RADXUP

COVID-19 Equity Evidence Academy 2021

TRANSLATING INNOVATIONS IN TESTING

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Executive Summary

The COVID-19 pandemic has clearly exposed the structural inequalities throughout our society that have long denied opportunities for good health for so many people in the United States. Many people are more likely to contract COVID-19 because of the jobs they work, the neighborhoods and homes they live in, and the resources their communities have, or do not have. The same people are also more likely to feel the economic effects of the pandemic including loss of work, housing, childcare, and access to healthcare. While this is the case, the pandemic's impact has opened up new ideas and opportunities to build health equity.

Health disparities have long existed in the United States, leading to shorter, sicker lives for too many people. But 2020 brought to light the severity of these disparities, as people of color, people from rural areas, and people with less opportunity are those most likely to lose family members to the pandemic. The need to focus on building health equity has never been greater.[1] Communities across the nation are leading with innovative solutions that may not only ease the burden of the pandemic but also create long-term structures that lead to healthier, more equitable communities. This Data Profile and the COVID-19 Equity Evidence Academy are meant to provide a starting place to jointly discuss these innovative ideas and make change in communities.

An Evidence Academy is an engaged conference approach to understand the state-of-the-science, or the current evidence of COVID-19

testing and related factors in the populations most impacted. *The COVID-19 Equity Evidence Academy 2021: Translating Innovations in Testing* is an invited inaugural event hosted by the [Rapid Acceleration in Diagnostics-Underserved Population](#) (RADx-UP) initiative in partnership with the [Community Engagement Alliance (CEAL) Against COVID-19 Disparities](#) initiative. This Data Profile, which complements the Evidence Academy, is a brief overview of the different projects across the nation, and a snapshot of the current body of knowledge on COVID-19 testing in communities of greatest impact, or those hardest hit by the pandemic.

To successfully stop COVID-19, we must be able to identify it. Testing is crucial, but the way to quickly, resourcefully, and successfully test as many people as possible will vary in different communities. New technologies are important, but they must be paired with an understanding of the needs and cultures of different communities. Before reviewing the information provided, we must consider the context.

The person living in a multi-generational house who works a low-wage essential job* and has to pay out of pocket for a COVID-19 test. The person in prison. The caregiver in a nursing home. The farmworker living in remote, crowded housing with little access to care. Testing is not simple under these or any other conditions, but for some, it can be even more complicated. From getting access to affordable and accessible testing, to getting clear information about what

When we refer to those hit hardest by the pandemic, we mean the Black, Latinx and Indigenous communities fighting against the virus—but there are other groups that intersect by race, ethnicity, gender, geography, and socioeconomic status. These include:

- people living in congregate housing
- people with disabilities
- women who are pregnant
- children
- Blacks/African Americans
- Hispanics/Latinxs
- American Indians/Alaska Natives
- Asian Americans
- Native Hawaiians and other Pacific Islanders
- socioeconomically disadvantaged populations
- underserved rural populations
- sexual and gender minorities
- people with precarious legal status in the United States
- people with limited English proficiency and low literacy
- people who are homeless
- people who are victims of abuse or persecution
- people with multiple risk factors such as social isolation, mental illness, and substance use

actions to take with test results, many barriers— often stemming from structural inequalities— have prevented people from getting what they need.

While many types of work can be called "essential," in this context, a person is considered an essential worker if they work in critical industries such as health care, child care, sanitation, transportation, and in businesses that must stay open such as grocery stores and gas stations.

The COVID-19 crisis is far from over. Although vaccines have become available for more people, testing will remain a life-saving tool. Also, current vaccine communication and distribution issues may further complicate existing factors related to testing. Beyond the pandemic, the strategies used to address testing (and vaccine) equity may inform how we address the larger structural inequalities and consequently improve health and save lives in the long term.

This Data Profile includes:

- **A list of all funded projects through the National Institutes of Health (NIH) Rapid Acceleration of Diagnostics-Underserved Populations (RADx-UP) program**—a network of 69 funded projects across the United States, as well as all 11 **NIH-funded Community Engagement Alliance (CEAL) Against COVID-19 Disparities** research teams working in 11 different states. These projects reach over five different racial and ethnic populations, over eight different types of health-related factors, and include partnerships with academic institutions, community organizations, faith-based organizations, public health agencies, and other nonprofit organizations.

- **A summary of types of COVID-19 tests and testing applications** currently used.

- Literature summaries that reveal the complexities of testing in different populations, the cross-cutting issues, and the need for more collaborative research efforts to better understand how to appropriately translate and address the factors that can increase COVID-19 testing across communities. These summaries cover:

  – COVID-19, Race/Ethnicity, and the Social Determinants of Health
  – Social and Economic Costs for COVID-19
  – COVID-19 Testing Environments
  – Contact Tracing in Vulnerable Populations
  – COVID-19 Communication and Messaging
  – Trustworthiness and Equity in COVID-19 Testing

- **In Context Perspectives** from community members, researchers, and laboratory scientists woven throughout the Data Profile.

- **A glossary of common terms** used in testing, as well as other terms used in the Data Profile.

- **Equity Evidence Academy 2021 Agenda At-A-Glance**

The intent of this Data Profile is to help ground attendees of our inaugural COVID-19 Equity Evidence Academy so that we begin our conversation with a common understanding of the challenges ahead of us, as well as potential solutions. During the Evidence Academy, attendees will discuss these topics in the context of the communities they serve to devise and report strategies for action.

This document serves as an initial roadmap prior to the Evidence Academy, to guide us all toward a healthier future, one in which all communities have the best chance for good health.

RADx-UP and CEAL Initiatives

RAPID ACCELERATION OF DIAGNOSTICS-UNDERSERVED POPULATIONS (RADx-UP)

RADx-UP is an NIH initiative aimed to ensure that all residents of the United States have access to COVID-19 testing, with a focus on communities most affected by the pandemic. RADx-UP is developing strategies to reduce disparities in COVID-19 testing by supporting 69 community-engaged projects across the country with established community partnerships. These projects are seeking to understand and alleviate the barriers to COVID-19 testing in their communities. They are researching COVID-19 testing patterns, data on disparities in infection rates, and disease progression and outcomes.

RADx-UP is part of a larger NIH initiative to help speed innovation in the development and implementation of COVID-19 testing. There are three other programs: RADx[SM] Tech; RADx[SM]

Advanced Technology Platforms (RADx-ATP); and RADx[SM] Radical (RADx-rad).

COMMUNITY ENGAGEMENT ALLIANCE (CEAL) AGAINST COVID-19 DISPARITIES

CEAL is an NIH-wide effort led by the National Institute on Minority Health and Health Disparities (NIMHD) and the National Heart, Lung, and Blood Institute (NHLBI). The initiative

> *Community members want to know 'What does it mean when I get tested? What do I have to give up to go get a test?'*
>
> **NORMA MARTI**

[IN CONTEXT] Community Perspective: Norma Marti, BA, CHW

Norma Marti, BA, CHW
Minority Outreach Program Consultant in the Children & Youth Branch of the Women's and Children's Health Section, Division of Public Health, NC Department of Human Services, Raleigh, NC

"I think the community wants to know whether the scientist that they don't know, that they don't have a relationship with, is really a human being and that human being is doing something that's going to make a difference in their lives, in their family's lives. It is important to come out of the ivory tower once in a while, whether it's through print media or social media or even a phone call/robo call—something that just says, 'This is who I am, this is what I do, and this is what I want to share with you.' ... Community members want to know 'What does it mean when I get tested? What do I have to give up to go get a test? Will I have to miss work or what if I have to travel?' I mean, things that affect my day-to-day life that may make it harder for me to go out and get tested....

"It's one thing to just go get a test. It's another thing to have someone explain it to you, and how you then can take care of yourself if you're positive, or what you have to do if you're negative, and then understanding [that] what you have to do may not be possible. Do you isolate for 14 days? Who's bringing in the food? Who's bringing in the money? Who's taking care of the kids? That all is also part of that testing process. So, it's not just testing but also providing with resources... to know how they can manage the result of that test when it's brought back to them."

supports 11 multi-partner research teams in 11 states, with technical and administrative support provided by Research Triangle Institute (RTI) International, a nonprofit research institution.

CEAL focuses on addressing misinformation around COVID-19, engaging trusted partners and messengers in the delivery of accurate information, educating communities on the importance of inclusion in clinical research to overcome COVID-19, and most importantly, health disparities. This is especially important for people unduly burdened by COVID-19 such as African Americans, Hispanics/Latinxs, and American Indians/Alaska Natives, who account for over half of all reported cases in the United States. CEAL teams also conduct research on the most effective strategies for ensuring inclusion and for engaging, educating, and increasing awareness within these groups about vaccine and treatment clinical trials to prevent and treat the disease.

Table 1: RADx-UP Projects and States (n=69)

RADx-UP PROJECT	STATE
Obesity Health Disparities Research Center (OHDRC) — COVID-19 Testing Model among Vulnerable Populations: From Community Engagement to Follow-Up	Alabama
A Dynamic COVID-19 Community-Engaged Testing Strategy in Alabama (COVID COMET AL)	Alabama
Leveraging Bio-Cultural Mechanisms to Maximize the Impact of Multi-Level Preventable Disease Interventions with Southwest Populations	Arizona
Connecting our Neighborhoods Needs for Enhanced and Coordinated Testing to Achieve Equity: CoNNECT to Achieve Equality	Arkansas
Use of Behavioral Economics in Repeat SARS-CoV-2 Antibody Testing in Disadvantaged Communities	California
Collaborative Community Networks to Optimize Implementation of Low Barrier COVID-19 Testing Efforts among Diverse Latinx Populations in Northern California	California
ORALE COVID-19: Organizaciones para Reducir, Avanzar y Lograr Equidad contra el COVID-19 (Organizations to Reduce, and to Advance, and Lead for Equity against COVID-19)	California
Communities Fighting COVID!	California
Monitoring COVID-19 and Building Capacity with Northern Plains Tribes and the Future of Pandemics	California
COVID-19 testing in Underserved and Vulnerable Populations Receiving Care in San Diego Community Health Centers	California
Predicting Diabetic Retinopathy from Risk Factor Data and Digital Retinal Images	California
Getting Asian Americans INFORMED to Facilitate COVID-19 Testing and Vaccination	California
Harnessing Technological Innovation and Community-Engaged Implementation Science to Optimize COVID-19 Testing for Women and Children in Underserved Communities	California
Community-Engaged Research on COVID-19 Testing in the US Territories	Connecticut
COVID-19 Testing and Prevention in Correctional Settings	Connecticut
Monitoring COVID-19 and Building Capacity with Northern Plains Tribes and the Future of Pandemics	Delaware
Community-Engaged Research on COVID-19 Testing Among Underserved and/or Vulnerable Populations	Florida
Social, Ethical, and Behavioral Implications (SEBI) Research on COVID-19 Testing and Vaccine Uptake among Rural Latino Migrants in Southwest Florida	Florida
Increasing Representation of Black Communities in SARS-Cov-2 Serosurveys by Understanding Barriers and Motivations for Participation	Georgia
Rapid Optimization of COVID-19 Testing for People Affected by Diabetes	Georgia
Community-Driven Approach to Mitigate COVID-19 Disparities in Hawaii's Vulnerable Populations	Hawaii
Puipuia le Ola: Increasing reach and uptake of COVID-19 testing among Pacific Islanders in Hawaii and Guam	Hawaii
Investigating the effectiveness of COVID-19 testing choices, community engagement, and culturally-embedded mHealth literacy delivery in a medically-underserved, community-based sample	Illinois
Alive Church Network: Increasing COVID-19 Testing in Chicago's African American Testing Deserts	Illinois

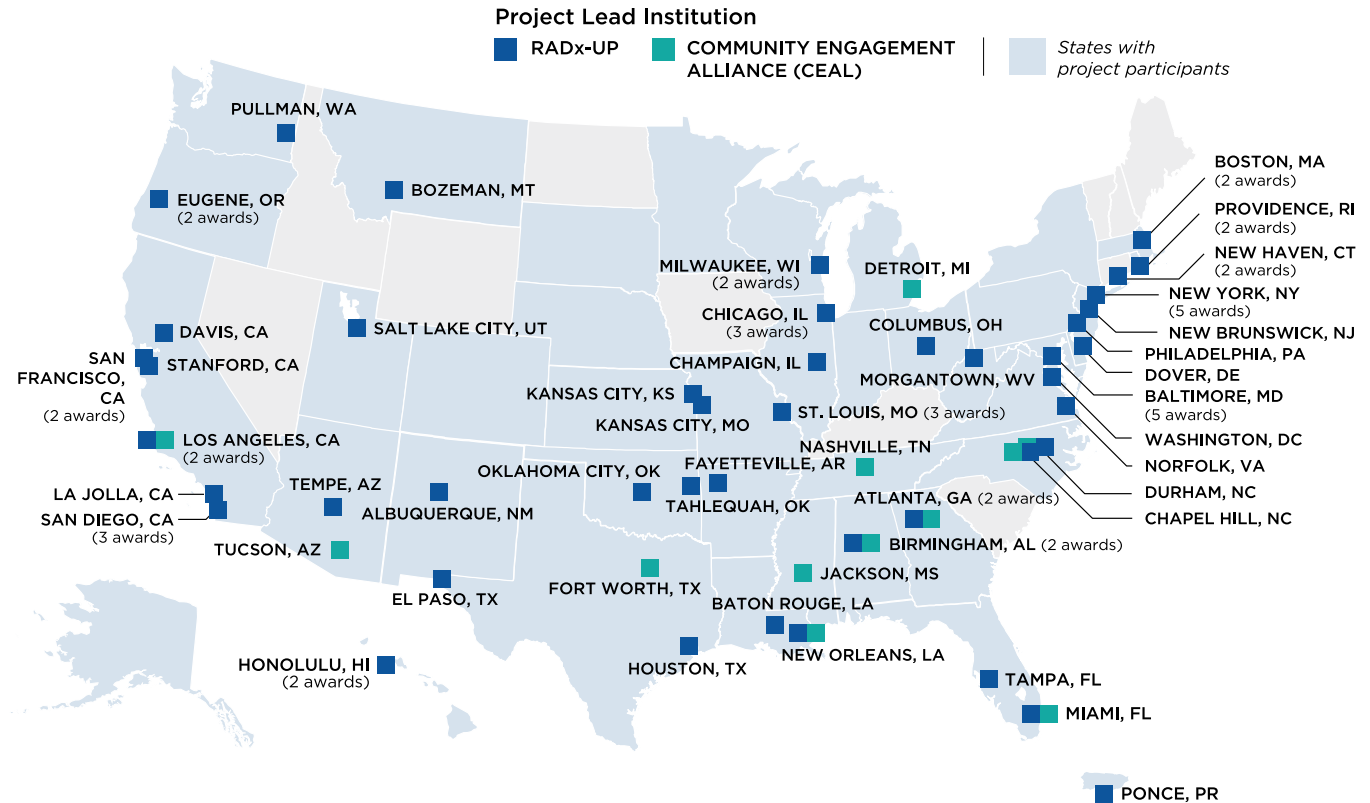| RADx-UP PROJECT	STATE
Role of Alcohol Disparities in HIV Risk among Sexual Minority Youth	Illinois
Community Network Driven COVID-19 Testing of Vulnerable Populations in the Central US	Illinois
Optimization of a new adaptive intervention to increase COVID-19 testing among people at high risk in an urban community	Illinois
RADx-UP: Improving the Response of Local Urban and Rural Communities to Disparities in COVID-19 Testing	Kansas
Louisiana Clinical and Translational Science Center	Louisiana
Assessing Vaccine Hesitancy and a Pharmacist Led Intervention Model to Increase COVID-19 Vaccine Uptake Among African Americans	Louisiana
The Johns Hopkins Center for AIDS Research (JHU CFAR) RADx-UP	Maryland
Protecting Native Families from COVID-19: RADx Initiative	Maryland
Juntos (Together): A community led approach to enhance to COVID-19 testing among vulnerable Latinos	Maryland
Exploring Barriers and Facilitators to Women Who Use Drugs (WWUD) Awareness, Acceptance, and Uptake of COVID-19 Testing, the CARE study	Maryland
LITE CONNECT: Addressing testing gaps and epidemiologic disparities of COVID-19 among transgender people in the United States	Maryland
Advancing Palliative Care in Northern Plains American Indians	Massachusetts
Implementation Science Center in Cancer Control Equity: A Competitive Revision to Accelerate COVID Testing in Vulnerable Communities	Massachusetts
COVID-19 Testing and Linkage to Care with African American Church and Health Agency Partners	Missouri
WUIDDRC Supplement-Supporting the Health and Well-being of Children with Intellectual and Developmental Disability during COVID-19 Pandemic	Missouri
Expanding population-level interventions to help more low-income smokers quit	Missouri
Safety, Testing/Transmission, and Outcomes in Pregnancy with COVID-19 (STOP-COVID-19 study)	Missouri
Protecting Our Community: A Pragmatic Randomized Trial of Home-Based COVID Testing with American Indian and Latino Communities [A project within the grant: Center for American Indian and Rural Health Equity]	Montana
New Jersey Alliance for Clinical and Translational Science: NJ ACTS	New Jersey
Keeping rural minority 'essential' workplaces open safely during the COVID-19 pandemic: The role of frequent point-of-care molecular workplace surveillance for miners	New Mexico
Reaching Communities through the Design of Information Visualizations (ReDIVis) Toolbox for Return of COVID-19 Results	New York
Leveraging Social Networks to Increase COVID-19 Testing Uptake: A Comparison of Credible Messenger and Chain Referral Recruitment Approaches	New York
A Nurse-Community Health Worker-Family Partnership Model to Increase COVID-19 Testing in Urban Underserved and Vulnerable Communities	New York
Bridging the evidence-to-practice gap: Evaluating practice facilitation as a strategy to accelerate translation of a systems-level adherence intervention into safety net practices	New York
Rapid Acceleration of Acceptable COVID Testing and Care Options for NYC Public Housing Residents [A project within the grant: Evaluation of Smoke-Free Housing Policy Impacts on Tobacco Smoke Exposure and Health Outcomes]	New York

RADx-UP PROJECT	STATE
HIV/AIDS Clinical Trials Unit (CTU) COVID-19 RADx-UP Supplement	North Carolina
Building Resilience and Vital Equity (BRAVE) — Increasing COVID-19 Testing in American Indians	North Carolina
The OSU Center for Clinical and Translational Science: Advancing Today's Discoveries to Improve Health	Ohio
Oklahoma Shared Clinical and Translational Resources	Oklahoma
RADx-UP NARCH Supplement: A Cherokee Nation Community-Driven Program for Testing and Contact Tracing (Cherokee PROTECT)	Oklahoma
Scaling Up SARS-COV-2 Testing to Serve Latinx Communities [A project within the grant: Prevention: Prevention Research Center: Parenting Among Women Who Are Opioid Users]	Oregon
Prevention of Substance Use in At-risk Students: A Family-centered Web Program	Oregon
Determinants and Outcomes of Nicotine Metabolite Ratio in HIV + Smokers	Pennsylvania
Epidemiologic Intelligence Network (EpI-Net) to promote COVID-19 testing and prevention practices among socially vulnerable communities in Puerto Rico	Puerto Rico
Improved Testing for COVID-19 in Skilled Nursing Facilities: IMPACT-C	Rhode Island
Rhode Island Center for Clinical and Translational Science	Rhode Island
Implementing Community-based Approaches to Increase SARS-CoV-2 Testing among an Underserved and Vulnerable Hispanic Population	Texas
Addressing COVID-19 Testing Disparities in Vulnerable Populations Using a Community Just in Time Adaptive Intervention [A project within the grant: UTHealth Center for Clinical and Translational Science Award Program]	Texas
Community-Academic Partnership to Address COVID-19 Among Utah Community Health Centers	Utah
Addressing Low-Income Housing Resident Mistrust in COVID-19 Guidance	Virginia
Community Organizations for Natives: COVID-19 Epidemiology, Research, Testing, and Services (CONCERTS)	Washington
Howard University Research Center for Minority Health and Health Disparities	Washington DC
Developing Novel Strategies to Increase COVID-19 Testing among Underserved and Vulnerable Populations in West Virginia through Community and State Partnerships	West Virginia
Continuous Traumatic Violence and the HIV Continuum of Care Outcomes Among BMSM	Wisconsin
Clinical and Translational Science Award	Wisconsin

Table 2: CEAL Projects and States (n=11)

CEAL PROJECT	STATE
Alabama CEAL Against COVID-19	Alabama
Arizona COVID CEAL Consortium (AC3)	Arizona
Share, Trust, Organize, Partner: the COVID-19 California Alliance - STOP COVID-19 CA	California
The Florida Community-Engaged Research Alliance Against COVID-19 in Disproportionately Affected Communities (FL-CEAL)	Florida
Georgia (Garnering Effective Outreach and Research in Georgia for Impact Alliance) CEAL	Georgia
Louisiana Community-Engagement Research Alliance Against COVID-19 in Disproportionately Affected Communities (LA-CEAL)	Louisiana
"The Fierce Urgency of Now": Communities Conquering COVID (C2)	Michigan
Mississippi CEAL Team	Mississippi
Increasing Trustworthiness through Engaged Action and Mobilization (I-TEAM)*	North Carolina
Community-engaged research to improve COVID-19 health outcomes among underserved residents of Tennessee	Tennessee
Texas CEAL Consortium Projects	Texas

Co-Sponsor of the 2021 Evidence Academy.

Figure 1: RADx-UP and CEAL Lead Project Institutions

Table 3: Distribution of Projects by Race and Ethnic Population

RACE/ETHNICITY	TOTAL	RADx-UP (N=69 projects)	CEAL (N=11 state sites)
Black/African American	51	41	10
Hispanic/Latinx	52	42	10
American Indian/Alaska Native	20	16	4
Asian American	12	11	1
Native Hawaiian/Pacific Islander	4	3	1
Other*	6	1	5

Other includes African immigrants, Caribbean Black, Vietnamese communities, Non-White, Non-Hispanic, More than one race, White individuals.

Table 3 displays the populations served by RADx-UP and CEAL projects by race and ethnicity. Over half of the projects are serving African American and Latinx populations. One quarter of the funded projects are serving American Indian/Alaska Natives and 15% are serving Asian American communities. At least three of the 69 RADx-UP and one of the 11 CEAL projects are serving Native Hawaiians/Pacific Islanders. All of these racial and ethnic groups are being disproportionately affected by the COVID-19 pandemic, which is why RADx-UP and CEAL sites are focused on serving these specific populations.

Table 4: Distribution of Projects by Population Characteristics

HEALTH-RELATED FACTORS	TOTAL	RADx-UP (N=69 projects)	CEAL (N=11 state sites)
Age-related	22	20	2
Health conditions	36	34	2
Social conditions	42	37	5
Geographic locations	36	31	5
Environmental exposure	6	6	0
Essential and service workers	11	10	1
Sexual and gender minorities	5	4	1
Farm workers	3	1	2
Others*	3	0	3

Others include Veterans, Socially/Medically vulnerable, Young African Americans attending HBCUs, Young African Americans not attending HBCUs

Table 4 reveals the distribution of RADx-UP and CEAL projects across population characteristics such as where people work, where they live, their age, their sexual orientation, and other factors. There are 10 RADx-UP projects and one CEAL project serving communities of essential and service workers. Six RADx-UP projects are working with communities facing environmental exposures, such as high rates of air pollution or other toxic exposures. One RADx-UP project and two CEAL projects are focused on the needs of farm workers. Four RADx-UP projects and one CEAL project are serving sexual and gender minority communities.

COVID-19 Testing Technologies: State of the Science

Testing for SARS-CoV-2, the virus that causes COVID-19, is an important part of slowing its spread. Testing for COVID-19 can also help people make the right choices to protect themselves and their communities. Because this virus is new, testing methods are constantly evolving with new data. While testing technologies continue to improve, there is an immediate need for **accurate, fast, and readily accessible testing** on a massive scale.[2]

Accurate Testing

Accurate or reliable tests mean that the tests detect what they are supposed to detect. An accurate diagnostic test for COVID-19 will correctly identify those with the virus most of the time. The accuracy of a test depends on the type of testing technology used (described below in the section, Types of Tests).

The timing for when people take a test is also a factor in its accuracy. Even accurate tests may sometimes give a negative result when someone does have the virus. This is called a *false negative.* False negatives are more likely to occur early into an infection (i.e., the first day of symptoms), or very late into an infection (i.e.,

after symptoms have started to lessen). The process of sample collection, the type of sample collected, and the process for performing a test also impact its accuracy.

Because the virus is still relatively new, clinical evaluation of individual tests are ongoing. It is important to note that while many tests are authorized by the U.S. Food and Drug Administration (FDA) for emergency use, none of the available tests are actually FDA approved. This means that none of the tests have gone through the rigorous FDA approval process.

Fast Testing

Alongside accuracy, there is a great need for **fast testing**. Once someone has taken a test, they need to get their results back within a reasonable amount of time to make the right decisions on whether to quarantine or self-isolate. Recent advancements in rapid diagnostic testing also allow for better contact tracing (described below in the section, Three Typical Uses of COVID-19 Tests).

> *...it's not just a question of testing, it's all of the components that are part of issuing a good quality result. That needs attention and focus.*
>
> **THOMAS DENNY**

Laboratory Scientist Perspective: Thomas Denny, MPhil, MS

Thomas Denny, MPhil, MS
Professor and Chief Operating Officer of the Duke Human Vaccine Institute, Durham, NC

"[In order to create a national testing protocol for communities most impacted by COVID-19], we absolutely need the development of assays that are easy to use, reliable, and have good sensitivities and specificities. And hopefully they also have a what I call a 'reasonable price point.' If we develop tests that costs $250 per test, it's very hard to spread that out. If we can get tests down in the $50, $35 price point or lower, I think it becomes a lot more doable.

"But again, we're looking at disseminating testing out into communities where you may be far from [a major] healthcare system, then it's even more critical that you have systems that are easy to use and not difficult and require complex laboratory settings... You have to have reasonably good defined tests and reagents to support it, you have to have people trained to use the test and how to get the appropriate sample swab that has to be used with that particular test, and then you should have some form of assessing how well these laboratories or these point of care centers perform the test over a period of time...

"So it's not just a question of testing, it's all of the components that are part of issuing a good quality result. That needs attention and focus."

Readily Accessible Testing

Readily accessible testing is affordable, convenient, and safe. For communities greatly impacted by COVID-19, accessible testing is critical to slowing and ultimately stopping the spread of the virus. The acceptance of testing is also important to its use in communities. Many factors go into the accessibility and acceptance of testing, including cultural and ethical considerations, testing locations, social and economic costs, contact tracing capacity, methods of communication and messaging, and the trustworthiness of sources of information.

COVID-19 TESTS AND TESTING APPLICATIONS

Below are three different categories of tests[3] the FDA has authorized for emergency use during the COVID-19 pandemic and the three different ways they are used to help slow or stop the spread of the virus.

Types of Tests

Molecular tests look for the presence of the viral genetic material in samples taken from the body. The more virus is present, the more viral genetic material. Some diagnostic tests are as fast as 30 minutes, but more routine testing usually takes several hours in a laboratory.

Antigen tests detect viral proteins in a sample usually collected from the nasal cavity or saliva in the mouth. Antigens are substances that cause an immune response in the body. Viral proteins have a shorter testing window than viral genetic material and therefore can lead to lower sensitivity if not appropriately employed. These tests, which can be as fast as 15 minutes, could be used for screenings where people live and work if appropriate testing strategies are followed, as recommended by the CDC.[4]

Serology tests detect present or past infections of COVID-19 by determining whether a person had an immune response to the virus. These tests, unlike molecular and antigen tests, are performed with blood samples. Processing these tests can take anywhere from 30 minutes to several hours. While the presence of SARS-CoV-2 specific antibodies may suggest immunity, it is unknown how long such antibodies remain in the blood after infection. The effectiveness of these antibodies varies from person to person. The reliability of the results also depends on the amount of antibodies present in the body. In other words, though serology tests have use in determining past infections, they should not

> *...only with knowledge can we work together to combat this virus. We need to take back control against this invisible enemy.*
>
> **MARA ASPINALL**

be used as an indication of active infection or immunity against re-infection. The best use for serology tests is the surveillance of a population (described in the section, Three Typical Uses of COVID-19 Tests).

Three Typical Uses of COVID-19 Tests

Diagnostic tests will show whether one has an active COVID-19 infection and whether one should take steps to isolate from other people. They should be used to test people exhibiting COVID-19 symptoms or close contacts of those who have already been diagnosed. For accuracy, diagnostic tests may be either a molecular laboratory test (that identifies the genetic content of the virus) or a high-performing and accurate antigen test done within the appropriate timeframe post-onset of symptoms (that identifies proteins on the surface of the virus).

Screening tests are used when a rapid response for a group is needed. It is used with more frequency and provides quicker results without symptoms or known exposure to COVID-19. Screening tests are less accurate than diagnostic tests but can be an effective way to screen healthcare workers or other essential workers. Point-of-care antigen tests are often use for screening, but should follow recommendations from the CDC.

[IN CONTEXT] Laboratory Scientist Perspective: Mara Aspinall, MBA

"Healthcare begins and ends with an accurate diagnosis. And in this pandemic, it is critical to understand that testing or diagnostics are key to the beginning, middle, and end of the pandemic. Without an accurate diagnosis, we cannot treat patients effectively. Testing or diagnostics is an area that has been long misunderstood in the healthcare environment where we value the importance of treatment. The reality is there is no single silver bullet to fixing disease or improving health without knowing what the accurate diagnosis is for that patient.

"The importance of diagnostics has never been clearer than it has been in the midst of the COVID pandemic. The only way to stop transmission is to know who is infected and have them isolate or quarantine to stop the spread. Unfortunately, early in the pandemic, we did not test enough and the spread has not only not decreased, it has increased with every one of the surges, and it's no longer about one part of the country, but true in every part of the country, particularly in areas where people are living very close to each other. And the sad reality is testing early on may have prevented a huge percent of the spread.

"It is so important for me to do everything I can to fight COVID-19 by providing reliable data. Knowledge through data is power—only with knowledge can we work together to combat this virus. We need to take back control against this invisible enemy. The only way to fight is to understand your enemy—understand what it does, what it doesn't do."

Mara Aspinall, MBA
Professor of Practice in the College of Health Solutions at Arizona State University, Tempe, AZ

Surveillance tests are used for monitoring COVID-19 at the population or community level. They can be used to inform community and regional policies. Surveillance tests are not used for individuals to make decisions such as quarantining or seeking treatment. Serology testing can be used for surveillance (described in the section, Types of Tests), as can technologies such as testing wastewater for the virus.

Table 5: Types of COVID-19 Tests

TEST TYPE	PURPOSE	COMPONENT DETECTED	SAMPLE NEEDED	TESTING LOCATION	ANALYSIS TIME	OTHER ASSOCIATED TERMS	CONSIDERATIONS
Molecular	Identifies active infections used for diagnosis	Viral RNA	Naso-pharyngeal, nasal or throat swab, saliva	POC or laboratory	Can be as fast as 30 to 60 minutes, but more accurate laboratory tests can take several hours	Diagnostic test, nucleic acid amplification test (NAAT), PCR test, LAMP, isothermal amplification	High sensitivity and specificity with lower probability of false negatives or false positives, but potential delays if sending to a laboratory for processing
Antigen	Identifies active infections used for diagnosis or screening	Viral proteins	Naso-pharyngeal, saliva	POC	15 to 30 minutes	Rapid diagnostic	Rapid results, ideal for on-site screening, but generally lower sensitivity means that some infections may be missed

Please follow testing guidelines recommended by the CDC. |
| **Serology** | Identifies past infections used for surveillance | Human antibodies | Blood | POC or laboratory | Can be as fast as 15 to 30 minutes, but more accurate laboratory tests can take several hours | Antibody test, blood test | Reliability of the result depends on prevalence, and the protective effect of antibodies is still unknown |

Modified from: Schneider M, Dentzer S, Sheehan S, et al. From Development to Market: Understanding COVID-19 Testing and its Challenges. Robert J. Margolis Center for Health Policy; 2020.

COVID-19 Testing Equity: State of the Science from the Literature

From race, ethnicity, and social determinants of health, to communication and messaging, to trust, trustworthiness, and testing access and environments, the current body of science reveals a series of cross-cutting factors that are associated with equity in COVID-19 testing.

> *So those are the questions, but it still boils down to—is there hope, and will you hurt me again?*
>
> **AZIZA LUCAS-WRIGHT**

COVID-19, RACE/ETHNICITY, AND SOCIAL DETERMINANTS OF HEALTH

Cultural, ethical, and race and ethnic considerations in testing for COVID-19 have been identified in the literature. Black and Latinx Americans are more likely than White or non-Hispanic Whites to test positive for COVID-19, even accounting for health conditions,[5] geographic location,[6] and socio-economic status. This is not because they are inherently more likely to get the virus, but because of existing structural and socio-economic disparities that continually put their communities at greater risk.[7] Indeed, while

Black Americans are more likely to contract COVID-19, those hospitalized are not more likely to die from it.[5-6] In fact, once hospitalized for COVID-19, Black Americans may actually fare better than White Americans.[7]

Race and ethnic disparities also vary with geography and setting. The disparity between Blacks and Whites testing positive for COVID-19 is greater in the Midwest than West. However, the disparity in positive COVID-19 tests between Hispanics and Whites is consistent across geographic region and outbreak pattern.[6]

Disparity in testing rates is also found by neighborhood. For example, in New York City, the proportion of Black American residents and the proportion of older persons in a neighborhood was associated with higher positive COVID-19 testing.[8] Individuals from poorer communities are less likely to test, but once tested are more likely to test positive for COVID-19.[9] In Philadelphia, where most of the population is Black, there is six times as much testing in high-income zip codes compared to low-income zip codes.

These inequities point to long-standing structural racism impacting health access.[1,5,9,10] Proactive and community-based strategies for addressing COVID-19 in Black/African American communities are needed. While better data are helpful, policy changes to improve the

[IN CONTEXT] Community Perspective: Aziza Lucas-Wright, MEd

"I have developed Community Advisory Boards and alongside the team, make sure that all of the residents in our cities are at the table, which means, of course, African Americans, it certainly means Latinx, but it also means the Pacific Island community. While the percentage of these community numbers is small (Pacific Island), when you disaggregate the information, the Pacific Island community has health outcomes that mirror African American health outcomes. They have been asking for quite a number of years to have their information disaggregated from Asians. They want us to hear from them and see them individually, because their experiences are very unique, and to make sure that they have a seat at the table. And then we also bring in of course the Indigenous Tribal Nations who also have more cases than their population share. My job is to make sure that those who have the greatest level of need are at the table, and that we hear from them individually, lest we mirror what other communities have done to us and just assume and begin to create things for them without them, and that is not what we intend to do—nothing for us without us.

"What community members want to know about COVID-19 testing is: are you going to hurt me again and will it help me? That's it. Even if they want to know specific things like, 'If I get it, will I get it again? If I am vaccinated, will I be able to spread it if it comes through me?' Particularly in communities where we were at the top of the misery index. We have everything. If it's out there, we got it and we get it faster and we get it earlier and we have the worst outcomes. So, we do want to know something like this in other communities because they don't have the same kind of response, they don't have the centuries of DNA that has been pounded by pain and by systemized racism. We are more fragile in some ways, we're more fragile and so we are more careful about what somebody wants to inject or what somebody wants to take out/extract. So those are the questions, but it still boils down to—is there hope, and will you hurt me again?"

Aziza Lucas-Wright, MEd
Instructor and Vice-Chair of the Department of Preventive and Social Medicine at Charles R. Drew University of Medicine and Science, Los Angeles, CA

long-term health of Black Americans are also needed. This includes addressing economic injustices, increased public health funding, as well as the democratization of COVID-19 screening.[10] Geographic segregation, financial and technological/transportation barriers also play a role in equity in testing. Drive-through testing and conducting screenings by phone or by using the internet are not as accessible to those without a vehicle or Wi-Fi, respectively. Also, those without health insurance face additional difficulties and may fear the costs of testing at the emergency department.

COVID-19 poses many hurdles specific to immigrant Latinx communities.[11] Even before the pandemic, Latinx immigrants faced barriers to health access.[12] Many lack a primary care provider and/or health insurance. Many have chronic health conditions. The pandemic adds additional stress. These communities face difficulty accessing public health information about COVID-19 testing, as this information often is not translated into Spanish and other languages. Language interpreting in high-volume settings (such as call centers and drive-through testing sites) is often unfeasible. Access to testing sites themselves could also pose difficulties. In the early days of the pandemic, testing sites would often require a medical doctor's prescription, which posed a hurdle for those without a primary care provider.

The United States also risks leaving behind Indigenous communities in COVID-19 related efforts.[13] Indigenous people—across the nation and beyond—often face more health problems than non-indigenous populations, in addition to having less access to health resources. Appropriate cultural and language adjustments are rarely made. Reports that separate, or disaggregate, rather than group Indigenous population data with other race or ethnic groups are needed. In addition, data on the availability and need of resources are essential. Although they make up only 0.7% of the population, Indigenous people represent 1.3% of COVID-19 cases reported to the Centers for Disease Control and Prevention (CDC). American Indians and Alaska Natives with COVID-19 also had a younger median age than Whites. (The median age for American Indians was 40 years, yet for Whites it was 51 years.)

More data as well as culturally responsive and evidence-grounded efforts to address social determinants of health and systematic and structural racism are needed.[7] While the

pandemic stresses the importance of individual choices, people must have "good choices to make."[14]

SOCIAL AND ECONOMIC COSTS OF COVID-19

The COVID-19 pandemic poses substantial social and economic disruptions to many people. Financial insecurity may increase risk of COVID-19 while decreasing access to testing.[10] Other social and economic barriers to testing include language and documentation status. There is also an overlap here between the racial and ethnic disparities and these overarching social factors.

Latinx immigrant communities often face greater financial insecurity. Many Latinx immigrants cannot get financial help from the government and cannot afford to stop working. Decisions on whether to test and/or quarantine become complicated by food and housing insecurity and fear around accessing resources.[10] People may be asked to work while sick, or face threats to their employment if sick.[6] Federally Qualified Health Centers (FQHCs) are a possible resource for undocumented immigrants, but changes in immigration policies have created even more distrust in immigrant communities. Some people fear that seeking free care may endanger their immigration status.[11]

Black and Latinx workers generally face greater financial hardship from COVID-19 than White workers.[15-16] The COVID-19 economy can be considered as three groups: essential workers; those who lost their jobs and face financial insecurity; and those who are able to continue working from their homes. Black workers are less likely to represent the last (and safest) group, yet they are disproportionately represented in the "essential worker" group. Essential workers, across race/ethnicity, education and income, face greater risk of contracting COVID-19.[17] For instance, in New York City, neighborhoods with higher rates of COVID-19 disease burden have lower overall median incomes and more Black and Hispanic residents.[18] This may be due to disproportionate use of public transit, people being less able to work from home, as well as greater difficulty

Community-Engaged Researcher Perspective: Mona Fouad, MD, MPH

"When the pandemic started, we looked at all the COVID-19 drive-through testing sites in the city, and noticed that

Mona Fouad, MD, MPH
Professor and Director of the Department of Medicine Division of Preventive Medicine, University of Alabama, Birmingham, AL

neither inner-city nor rural residents were coming to big clinical centers to get tested. That's when we went back and listened to the community asking, 'What's going on? How do you feel? What's happening with COVID?' It was as if they were waiting for someone to ask these questions.

"Through this process, we learned residents were confused about all the different messages coming from various places—such as websites, TV, and more. They didn't know exactly what they needed to do, and no one drilled the

information down into a simple message: how can they follow the guidelines.

"What I've found is that researchers need to deliver on their promises. If you want to be trustworthy, don't talk and overpromise if you can't deliver. When community members see that you really can fulfill your promises, they will begin to see you as trustworthy. Another essential element is respect. Respect their opinion, respect the role, respect transparency, and deliver on your promises—these things are very important."

social distancing.[19] These socio-economic trends are troubling given that in the United States, health insurance—and therefore COVID-19 testing and access to treatment—is often tied to employment.[20]

More research is needed on how public policy—at the local, state, and federal levels—can be used to protect lower income communities during a pandemic. This could mean rent freezes, banning utility shut-offs, and requiring employers to offer sick leave. Because poverty also contributes to the COVID-19 disparities Black, Latinx, and Indigenous communities face, a more equitable COVID-19 response means addressing these larger social issues.[1,19]

COVID-19 TESTING ENVIRONMENTS

Setting and environment play an important role in how testing is conducted. Healthcare settings (such as hospitals and nursing homes) and incarcerated settings (such as prisons and jails) require special care in order to keep people safe and avoid the spread of the virus. Geography also factors into the resources available for testing.

Frontline healthcare workers face greater risk of COVID-19.[21] This risk stresses the importance of Personal Protective Equipment (PPE) and additional strategies for healthcare workers from racial and ethnic minority backgrounds. Black and Latinx workers are

disproportionately represented in the long-term care workforce.[22] Not only are long-term care settings getting hit hard by COVID-19 because of the demographics of residents and the role that congregate, or group, residences play in spreading the virus, but also long-term care workers disproportionately have low wages. It is recommended to do surveillance testing among healthcare workers (such as the serology testing conducted among New York City healthcare workers)[23] in order to measure infection rates and patterns.

Correctional facilities and prisons have challenges in avoiding transmission within the facilities and the local communities.[24] These settings require additional safety measures and greater surveillance. For example, the Louisiana Health Department developed a telephone-based tool for the state's correctional facilities, called the COVID-19 Management Assessment and Response, to address COVID-19 outbreaks and to encourage adherence to CDC guidance. While correctional facility staff and administrators are aware of CDC guidance, there are substantial challenges to following it: specifically, the lack of space to quarantine individuals, and the difficulty of incarcerated people practicing social distancing in dorm-style housing. Those incarcerated also rely on the detention system for screening, diagnostic testing, and infection control, but resources differ among facilities.

Older adults are at the highest risk of contracting and dying from COVID-19. Older adults with COVID-19 who transition out of the hospital to their homes face particular needs and challenges.[25] One possible solution, the Transitional Care Model (TCM), is built on increasing screening, relationship-building, and involving patients in decisions, among other things. The screening component of the TCM calls for a standardized screening tool to help older adults understand symptoms and risk factors (both social and health factors).

Geography also plays a factor in COVID-19 testing and health access in general. There are disparities in testing between urban and rural areas. Though testing rates in rural states and

> *Respect their opinion, respect the role, respect transparency, and deliver on your promises—these things are very important.*
>
> **MONA FOUAD**

areas have improved, the disconnect between higher rates of chronic conditions in rural populations and decreased access to health care remains an issue. There are limitations of medical capacity, testing capacity, and access in rural communities (as well as in marginalized urban communities.)[26]

More research is needed on the best way to screen and test for COVID-19 in high-risk settings, as well as the best ways to address outbreaks once they happen.[24] Research is also needed on the best ways to ensure testing in rural and underserved urban communities with fewer resources.[26]

CONTACT TRACING IN VULNERABLE POPULATIONS

Contact tracing is a process for identifying people who come into contact with an infectious disease and following up with them. Contact tracing is an important aspect of stopping the spread of a virus. An effective testing strategy includes contact tracing.[27]

Contact tracing is typically conducted through conversations, usually by phone. A trained

health worker interviews the infected person and locates contacts. This can pose challenges. Resources and funding are needed to find, train, and send people where they are needed. Serving 1 in 6 rural residents, community health centers play a vital role in caring for rural communities where health infrastructure is limited.[28] Despite how important they are, community health centers often lack proper funding, and the pandemic has increased their financial difficulties.[29] To do targeted testing and contact tracing among the communities that need it, community health centers need both the funding and the staffing.[28]

But even with the resources to contact trace, people who were exposed may not know or remember everyone with whom they have been in contact. One solution is to automate this

process through smartphone data.[30] However, technological solutions pose issues as well. Their effectiveness depends largely on the use of the technology within specific communities.[31] Privacy and data security are common concerns.[27,32] Equity and accessibility can also be a challenge. An approach that combines digital solutions with more traditional forms of contact tracing could help avoid leaving behind those without smartphones or internet access.[33]

Many affected communities need solutions that consider the social factors of the pandemic. Social workers could play a role in leading contact tracing efforts. Trained social workers could not only help identify other possible infections, but also help address community needs and link people to services.[34] Special consideration should be taken in American Indian and Native Alaskan communities, where multi-generational households may

make infection more likely and self-isolation more difficult. Partnerships with Tribal leaders can help build the trust needed to slow the spread.[35] More broadly, involving people early in meaningful ways and building sustainable community partnerships are critical to contact tracing. This is true across many communities, including essential workers and people who are homeless, living in rural areas, who are LGBTQ, or are from racial and ethnic minority backgrounds.[36]

More research is needed on the automated forms of contact tracing and the ethical and equity concerns they bring.[31] Research is also needed around best practices and strategies to build trust in specific vulnerable communities.[36]

COVID-19 COMMUNICATION AND MESSAGING

Awareness and accessibility are crucial to the uptake of testing among hard-hit communities. There are racial and ethnic disparities in level of knowledge and awareness between White people and Black and Latinx people.[37] Historical lack of trust in the healthcare system and public health authorities plays into this disparity. So does structural racism and unequal access to health care.

In some cases, there may be inadequate COVID-19 risk perception and preventive behaviors (such as hand-washing, keeping social distance) in asymptomatic Latinxs.[38] For instance, in one Latinx community in Maryland, of 410 people, 90% lived in poverty and only 6% had a college education. Many lived in homes with more than six family members—this can be a factor in greater transmission in ethnic minority communities,[39] as household transmission is one of the most likely ways that COVID-19 spreads.[40] The social determinants of health worsen the impact of the pandemic. Poverty, low education, and lack of access to health care impact both risk and awareness. Those from lower socio-economic status may have gaps in knowledge and awareness of COVID-19 that impact decision-making.[41]

A North Carolina clinic implemented a Patient Engagement Messaging campaign (PEM campaign) that promoted ways to obtain health care among members of a rural community.[42] Their purpose was to decrease the care delays

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[IN CONTEXT] Community-Engaged Researcher Perspective: Caroline Compretta, PhD

Caroline Compretta, PhD
Assistant Professor in the Departments of Preventive Medicine and Pediatrics at the University of Mississippi, Jackson, MS

"I often say that 'our programs move at the speed of trust.' Trust is an essential component to building community-engaged partnerships in research and it takes time to develop. Trust is not forged at the speed of a proposal, but rather over months and years. As researchers, we must recognize the long-term nature of such relationships and build into our work the time to nurture and respect community collaborations. In so doing, two additional components are integral in our efforts to build trust: listening and sustainability. Trust is built when we listen, truly listen, to communities and create collaborative projects that address their concerns and interests. We also show that we honor community voices, that we are listening, and that we are collaborative partners when we create sustainable programs that last beyond funding cycles. The 'speed of trust' may be longer than a study period, but taking the time to build meaningful partnerships leads to lasting impacts for communities and researchers alike."

> ## " I often say that 'our programs move at the speed of trust.'
>
> **CAROLINE COMPRETTA**

that worsen racial and ethnic health disparities in COVID-19. This PEM campaign sent messages to 95.4% of the clinic population informing them of a regional call center offering health appointments and testing. The clinic had greater difficulty getting these messages to Black patients than non-Hispanic White patients. However, of those patients they did manage to reach, those who phoned the call center were more likely to be minorities.

People who were uninsured or using Medicaid called the center more than those with private insurance. Those who called the line were more likely to receive care and a COVID-19 test.

Community members and state and nonprofit organizations can work together to address prevention and testing for COVID-19 as well as its socio-economic impact. Policymakers drawing on the advice and guidance of community members and communication leaders to refine and translate messages can be an effective way to better reach more people.[43] Healthcare organizations may need to make use of existing resources to meet the needs of their patients. As an example, one hospital in Massachusetts, recognizing the limitations of on-site testing for those who are frail or unable to travel to a clinic, used an existing

Emergency Medical Service resource to test patients for COVID-19 at home. Programs like these can help patients access testing, and may also reduce costs and the use of limited Emergency Department resources.[44] Access to at-home testing can also help make testing more accessible to some people. For instance, Minnesota recently piloted a home-testing program that will serve all residents.[45]

Even with such innovations, there remains a great need for research identifying trusted sources of information and ways of communicating with Black, Indigenous and Latinx communities, as well as other communities hit hard by the pandemic.

TRUSTWORTHINESS AND EQUITY IN COVID-19 TESTING

As the pandemic continues, earning the trust of communities at every level of the healthcare system is crucial. Specific funding is needed for communities to partner with academic organizations and local nonprofits.[10] In working with immigrant and refugee communities, academic and medical institutions may need to collaborate across disciplines in order to provide legal guidance and mitigate or address concerns.[6]

People's trust in the source of information affects how they perceive risks. Perception of risks in turn plays a role in how people

prevent and react to COVID-19 as a threat. How people perceive risks is influenced by cultural, political, emotional, cognitive, and social elements.[46] Culture and religion have a strong ability to positively inform how people understand their risks. Trust in government and other public health authorities can play an effective role in informing how people view risks.[11,14,25] Collaboration between researchers and community partners may help create more effective crisis management and emergency risk communication in communities through greater trust.[43] There is also an individual level of trust and risk perception. Interpersonal relationships are important in informing choices, especially within medical settings and with disadvantaged people who might not trust the healthcare system.[25]

Misinformation (and outright disinformation) can quickly erode trust in political authorities and public health expertise. Misinformation has been ever-present during the COVID-19 pandemic. Conspiracy theories doubting the nature or the source of the virus have created disregard for public health guidance (such as mask wearing, stay-at-home orders, etc.). COVID-19 misinformation popularizing racist and xenophobic ideas have led to harassment and hate crimes against Asian Americans.[47] Misinformation about possible "remedies" for the virus have resulted in deaths.[48] Misinformation can spread via social media, which can make it difficult for public health organizations and governments to counter or debunk. Governments partnering with social media companies to monitor channels

for misinformation and conspiracy theories is one possible solution.[49] The World Health Organization is now using machine learning to sort through social media content mentioning COVID-19. They track trending topics to help tailor their messages; they are also tracking the emotional tone of social media posts in order to develop strategies to address concerns.

> *…it requires an organization like ours to kind of bridge that relationship and make sure that we advocate for the community that we serve.*
>
> **PATRICK ROCK**

Forming partnerships to address the social determinants of health and barriers to testing and positive test follow-up may also build trust in communities.[36] San Francisco's Unidos En Salud—a partnership between Mission District community organizers, researchers and the San Francisco Department of Public Health—conducted a community-based screening program of nearly 3,000 Mission District residents in April 2020. They found that those unable to stay at home because they were unemployed/furloughed or working essential jobs faced high risk of COVID-19

infection. Most of those testing positive were low-income and Hispanic/Latinx.[50] Considering the lessons learned from this program—which also identified many asymptomatic cases of COVID-19—the city began offering free testing to essential workers. They also offered links to food assistance and benefits to those who tested positive to help them successfully quarantine. The state of Vermont has employed similar strategies, offering tailored and proactive solutions to testing in high-risk settings and vulnerable communities. In order to best protect their homeless population, they have made homeless shelters less crowded by housing people in state-funded motel rooms. They have supported motel residents with mobile food drives and connections to primary care and other health services.[51] The Navajo Nation partnered with nonprofits, hospitals, and universities to make sure that clinicians and community members had the resources they needed to address COVID-19. New Mexico City partnered with nonprofits, universities, and the Medical Reserve Corps to offer community-based solutions for keeping homeless people safe, including contact tracing, timely testing for COVID-19, and access to hotel rooms.[36] These are only a handful of examples among many across the country.

Building trust in communities is also essential to vaccine acceptance. Many Blacks mistrust research because of historical injustices such as the Tuskegee syphilis experiment.[52] Vaccine trials have struggled to recruit both Black and Latinx volunteers because of this mistrust. To overcome this wariness, public

health organizations must build relationships with communities and actively work to address concerns and confront past injustices. Pharmaceutical companies, governments, and public health organizations must "earn and deserve" trust, not simply ask for it.[52] Transparency is key, both in communicating about the vaccine and in the distribution process.[53]

More research is needed around what steps public health organizations and their partners should take in order to build and maintain trust in communities. Governments and public health organizations must continue to work to understand the roots of misinformation, as well as how to control its spread. In the long-term, investment is needed in public health infrastructure that supports communities

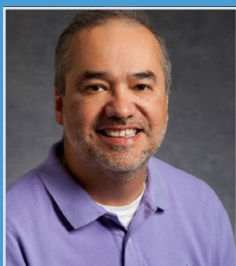and helps reduce health inequities in future disasters.[36]

GLOBAL PERSPECTIVES

It is also worth considering global perspectives and experiences with COVID-19. Many of the countries with the highest COVID-19 death tolls are in Europe, while many lower income countries have avoided catastrophic spread.[54] There are many reasons for this, including the lower age demographic profile[55] and different ways of recording deaths—but these countries often act earlier and more forcefully. Some are leveraging previous experiences with other outbreaks (Ebola, SARS, MERS) to inform their response. In community-level approaches used in the Democratic Republic of the Congo (DCR) and Sierra Leone to combat the pandemic, public health authorities trained locals to do contact tracing. Comprehensive community engagement was crucial in Sierra Leone's response.[56] Solutions based in technology must be used alongside strategic and community-engaged responses.[54] Despite the successes of some developing countries, they still face substantial hurdles, including the scale-up of testing and access to healthcare supplies such as oxygen.[57] Making sure lower income countries have access to COVID-19 therapies and interventions should be a global priority.

[IN CONTEXT] **Community Perspective: Patrick Rock, MD, FQHC Clinician**

"One of the questions the community has is centered around vaccines. And there are a lot of questions that are being asked to the state like 'are vaccines going to be equitably shared?' And it requires really a trusting relationship between an organization like ours that really is a community-grounded organization and the state where the vaccine is going to be coming to and making sure that the number is equal to the impact that we've seen.

"…A lot of community members are hesitant about getting the shot and there are several reasons for that. Some don't want side effects or some will say, 'Well, if I get the first one, will I get the second one? Will I have access to the second one also?' So, it requires an organization like ours to kind of bridge that relationship and make sure that we advocate for the community that we serve. We've given generations of vaccines to kids, elders, flu shots, you name it. We're a known and trusted partner that will vet the vaccine for the communities and make sure that we provide really the most high-level and high-quality care services that we can provide to our community. So, it's an important role. Otherwise, if the vaccine is going from the CDC or from the department of health directly to the community, I question how fast and how effective it would be."

Patrick Rock, MD
CEO and Medical Director
of Indian Health Board,
Minneapolis, MN

Glossary

GLOSSARY OF COVID-19 TERMS

Antibody—a blood protein that the body produces to combat viruses and bacteria. It is also known as an immunoglobulin.

Asymptomatic—is when a person is not showing symptoms of a sickness. The person may have a virus, but still show no symptoms. Or, a person may be recovering and their symptoms have gone away.

Contact tracing, associated case investigation—contact tracing is a process for identifying people who come into contact with an infectious disease and following up with them. Contact tracing is an important aspect of stopping the spread of a virus. Also called Associated Case Investigation.

COVID-19 vs. SARS-CoV-2—severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the name of the virus that causes the coronavirus disease (COVID-19). While the virus and the disease it causes are often used to mean the same thing, not everyone who has the virus will develop the disease. While this report refers to testing for COVID-19, tests are actually run for the virus that causes the disease.

Immunity—the body's ability to protect itself from infection.

Immunoglobulins—a protein used by the immune system to find and get rid of harmful viruses and bacteria. Also called an antibody.

Infection—sickness caused by a virus, bacteria, parasite, or other microorganism.

Isolation—keeping someone who has or may have COVID-19, or who has tested positive for COVID-19 but has no symptoms, away from others. The Centers for Disease Control and Prevention (CDC) recommends that a person stays home and away from others until ten days after symptoms first appeared, or until ten days after passing a positive test.

Personal protective equipment (PPE)—equipment that workers can use to protect themselves from dangers. In the case of COVID-19, PPE includes gloves, masks, face shields, goggles, gowns, or coveralls.

Point-of-care—a point-of-care test is one that can be done entirely at the time and place of patient care, for instance, at the doctor's office.

Polymerase chain reaction (PCR) testing—one of the most common ways of testing for COVID-19, PCR is a diagnostic test that detects the virus's genetic material.

Quarantine—keeping someone who has had close contact with someone with COVID-19 away from others, especially away from those who may be at risk of getting very sick from the virus. The CDC recommends staying home for 14 days after the last contact.

Severe acute respiratory syndrome (SARS) and Middle East Respiratory Syndrome (MERS)—SARS and MERS are two other infections related to coronaviruses. SARS first appeared in China in 2002. MERS first appeared in Saudi Arabia in 2012.

Viral load—the amount of a virus in an infected person's blood.

Viral transmission—the process by which a virus spreads from person to person.

GLOSSARY OF OTHER TERMS

Automated—a process carried out by machines or computers that needs little human control.

Barrier—a roadblock or obstacle in the way of something.

Chronic condition—a health issue/condition that lasts a long time, at least more than three months. Common examples include diabetes and hypertension.

Cognitive—related to thinking and remembering.

Community-based—an activity or process that takes place locally, organized by leaders or members of the community.

Congregate residence—a group housing arrangement with more than 8 people living and sleeping in one building. Examples include dormitories, correctional facilities, nursing homes and other senior housing.

Correctional facility—a place where people are kept after being arrested and punished for a crime. This includes jails, prisons, and juvenile detention centers.

Demographics—characteristics of people such as age, race, ethnicity, gender, income, and employment.

Disparity—a great difference. In this Data Profile, we are talking about the differences between outcomes for people from different communities.

Disproportionate—too large or too small in comparison with something else.

Dissemination—spreading information

Federally qualified health centers—healthcare clinics that get help from the government to serve communities that have fewer resources.

Geographic segregation—in people, geographic segregation is when different social, racial, or ethnic groups tend to live in different areas.

Incarcerated—the state of being in prison or jail.

Indigenous people—are originally from a country or place. In the United States, indigenous peoples or communities refer to American Indians, Native Alaskans, and Native Hawaiians.

Innovation—the process of creating new things.

Intervention—an action taken, often to improve a situation or a health problem.

Marginalized—when someone's power or autonomy in society has been taken away.

Median—the middle value in a list of values. In some cases, it is very similar to the average.

Mitigate—to make something less severe.

Multi-generational household—a home in which children, parents, and grandparents or older relatives live together.

Preventative—describes actions taken in order to avoid harm or illness.

Scale up—to increase the size of a project, program, or service.

Social determinants of health (SDOH)—the conditions and the environments in which people are born, live, learn, work, play, worship, and age that affect their health and wellbeing.

Socioeconomic—related to social or financial/income factors.

Strategic—acting in order to achieve long-term aims and interests

Structural racism, systemic racism, institutional racism—racism that is inherent to an organization's structure.

Uptake—the use of something that is available.

Vulnerability—able to be harmed or hurt.

Acknowledgments

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FUNDERS AND SPONSORS

The RADx-UP CDCC, which is funded through an NIH emergency cooperative agreement, 1U24MD016258

The NC CEAL, I-TEAM, which is funded through a NIH-NHLBI sponsored award, 17-312-0217571-66099L

SCHOOL OF MEDICINE

North Carolina Translational and Clinical Sciences Institute

North Carolina Translational and Clinical Sciences (NC TraCS) Institute, the home of the UNC Clinical and Translational Science Awards (CTSA), grant number UL1TR002489

PROJECT OFFICERS AND PROJECT SCIENTISTS OF THE NIH-FUNDED RADX-UP AND CEAL INITIATIVES

National Institute on Minority Health and Health Disparities—
Monica Hooper, PhD, Nathaniel Stinson, MD, MPH, PhD, Dorothy Castille, PhD, Beda Jean-Francois, PhD, Maryline Laude-Sharp, PhD, Nadra Tyus, DrPH, MPH, Fabienne Santel, MD

National Heart, Lung, and Blood Institute—George Mensa, MD, Catherine Stoney, PhD

National Institute on Aging—Partha Bhattacharyya, PhD

CITATION SUGGESTION

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COVID-19 Equity Evidence Academy (EA) 2021 Agenda At-A-Glance*

Translating Innovations in Testing

DAY 1: WEDNESDAY, FEBRUARY 24, 2021, 12:00–5:00PM ET

12:00–12:05	**Welcome—Overview of the Annual EA Series** *Micky Cohen-Wolkowiez, MD, PhD, Co-PI, RADx-UP, Duke*
12:05–12:15	**Attendee-to-Attendee Small Group Virtual Greetings**
12:20–1:20	**Land Acknowledgment and Introduction of Day 1 Opening Keynote 1** *Giselle Corbie-Smith, MD, MSc, Co-PI, RADx-UP, UNC* **KEYNOTE 1—IMPORTANCE OF COVID-19 TESTING TECHNOLOGIES AND STRATEGIES** *Eliseo J. Pérez-Stable, MD, Director, NIH/NIMHD* **Introduction of Day 1 Opening Keynote 2** *Al Richmond, MSW, Co-PI, CEAL I-TEAM, CCPH* **KEYNOTE 2—IMPORTANCE OF COMMUNITY IN ADDRESSING COVID-19 TESTING** *Yvette Roubideaux, MD, MPH, Director, Policy Res Ctr, NCAI*
1:20–1:30	**Overview of the First National Equity EA: Focus on Testing Innovations** *Lori Carter-Edwards PhD, MPH, Equity EA Lead, UNC*
1:30–1:35	**Break**
1:35–2:25	**Concurrent Breakout Session I: Cross-Cutting Themes 1–3**

Theme 1: Cultural and Ethical Considerations	**Theme 2: Social and Economic Costs**	**Theme 3: Robust Data Science**
1a: Understanding and Alleviating Fears *Allan Chrisman, MD* **1b: Building Linguistic and Cultural Capacity** *Felix Valbuena, MD* *Cherry Maynor Beasley, PhD, MS, FNP*	**2a: Barriers to and Effective Strategies for Improving COVID-19 Service Delivery to Farmworkers** *Rick Mines, PhD, MA* **2b: Social Justice and COVID-19 Testing Research** *Audrey Anderson, JD* *Samar Ali, JD*	**3a: Addressing Community Context through Meaningful Data Science Methods** *Paul Tessier* **3b: Bi-Directional Translation of Testing Protocols** *Eric Perakslis, PhD* *Tom Denny, Msc, MPhil*

2:25–2:35	**Break**
2:35–3:25	**Concurrent Breakout Session II: Cross-Cutting Themes 4–6**

Theme 4: Trustworthiness and Equity	**Theme 5: Communication and Messaging**	**Theme 6: Contact Tracing and Case Investigation**
4a: Establishing Trustworthiness when Conducting Research on COVID-19 Testing *Stephen Sodeke, PhD, MA* **4b: Activating Principles of Community Engagement to Build Trustworthiness for Testing** *James D. Gailliard, MBA, MDiv* *Gerardo Reyes Chavez*	**5a: Core Principles in Health Risk Communication** *Amanda Boyd, PhD* *Rodney Washington, EdD, MS* **5b: Communication and Grassroots Advocacy in Testing** *Ed Kissam, PPE* *Jay Leggette*	**6a: Role of Public Health Departments in Contact Tracing** *Linda Ivory-Green, MS, CSW* *Victoria Mobley, MD, MPH* **6b: Mobilizing Collaboration and Contact Tracing Advocacy in LatinX Communities** *Norma Marti, BA, CHW*

3:25–3:35	**Break**
3:35–4:00	**Reporters Summarize the Six Breakout Sessions**
4:00–4:30	**Introduction of Day 1 Closing Keynote Address** *Warren Kibbe, PhD, Co-PI, RADx-UP CDCC, Duke* **KEYNOTE 3—IMPLICATIONS OF TODAY'S DISCUSSIONS FOR COVID-19 TESTING IN AGING POPULATIONS** *Richard Hodes, MD, Director, NIH/NIA*
4:30–5:00	**Participant Closure, Closing Remarks, and Instructions for Day 2** *Giselle Corbie-Smith, MD, MSc, Co-PI, RADx-UP, UNC*

*Please note that exact speakers and titles may have changed since the production of the Data Profile.

COVID-19 Equity Evidence Academy (EA) 2021 Agenda At-A-Glance*

Translating Innovations in Testing

DAY 2: THURSDAY, FEBRUARY 25, 2021, 12:00–3:00PM ET

12:00–12:15	**Welcome, Participant Greetings, and Purpose of the Day's Activities** *Anissa Vines, Co-PI, CEAL I-TEAM, UNC*
12:15–12:45	**Introduction of Day 2 Opening Keynote** *Krista Perreira, PhD, Co-Director, RADx-UP CDCC Community Engagement Core, UNC* **KEYNOTE 4—IMPORTANCE OF COLLECTIVELY ESTABLISHING TESTING PLANS OF ACTION** *Georges Benjamin, MD, Executive Director, APHA*
12:45–12:50	**Instructions for the Roundtable Discussions** *Katie Brandert, MPH, CHES, Director, Great Plains Leadership Institute, UNMC*
12:50–1:30	**Concurrent Roundtable Discussions—Recommendations and Action Plans** *4 Roundtables per Cross-Cutting Theme*
	Theme 1: Cultural and Ethical Considerations in COVID-19 / **Theme 2: Social and Economic Costs of COVID-19** / **Theme 3: Robust Data Science in COVID-19 Testing** **Theme 4: Trustworthiness and Equity in COVID-19 Testing** / **Theme 5: COVID-19 Communication and Messaging** / **Theme 6: COVID-19 Contact Tracing and Case Investigation**
1:40–2:10	**Reporters Summarize the Roundtable Discussions**
2:10–2:40	**Introduction of Day 2 Closing Keynote** *Goldie Byrd, PhD, Co-PI, CEAL I-TEAM, Wake Forest* **KEYNOTE 5—MOVING THE SCIENCE OF COVID-19 TESTING FORWARD BEYOND THE EA** *Patrice Harris, MD, Past President, AMA*
2:40–3:00	**Participant Closure, Instructions for Next Steps Post-EA, and Closing Remarks** *Lori Carter-Edwards PhD, MPH, Equity EA Lead, UNC*

Please note that exact speakers and titles may have changed since the production of the Data Profile.