIH RADx initiative developed during the COVID-19 pandemic provides an excellent model.

Phase 3: Week one

Scenario during this phase

Health authorities have identified multiple clusters of cases in different US states, indicating that there has been more than one introduction and probable local transmission. Preliminary information is emerging that can be used to support public health action regarding the mode of transmission of the pathogen and its incubation period. Diagnostics manufacturers are beginning to design and develop their own tests based on the available sequence. HHS has declared a national emergency.

The first available FDA-authorized test has been deployed to PHL/LRN laboratories, which are actively testing. A surge process is in place to transfer samples if one regional LRN laboratory becomes overwhelmed and cannot maintain a 24-hour internal turnaround time (TAT), which is important to ensure test results support public health and medical decision-making. To do this, LRN laboratories will need to have interoperable test requisition and reporting systems. In the past, legal challenges have limited abilities to transfer specimens across state lines, which must be resolved. Plans have been executed for distribution of kits of the first available FDA-authorized test to hospital laboratories and potentially some commercial laboratories as a backup to the LRN laboratories. This is dependent on the state of the supply chain. Hospital laboratories and some commercial laboratories are also adapting the first available test to their own high throughput platforms and will pursue FDA-authorization. It appears likely that the need for testing will exceed the capacity of the LRN and hospital laboratories and the US government is actively engaging commercial laboratories. The FDA is reviewing the validation data from new tests with rapid turnaround for a decision – no more than 21 days. The CDC has confirmed enough of the early results by targeted sequencing of the amplicon, such that confirmation by a second method is no longer required.

Supply chains are holding but mechanisms are in place to ensure materials are being transported to areas of greatest need. Funds from federal reserves are needed to enable and support widespread testing. POC and home-use test platforms are being developed to detect the new pathogen but will not be available for some time.

Information that should be obtained

1. **As the outbreak expands to multiple states, how will disparate testing needs and logistics be coordinated?** State, large city, and tribal health authorities should identify a qualified individual to act as the testing lead to coordinate all regional testing issues. This individual should have both scientific and logistical expertise. The TRC should utilize a pre-established, regular communication and problem-solving channel with these individuals. An example is the STAT Public Health Network launched by The Rockefeller Foundation and supported by Brown University School of Public Health.

2. **How will equitable access to testing be assured, especially until POC and home-use testing becomes available?** State, large city, and tribal health authorities should ensure specimen collection and subsequent laboratory testing is widely available as soon as possible. Testing must be equitably accessible and appropriate for the population being served, such that mass specimen collection sites, testing and collection sites in rural/frontier states, pop-up sites, and drive-through sites are quickly established.

3. **How can the work of researchers at academic institutions and private companies be used as a resource during an outbreak?** The TRC should develop a subgroup specifically charged with evaluating innovative solutions developed in academia and/or in private industry to challenges posed by the outbreak.

4. **As the need for testing expands, the time that it takes from specimen collection to reporting of a result may lengthen. This will reduce the individual and public health value of the result. How can this be avoided?** All laboratories should plan to support surge capacity including appropriate staffing and funding. This may include planning for alternate overlapping shifts for staff and should also include rest periods for all involved staff. Laboratories should strive to maintain an internal TAT of 24 hours or less from receipt of specimen to provision of results to the healthcare provider, the patient, and/or public health authorities. The time from collection of the sample to availability of results should not exceed 48 hours.

5. **As more diagnostic tests are developed, the FDA may not be able to review them in a reasonable time. How can this be avoided?** The TRC should ensure FDA is able to expand the staff of the section that will review and evaluate tests and testing protocols and encourage prioritization of tests that have previously undergone a PEUA review. Regulatory submissions should receive initial feedback in fewer than seven days and decisions after complete submissions in less than three weeks.

6. **How can the US government limit the impact of mis- and dis-information?** The TRC should ensure that public messaging regarding the role of testing is clear and concise. Messaging should indicate that the information will change over time as the US learns more. The same information must be made available through as many media platforms as possible.

7. **How can the US government (CDC, FDA, HHS, and other agencies) effectively communicate to providers about who should test, when they should test, and how to access tests?** What mechanisms can the US government use to ensure that providers have the latest recommendations?

    a. Has the CDC sent out an updated HAN alert?

    b. Have HCP professional societies been asked to communicate correct information to their

members?

c. Have engagements via town halls, meetings, and webinars with national and regional professional societies, health systems, and state medical boards been scheduled?

8. **As testing expands, supplies may become a limiting factor. How can this risk be mitigated?** The TRC should continually use the results of outbreak modeling, using multiple scenarios, to anticipate, communicate, and coordinate to address supply constraints.

Phase 4: Month one

Scenario during this phase

The pathogen has been detected in many states and the caseloads indicate the US is in the rapidly rising part of the epidemic curve. Federal emergency funding mechanisms have been put in place. Public health laboratories are at capacity but, provided the supply line is stable, are able to provide testing with a turnaround time from specimen collection to provision of results of less than 48 hours, which is less than the disease incubation period. Since the need for testing has exceeded the capacity of the LRN and hospital laboratories, the US government has incentivized large commercial laboratories to develop and validate tests on high-throughput automated platforms; having received FDA authorization, commercial laboratories have rapidly increased capacity for testing. Diagnostic manufacturers are developing POC and home-use tests and these platforms are being tested in clinical trials and will soon be reviewed by the FDA. The FDA should be providing clear test development and validation guidance for manufacturers, including how many samples should be used in validation studies.

Genomic sequencing to detect variants as well as drug resistance mutations is widespread and a plan, with funding, for appropriate US coverage for viral and serological surveillance has been developed by the CDC. The knowledge about the pathogen has increased, including an understanding of which populations are most vulnerable, the route of transmission, which are the most effective specimen types and whether asymptomatic individuals can transmit the virus. It is not yet known whether natural infection produces any, or potentially long-lasting, protection. Vaccines and therapeutics are not available.

The plans and infrastructure are in place for surveillance and reporting of results of laboratory-based tests. Plans and infrastructure are being developed for surveillance and limited reporting of home-use tests and POC tests so that they can be put in place as soon as the devices are authorized. Appropriate ways of communicating a rapidly evolving situation to the public have been determined as well as designating the right officials to be the designated communicators.

Information that should be obtained

1. **How will equitable access to testing be assured?** The TRC should deploy a variety of modalities and approaches to testing including specimen pooling, non-medical collection methods such as self-collection, and accessible testing sites in non-medical areas. Most importantly, POC tests and home-use tests should be deployed broadly, as soon as the tests are FDA-authorized and available.

   a. Is the US government directing federal funding entities such as RADx and the Biomedical Advanced Research and Development Authority (BARDA) to aggressively pursue diagnostic manufacturers to develop POC and home-use tests?

   b. Are POC and home-use tests FDA-authorized and available in sufficiently large quantities?

   c. What community organizations and/or large employers can help expand access to testing to the greatest number of people?

   d. Have states organized testing sites at public libraries, food banks, congregate and low-income housing, and other locations to reach people where they are?

2. **What information, valuable for informing public health action, should be collected from home-use tests?** While home-use tests are in development, the TRC, along with subject matter experts with modeling and epidemiology expertise, should work with manufacturers to develop a minimal data set that is non-identifying, but will provide information useful for modeling and epidemiology. For instance, (1) electronic notification that a test box has been opened, and (2) a positive result has been obtained, and (3) the zip code, may be sufficient to initiate further public health investigation.

3. **How can private industry be incentivized to develop new diagnostics?** The TRC should work closely with the NIH RADx program, BARDA programs, or similar initiatives to provide a structure and incentives for the private sector to innovate and develop new testing approaches to lower cost and increase consumer usability and that can be used in non-medical testing sites and in rural and frontier states. This will require funding but will help to ensure equitable access and support for testing in all populations.

4. **How can positive and control samples be collected to facilitate necessary clinical trials for test manufacturers to speed up FDA submission?** The TRC should support the use of synthetic biological control material, as well as work with the LRN and state health officials to facilitate access to samples for test manufacturers.

5. **How can therapeutic agents be best linked to testing to create the most efficient and effective distribution system?** Therapeutic agents to treat people with disease and/or prevent disease in the vulnerable are a critical piece of crisis response. Whether treatments exist or new ones are developed (and become FDA-authorized), how can testing be linked to treatment in both time and space? The TRC should develop an integrated national "test to treat" approach that allows broad and easy access at multiple locations including retail pharmacies. This effort was established late during the COVID-19 pandemic, which may have limited its full impact.

6. **Can the US government maintain the collection of data needed to inform public health action before, during, and after the next crisis?** The TRC, with the CDC, should plan for, and fund, long-term population scale surveillance and monitoring, including wastewater testing. The CDC should

continue use of outbreak modeling based on multiple possible scenarios to inform the level and location of testing and supply needs. This information should be supplied to the TRC.

a. Is whole genome sequencing to monitor the emergence of variants being funded by CDC at state and contract laboratories to ensure national coverage?

b. Are states willing to send positive and control samples to CDC?

c. Are medical sites being used for collection of specimens for genomic surveillance? This should include airports that are major points-of-entry to the US.

d. Is there a technology able to track at least the number of home-use tests bought and used?

7. **How will the US government keep all partners informed?** Robust lines of communication and coordination between and within state, local, tribal and territorial governments, and the White House, should be supported by using an existing coordination mechanism like the STAT Public Health Network that brings together federal, state, and local operational officials regularly to troubleshoot testing. Such a communication network ensures that knowledge and best practices are shared and problems are solved quickly.

Phase 5: 6-12 Months / Continuing response

Scenario during this phase

The pathogen has shown a capacity for extensive genomic variability and the resulting ability to circumvent individual immunity or evade the therapeutic effect of drugs. Because of this, there have been successive, non-seasonal surges of cases. Hospitals are at capacity, and healthcare professionals are exhausted. Commercial laboratories, with US government financial support, continue to provide testing in the population, as do public health laboratories. Non-medical testing sites are being heavily used either as collection sites with specimens being processed with POC platforms or being delivered to laboratories. Home-use tests are also now widely available through government funding although data on their use is not readily available. Vaccines and therapeutic agents are not yet available. Maintaining capacity and capability for a high level of testing in the face of successive surges is critical.

Information that should be obtained

1. **How can laboratories support staff to minimize burnout and limit the number who leave the profession?** State, large city, and tribal health authorities, hospital administrators, and commercial laboratory directors should support resilience in the laboratory, healthcare, and diagnostics workforce by all appropriate means to avoid burn-out. This may include providing support from professional counselors, supporting remote work when work duties permit, and flexible work schedules to accommodate child-care and elder-care needs.

2. **At this stage, POC and home-use diagnostics have been FDA-authorized, are federally funded, and are widely available. How can they be best utilized to promote access to testing?** State, large city, and tribal health authorities as well as health officers in rural and frontier communities should integrate home-use testing into their plans as soon as these tests become available.

3. **What proportion of the population has been infected?** If high throughput, validated serological tests are available, is it possible to estimate the level of immunity in the population by performing population-wide serological studies? Knowing the proportion of the population that has been infected, coupled with an increased understanding of the level of protective immunity that infection provides, will allow modelers to estimate how much testing is still needed to prevent spread.

    a. Are regular regional serosurveys being performed?

    b. Can, and if so, when, states and CDC move from conducting surveillance by counting every case to using sentinel surveillance or right-size sampling such as is used for influenza?

4. **How can the US government ensure sustained testing?** The TRC should advocate to ensure sustained federal funding to support a robust testing infrastructure. For example, federal funding to support widespread use of POC and home-use tests will provide assurance of an ongoing market for manufacturers to produce the devices, and promote use of the devices in all populations, irrespective of health insurance status. When determining how and where to deploy supplies and testing devices, the TRC should use both population-based calculations, as well as a population density-based adjustment. This will account for testing in rural areas where the population is low, but where there are great distances between potential testing sites, such that a non-proportional number of devices is needed to support equitable access.

Phase 6: Deceleration

Scenario during this phase

The US is now on the downward slope of the epidemic curve, case numbers are steadily decreasing, and no new significant variants have been detected. Public health measures are being lifted all over the US and the population has psychologically moved beyond being in a pandemic state of mind. The population of healthcare workers and laboratory sciences has dramatically decreased with staff retiring or leaving the profession.

It is not well understood whether, or when, the current outbreak will be substantially over, whether the pathogen will become seasonal, or whether further variants will emerge. At this stage, it is understood that the pathogen cannot be easily eliminated, and that the disease will likely become endemic. There are no school, college, or business closures. Emergency status is likely to be lifted which will affect how data, important for determining public health action, are collected. For example, CDC and state health departments may no longer mandate case reporting.

Federal funding is being rolled back and non-medical testing sites are closing and most testing is provided by the standard procedures and reimbursements in a combination of commercial, hospital, and public health labs. Home testing is being promoted as an effective screening method that supports individual decision-making. New home testing data collection systems have been implemented and a consensus has been reached on the appropriate non-identifying metadata to collect. Depending on the timeline to reach the deceleration phase, vaccines may or may not be available. If available, vaccine uptake is being measured and some level of population immunity has been achieved. The number of vaccinated persons has been estimated, as have estimates of what percentage of the population has been infected, and thus acquired some level of natural immunity.

Information that should be obtained

1. **How will the US government be able to determine that the outbreak is coming to an end?** The TRC should use all modeling and epidemiological tools, in close coordination with CDC, to determine if the disease is endemic or can be eliminated with further targeted use of vaccines, testing, and other public health measures.

2. **How will the US government detect and monitor population levels of the pathogen in a non-emergency state?** To ensure that surveillance is maintained outside of emergency declaration, CDC should work with the Council of State and Territorial Epidemiologists to request that states include the new pathogen on the list of diseases that must, by law, be reported to the state department of health so it can continue receiving data on hospitalizations and caseloads. Council of State and Territorial Epidemiologists (CSTE) would continue to be necessary for organizing national notification.

3. **How will the US government ensure that home-use tests are broadly available for screening or diagnostic purposes if needed?** The US government should create supply contracts with several manufacturers to produce and maintain an in-date supply of antigen (or other appropriate technology) consumer-usable home-use tests that can be sold in retail pharmacies and/or distributed to households for at-home use. Additionally, if the US government requires all public and private health insurance programs to reimburse the purchase of home-use tests, this will provide an assurance of a market to test manufacturers and promote use of the devices in all populations, irrespective of health insurance.

4. **What capabilities and infrastructure should remain in place?** In order to monitor the evolution of the outbreak, the TRC should advocate for funds to be available so that data streams remain in place to allow collection of morbidity and mortality data, as well as test use data, attributable to the impact of the pathogen.

    a. Are wastewater surveillance programs still funded and covering all regions of the US?

    b. Is genomic sequencing still funded at state and contract laboratories?

5. **How can the US government establish a "warm base" so the US does not have to start from scratch when another epidemic or pandemic occurs?** Through federal government funding, the TRC should establish financial incentives, including guaranteed minimum supply contracts to encourage manufacturers and laboratories to develop and maintain just-in-time plans for emergency scale-up capacity.

6. **If the pathogen becomes endemic, then some level of testing and treatment will need to remain available. How can this be maintained? At this stage, payment for testing for individuals will transition to traditional health insurance mechanisms.** The TRC, working with CMS and public and private healthcare payors, should ensure that accessible, timely, and affordable testing and treatment are available to all individuals at risk, whether insured or not.

Calls-to-Action to enhance and improve United States readiness before global early warning systems are activated

Structural and Functional Recommendations

Structural Recommendations

1. **Establish a permanent National Testing Lead within the White House now.** This function should be embedded as part of the OPPRP and the existing White House National Security Council Directorate on Global Health Security and Biodefense. This position should become the US government hub for synthesizing information to inform the President and to provide cross-agency coordination and communication.

2. **Establish a sustained (federal) Testing Readiness Commission now, building on the Pandemic Testing Board concept, that can rapidly integrate the private sector into the response to biological emergencies and advise the federal government about new diagnostic technologies.** Test manufacturers and suppliers, commercial laboratories, and pharmacies are instrumental in surging testing to health laboratories, clinicians, hospital systems, community health clinics, tribal healthcare providers, and people at home. Yet their early and full participation in the US COVID-19 response was hampered by the lack of a national mechanism to coordinate these entities and, in some cases, by a lack of incentives to participate in testing. The Pandemic Testing Board was a good idea that should be expanded, strengthened, and sustained as a standing Testing Readiness Commission focused on enabling national testing preparedness for any biological emergency, as well as improving access to testing more broadly across America. This collaboration will serve as the basis for continuous improvement of the nation's testing infrastructure and testing technologies in readiness for the next emergency. The inter-pandemic "peacetime" phase should be used to establish and regularly exercise a testing forum in which new diagnostic technologies are discussed in a pre-competitive environment.

3. **Sustain and exercise a forum for regular testing operational discussions among state, local, tribal, and territorial (SLTT) governments and federal operational officials responsible for testing.** The federal government should sustain a permanent communication network that links the National Testing Lead and other federal officials with oversight over testing with designated individuals that have operational responsibilities across all SLTTs. During "peacetime," the network should discuss routine and ongoing health responses and preparedness. During an emerging biological event, the network should meet regularly and enable direct, two-way communication among the White House, HHS, and SLTT testing leads. This effort should build on existing efforts, such as the STAT Public Health Network, which was launched with philanthropic resources from The Rockefeller Foundation to serve as a peer-to-peer network during the pandemic. To date, aside from the STAT Public Health Network, there is no dedicated and official mechanism for linking federal health emergency operational agencies, such as ASPR and FEMA directly to all SLTT (together or via regions) to exchange information quickly, understand best practices, and fill needs and gaps.

Functional Recommendations

4. **Establish a national "ready state," that is, prepared at all times, to rapidly detect an emerging biological threat by bolstering and modernizing the biological arm of the LRN.** CDC should work with PHLs to fulfill the mission of the LRN-B, as well as expand its capability and capacity. While the stated mission of the LRN-B includes responding to biological emergencies, the network was not activated during the COVID-19 pandemic. Additionally, the current focus has mainly been on providing assays to detect high-priority pathogens that represent potential risks for bioterrorism. By working with academia to develop pathogen-agnostic methods for initial detection of novel pathogens, and by involving the PHLs in subsequent method development and validation for laboratory testing, a broader capability will be achieved. The modernization initiative will also require adapting the current assays to automated extraction methods and high-throughput platforms. By strengthening inter-network cooperation, the ability to surge testing among LRN-B laboratories in an emergency will make more efficient use of the national testing capacity that exists within the network. These efforts, in total, will make more effective use of an existing laboratory response infrastructure.

5. **Strongly encourage FDA to develop a portfolio of pre-vetted test protocols to speed regulatory test approval in an emerging biological crisis, including by promoting the use of FDA's PEUA test submission under Section 564 of the FD&C Act.** It is essential that laboratories are able to access quality test kits as quickly as possible when a new outbreak arises. Laboratories and test manufacturers should solicit a proactive FDA review and feedback (via a PEUA submission) of test designs, protocols, and accompanying validation plans prior to a health emergency. Under its existing authority, FDA can receive PEUA submissions at any time, for tests that could help address a biological emergency potentially triggering a declaration under Section 564. Following a Section 564 emergency declaration, FDA should prioritize tests that had prior PEUA reviews. FDA should also prioritize EUA submission reviews from test developers who are willing to make test protocols publicly available, use commonly available reagents and instrument platforms, and are willing to authorize other laboratories to use these protocols. FDA should also prioritize reviews from experienced, high-volume, and high throughput central lab kit developers and, at the appropriate time following a declaration, experienced, high-volume POC and/or home-use test kit manufacturers.

6. **Promote the rapid use of effective point-of-care and including home-use, testing devices.** The COVID-19 pandemic has demonstrated that point-of-care including home-use devices, can both provide major public health benefits and meet FDA quality standards. This can be accomplished by: (1) expanding access to point-of-care testing in non-medical testing sites by using the CLIA waiver process; and (2) expanding access to home-use tests by promoting their use for equitable public health benefit and providing clear guidance for the optimal test selection and use in different settings. This will allow individuals to make timely personal decisions regarding their own health and the safety of those with whom they

may come into contact. Unfortunately, much confusion remains regarding how best to use these tests to maximize their public and personal health benefit. Using information gained during the COVID-19 pandemic, best practices should be defined, using clear unambiguous language, and distributed so that it is widely accessible. This guidance should be included in training programs for healthcare workers using point-of-care devices at waived testing sites, and in the packaging used for the commercial sale or government distribution of home-use devices. When a new pathogen emerges, as soon as relevant information is available, the best practice information should be updated.

7. **Make quality testing data accessible and useful to the American people, including by expanding wastewater surveillance, providing easy-to-use analyses and maps, and sustaining and bolstering the Center for Forecasting and Analytics and the Data Modernization Initiative.** Americans do not currently have regular or rapid access during outbreaks to comparable data that is visualized in a useful format. The CDC Center for Forecasting and Outbreak Analytics and the CDC Data Modernization Initiative are vital to ensure seamless and interoperable data connectivity and transfer among all laboratories and – ultimately – to ensure citizens and federal, state, local, tribal, and territorial decision-makers have the information they need to make informed and community-focused choices. These should be resourced at a level that allows for meeting the goals in this Playbook and to provide day-to-day situational awareness that is visible to the public.

8. **Purchase standing federal testing capacity with designated commercial laboratories, academic medical centers, and test manufacturers.** The federal government should establish advanced purchase agreements for new test development or test modification, and for surge and scale testing, by buying standing capability within commercial and academic laboratories that can rapidly expand testing capacity during pandemic crises and seasonal outbreaks alike. The federal government should establish routine contracts with diagnostic manufacturers and with commercial and academic laboratories, which will be regularly available for emergencies in all regions of the United States to surge and scale testing capacity when a health emergency occurs. These contracts should guarantee funding of a minimum market size to incentivize manufacturers and laboratories to scale up processes in an emergency. This would include standing capacity to surge high throughput testing for clinical purposes from commercial and academic labs, as well as capacity to surge manufacturing of test kits for individuals.

9. **Establish a permanent program for moving tests into communities quickly during health emergencies and seasonal outbreaks, to enhance awareness, choice, and equitable access.** Early testing enhances equity and provides the information needed to make informed decisions, gives clinicians and citizens the tools they need to make choices, and allows healthcare facilities to best prepare. Meeting the testing needs of different populations, especially underserved communities and indigenous and tribal communities, will require developing testing technologies and methods of data collection for use in non-medical settings. The federal government should convert initiatives like Increasing Community Access to Testing (ICATT) into permanent programs for a wide variety of public health testing. Not only will this enhance

access to testing for infectious diseases and support under-resourced communities, but the data will also contribute to national surveillance programs.

10. **Involve the private sector early, and closely, in responding to biological emergencies.** Test manufacturers and suppliers, commercial laboratories, and pharmacies were instrumental for surging testing to health laboratories, clinicians, hospital systems, community health clinics, tribal healthcare providers, and people at home. Early and full participation by these entities was hampered by lack of a national mechanism to coordinate these entities and, in some cases, by a lack of funding incentives for commercial entities to participate in testing. Prior to the next biological crisis, the proposed Testing Readiness Commission will be instrumental in ensuring that all relevant testing sectors are tapped to their fullest potential during an emergency.

11. **Prioritize testing readiness within pre-existing emergency funding mechanisms.** Pre-existing emergency funding mechanisms, including the Public Health Emergency Fund, the Infectious Diseases Rapid Response Reserve Fund, the Disaster Response Fund, and the Hospital Preparedness Program, should contain sufficient emergency reserves to support widespread testing until additional emergency funding becomes available through Congress.


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Additional Reading:

The Playbook was developed to focus specifically on the role of diagnostic and surveillance testing in mitigating a biological emergency. There are a number of other post-pandemic documents that include testing requirements but generally focus more broadly on the complexity of factors required to mount an effective response to a biological emergency. In particular, readers are referred to the recently released "Biological Incident Annex to the Response and Recovery Federal Interagency Operational Plan" (FEMA). In addition;

- National Biodefense Strategy and Implementation Plan for Countering Biological Threats, Enhancing Pandemic Preparedness, and Achieving Global Health Security (White House)
    - ◊ Agencies are currently drafting a Diagnostics Joint Capabilities Plan for how the US government will achieve target 3.2: Rapidly and Widely Available Diagnostics. This effort is being coordinated by the White House National Security Council and the Office of Science and Technology Policy.
- Proposal for a National Diagnostics Action Plan for the United States (American Clinical Laboratory Association, Johns Hopkins Center for Health Security)
- Lessons Learned from the COVID-19 Pandemic to Improve Diagnosis (National Academies)
- Lessons Learned from COVID-19 Are Informing Preparation for Future Public Health Emergencies (FDA)
- EvidenceCommons (A comprehensive, searchable, interactive database of clinical and research publications focused exclusively on COVID-19 tests and testing protocols.

Interviewee List*

Name	Title	Organization
Susan Van Meter	President	ACLA
Coleman Cutchins	Lead Pharmacist	Alaska Department of Health
Anne Zink	President, CMO	Association of State and Territorial Health Officials (ASTHO); Alaska Department of Health
Elizabeth White	Assistant Professor of Health Services, Policy, and Practice; Adult Geriatric Primary Care Nurse Practitioner	Brown University School of Public Health, PACE Organization of Rhode Island
Kathleen Jacobson	Chair Testing Task Force	California Department of Public Health
Paul Kimsey	Former Director	California Public Health Laboratory
Ren Salerno	Director, Division of Laboratory Systems	CDC
Wendi Kuhnert	Senior Advisor for Infectious Disease Laboratory Science, Office of Laboratory Science and Safety	CDC
Dylan George	Director	CDC Center for Forecasting and Outbreak Analytics
Henry Walke	Director	CDC Office of Response and Readiness
Jennifer Rakeman	Senior Director, Medical Affairs; Former Assistant Commissioner, Public Health Laboratory	CEPHEID; New York City Department of Health and Mental Hygiene
Andrew Adams	Senior Program Analyst	Council of State and Territorial Epidemiologists (CSTE)
Elizabeth Daly	Director of Infectious Disease Programs	Council of State and Territorial Epidemiologists (CSTE)
Janet Hamilton	Executive Director	Council of State and Territorial Epidemiologists (CSTE)
Megan Tompkins	DMI Implementation Lead	Council of State and Territorial Epidemiologists (CSTE)
Ruth Lynfield	Secretary & Treasurer; State Epidemiologist and Medical Director	Council of State and Territorial Epidemiologists (CSTE); Minnesota Department of Health
Steven Santos	Chief Operating Officer	COVID-19 Testing/Diagnostic Working Group

Name	Title	Organization
Hilary Marston	Chief Medical Officer; Senior Advisor for Global COVID-19 Response	FDA; White House COVID-19 Response Team
Timothy Stenzel	Director	FDA Office of In Vitro Diagnostics and Radiological Health
David Bibo	Former Deputy Associate Administrator for Response and Recovery	FEMA
Danielle Haydel	Infectious Disease and Emerging Pathogens (IDEP) Manager	Louisiana Department of Health
Robert Goldstein	Commissioner	Massachusetts Department of Public Health
Aaron Barnes	Supervisor for Emergency Response and Preparedness, Biolabs	Minnesota Department of Health
Anna Strain	State Infectious Disease Lab Manager, Former Virology Unit Supervisor	Minnesota Department of Health
Kathy Como-Sabetti	Epidemiology Supervisor in Emerging Diseases	Minnesota Department of Health
Bruce Tromberg	Director	NIH NIBIB & RADx Tech
Mark Hamlin	State Testing Lead; Public Health Policy Advisor	Ohio Department of Health
Rachel Griffin	Project Manager	Ohio Department of Health
Beth Marlowe	Senior Scientific Director, Head R&D Infectious Diseases	Quest Diagnostics
Meghan Starolis	National Science Director, Infectious Diseases	Quest Diagnostics
William A. Meyer III	Medical and Technical Laboratory Consultant	Quest Diagnostics
Michael Iademarco	Rear Admiral and Assistant Surgeon General; Deputy Assistant Secretary for Science and Medicine	U.S. Public Health Service; Office of the Assistant Secretary of Health
Kendra Babitz	COVID-19 State Testing Director	Utah Department of Health and Human Services
Angela Caliendo	Professor and Executive Vice Chair of Medicine	Warren Alpert Medical School of Brown University
Heather Drummond	COVID-19 Vaccine Director; Former Testing Branch Manager, COVID-19 Response	Washington State Department of Health
Matt Hadorn	Testing Branch Manager; Former Testing Operations Supervisor	Washington State Department of Health

Interviewee List*

Name	Title	Organization
Demetre Daskalakis	National Monkeypox Response Coordinator; Director of the Division of HIV/AIDS Prevention	White House; National Center for HIV/AIDS
Tim Manning	Former COVID-19 National Supply Coordinator	White House COVID-19 Response Team
Tom Tsai	Former Testing and Treatment Coordinator; Assistant Professor in Health Policy and Management; Assistant Professor of Surgery	White House COVID-19 Response Team; Harvard T. H. Chan School of Public Health; Brigham and Women's Hospital
Matt Hepburn	Former Senior Advisor	White House Office of Science and Technology Policy
Sheldon Campbell	Professor of Laboratory Medicine; Director of Clinical Laboratories for the VA Connecticut Healthcare System	Yale School of Medicine
David Peaper	Associate Professor of Laboratory Medicine; Director, Medical Microbiology Laboratory; Director, Virology Reference Laboratory	Yale School of Medicine; Yale-New Haven Hospital; VA Connecticut Healthcare

*This document presents a summary of key themes that emerged in the literature and during interviews. It does not necessarily represent unanimous consensus or endorsement by the interviewees and their organizations.


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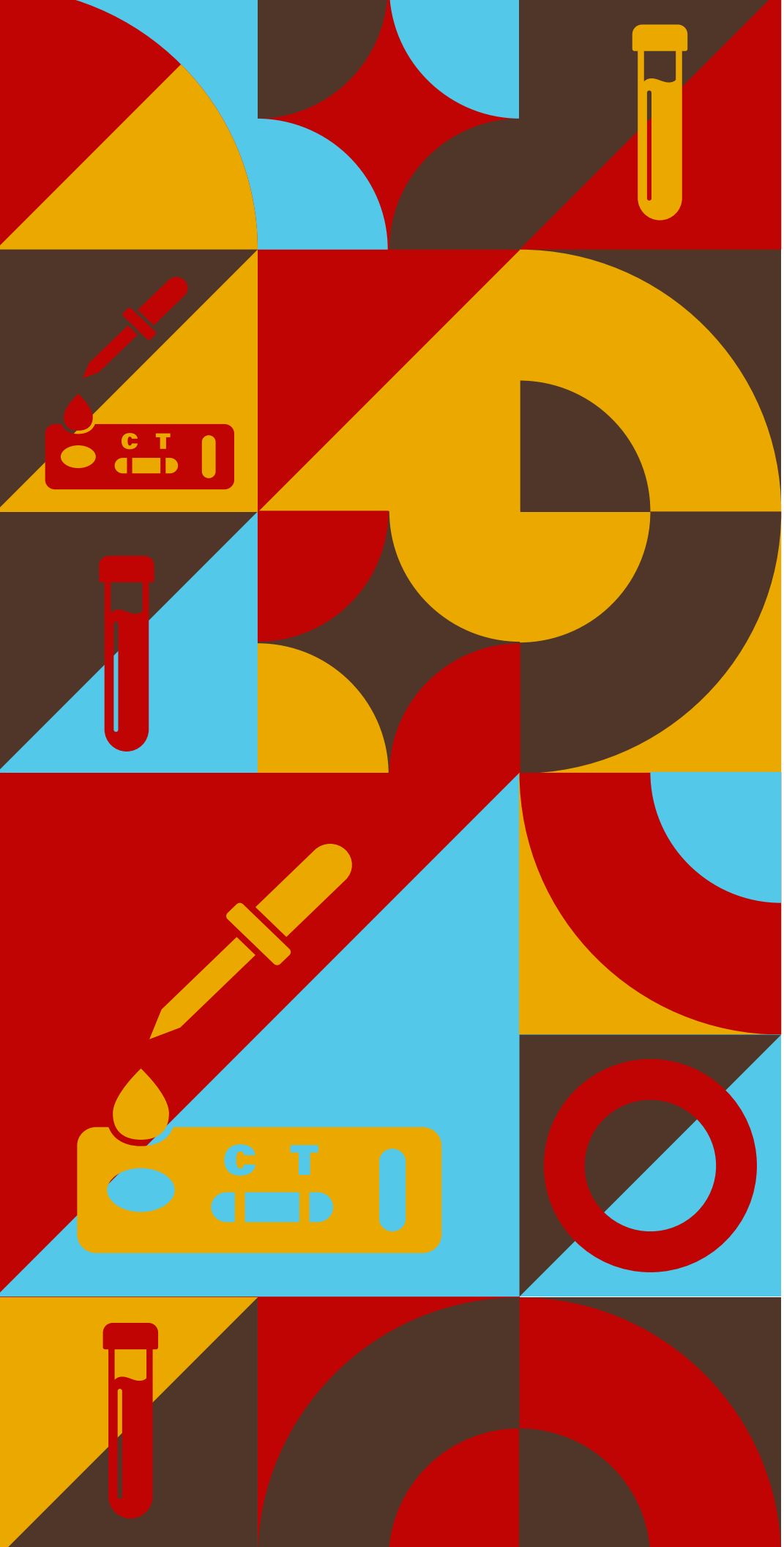

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Testing Playbook for Biological Emergencies