

# Qualitative Review of Early Experiences of Off-site COVID-19 Testing Centers and Associated Considerations

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## **Preface**

*Leveraging the power of networks is more vital than ever in this unprecedented moment in time. The Network for Regional Healthcare Improvement (NRHI) is drawing on the practical experience and insight of its national membership to help inform local leaders working to protect their communities from COVID-19. Craig Brammer, President & CEO, NRHI*

## Abstract

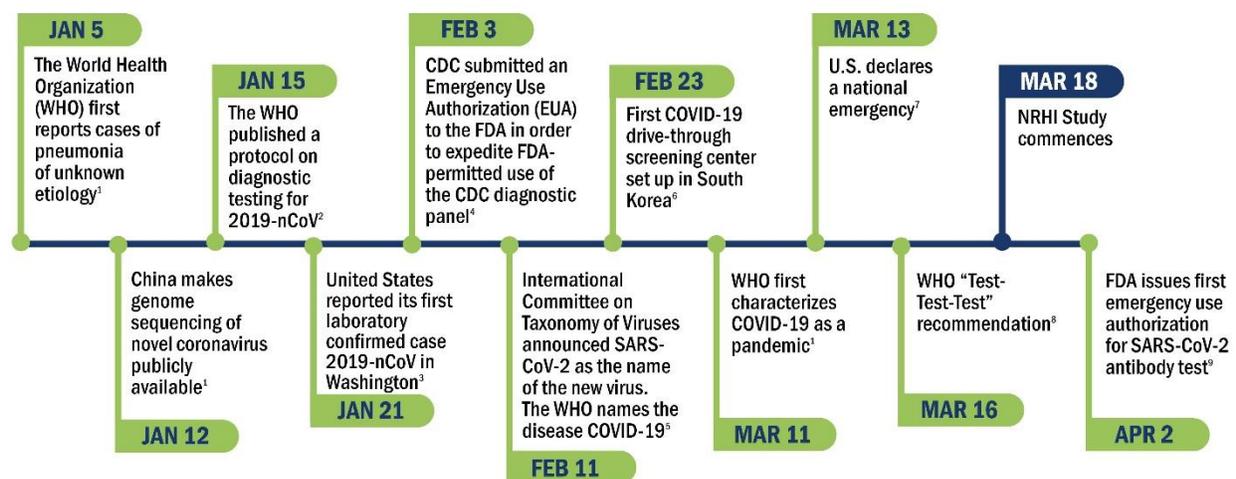
Early adopters from 11 temporary COVID-19 testing centers outside acute care and tertiary care centers were interviewed using a purposeful, geographically stratified, qualitative approach. The experiences represent centers from both urban and rural settings from individuals who have stood up testing solutions amid serious resource constrained conditions. This study presents practical considerations based on the lessons learned from those tasked with setting up the off-site testing locations.

## Introduction

The WHO Director-General, Tedros Adhanom Ghebreyesus, on March 16, 2020, stated the WHO's key aggressive public health response to combat COVID-19 is to "test, test, test. Test every suspected case." He further stated that this was the MOST effective method to prevent infections and save lives by testing and isolating the virus (World Health Organization, 2020). The purpose of this paper is to review US-based experiences in standing up off-site COVID-19 testing centers in support of the WHO's recommendation to combat the disease.

Sixty-seven days after the announcement by the World Health Organization (WHO) announcing a respiratory infectious disease outbreak in Wuhan City, China, and two days after the Director-General's proclamation the Network for Regional Healthcare improvement (NRHI) undertook this qualitative research study. The intention of the study was to perform a rapid assessment of the then-current conditions across the United States of off-site COVID-19 testing centers (OSCTC), and to publish considerations and lessons learned so others may be better prepared to deploy similar solutions in response for the need of rapid testing. Over this brief period, many notable events have occurred that have affected the ability to test and the type of test performed. This study acknowledges that our findings and considerations are based on early and evolving US-based experiences that were impacted by the availability of tests and testing material, personnel, and personal protection equipment (PPE). Of note is the ingenuity that front-line professionals implemented to address real-time OSCTC challenges. **Figure 1** is a timeline of the fast-moving events that led up to this study:

**Figure 1. Timeline of COVID-19 Pandemic** <sup>1, 2, 3, 4, 5, 6, 7, 8, 9</sup>



## Background

**Clinical picture:** COVID-19 is a respiratory disease caused by the coronavirus SARS-CoV-2. While the complete clinical picture of COVID-19 is unknown, risk for severe illness and death increases with age as well as in those of any age with serious underlying medical conditions. From data published on March 18, 2020 from the United States, eighty percent of deaths occurred in those 65 years of age and older. Importantly, preliminary data also highlight that severe illness leading to hospitalization, ICU admission, and death can occur in adults with COVID-19 of any age.<sup>10</sup>

**COVID-19 Testing:** In the absence of a vaccine for SARS-CoV-2, diagnostic testing will continue to be a crucial tool to prevent viral spread and save lives. Laboratory testing for COVID-19 can be classified into two general methods. The first method looks for actual presence of the virus and uses respiratory samples generally taken through a nasopharyngeal swab. The test is called a real-time reverse transcriptase polymerase chain reaction (RT-PCR) and can return results within a few hours in optimal laboratory conditions. These tests clarify a patient's current status of infection with SARS-CoV-2.

The second COVID-19 testing method looks for evidence of infection through the detection of antibodies produced as part of the immune response to SARS-CoV-2. Antibody tests are particularly helpful in diagnosing past or present asymptomatic SARS-CoV-2 infection, and if done in significantly large numbers, will help quantify population herd immunity. Antibody tests may be done via a drop of blood from a skin puncture and may produce results in minutes versus hours. The first antibody test was given emergency use authorization by the FDA in the United States on April 2, 2020.

The Centers for Disease Control and Prevention (CDC) developed an RT-PCR test for SARS-CoV-2 in January, following release of the viral genome. In early February, CDC submitted an Emergency Use Authorization (EUA) to the FDA in order to expedite FDA-permitted use of the CDC diagnostic panel; however, due to a lack of reliability in the early testing process, tests were not permitted to be conducted by state and local laboratories until the end of February. The first U.S. commercial lab began testing in early March, following a new policy that allowed laboratories to immediately use tests they developed and validated while pursuing EUA. Additional labs began offering tests in the following weeks.

By March 31, 2020, the U.S. was testing an average of 100,000 specimens per day. However, test availability varied significantly by region of the country, with many commercial labs reporting significant backlogs, sometimes up to a 9-day turnaround for results, due to challenges in scaling up their operations.<sup>11</sup> Long turnaround times, particularly for hospitalized patients, place an additional burden on already thinly stretched PPE. Recent innovations in testing efficiencies hope to alleviate the bottleneck, although availability of equipment and reagents may continue to limit labs developing and/or increasing capacity.<sup>12</sup>

**Off-site COVID-19 Testing Centers (OSCTC):** On February 23, 2020 Kyungpook National University Chilgok Hospital, Daegu, Korea implemented a drive through (DT) screening center as a safe alternative to COVID-19 screening.<sup>6</sup> As of March 12, the DT program was implemented in 577 centers across Korea. The authors reported the following advantages over on-site centers: 10-minute screening times (one-third less than conventional); ventilation requirements are eliminated given the patient remains in the car; and risk of cross-infection to other individuals is reduced.

During the month of March, U.S. medical facilities and public health departments began implementing off-site COVID-19 testing centers across the United States. OSCTC reduce the risk of exposure to patients and medical staff within medical facilities, and minimize the use of PPE, which has been reported in short supply across the country. While many OSCTC modeled their approach on what was done in South Korea, there has been historical precedent for the benefits of off-site testing centers from the 2009 H1N1 pandemic.<sup>13,14,15,16,17</sup>

Given the predicted need for continued SARS-CoV-2 diagnostic testing, as well as the evolving availability and types of diagnostic tests, OSCTC leaders need timely guidance to ensure they are meeting the needs of their unique populations. This study endeavors to identify these lessons learned and presents considerations for others who may need to stand up similar testing centers.

## Methods

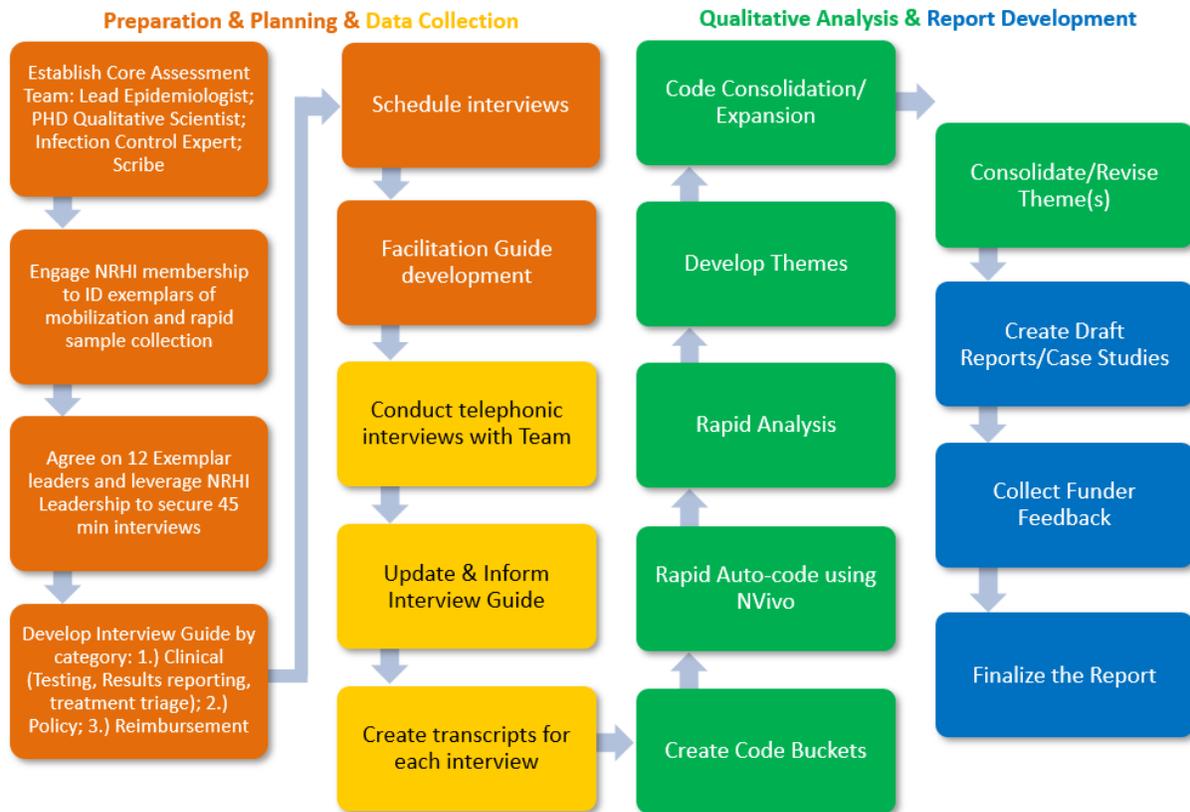
Qualidigm, an NRHI member, in partnership with NRHI, interviewed eleven individuals with a leadership role in an OSCTC in the United States between March 26 and April 3, 2020. The interview guide was created by outlining broad areas of knowledge relevant to the larger research questions of the study. An infection control expert and epidemiologist initially developed a set of interview questions designed to explore respondents' experiences and expertise with OSCTCs. The qualitative researcher adapted these questions into a five-question interview tool covering their site's intake processes, PPE protocols, site origination, challenges, and recommendations, with probing questions agreed upon by the full research team. All interviews were conducted by the lead qualitative researcher.

Recruitment was aided first through the review of media published that focused on notable OSCTC efforts across the United States, which identified primary geographic targets. This list was shared with an ad hoc NRHI Advisory Board that was chosen because of their broad national contacts and geographic diversity. Working with the Advisory Board, a targeted list was created, and the advisors were charged with making introductions and gaining commitments from the subject targets. Once agreement was reached, the contacts were sent to our research administrator to schedule the interview. All subject participants were required to have been actively involved with the set-up of their site's OSCTC.

Interviews lasted approximately 30-60 minutes and were audio recorded for analysis purposes. To ensure confidentiality, only the research team had access to each interview and the identifiable interview information and recordings. At the completion of each interview, recorded interviews were run through New Dragon Professional 15 Individual dictation software to convert the voice recordings into raw verbatim text transcriptions. The research team used the raw output to convert the recordings into usable transcripts.

All interviews were initially coded utilizing oral coding via rapid identification of themes from audio recordings (RITA). Then, the transcripts were coded in NVivo for further refinement and analysis. Our protocols in conjunction with our research team's field notes and the interviews achieved data triangulation for added reliability of the data. As no single data source can address multiple research aims, and two or more methods of data collection make for an idea, triangulation allows for the use of multiple data collection points to enhance the trustworthy quality of the data collection and analysis. **Figure 2** represents the workflow of the process followed:

**Figure 2. COVID-19 Learning & Documentation Process Overview**



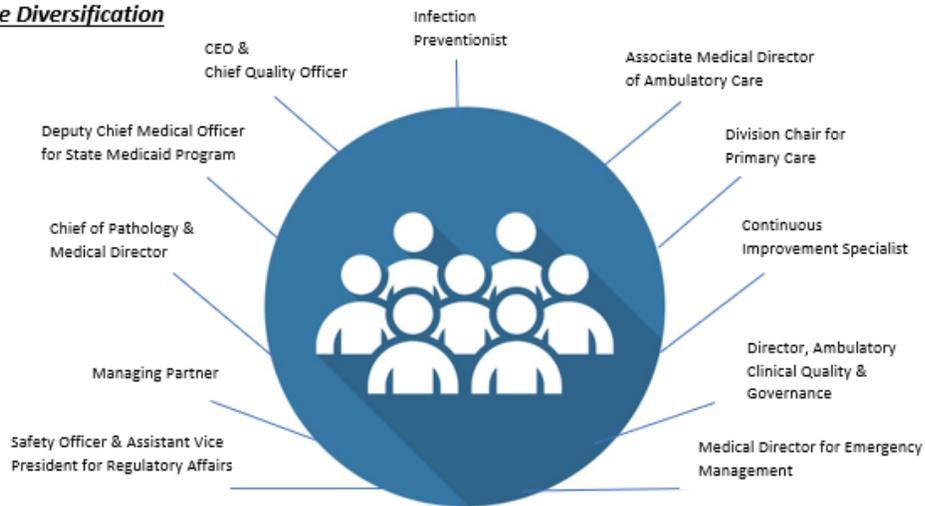
Adapted from: Creswell, J. W. & Plano-Clark, V. L. (2011). *Designing and conducting mixed methods research* (2nd ed.). Thousand Oaks: Sage Publications.

## Results

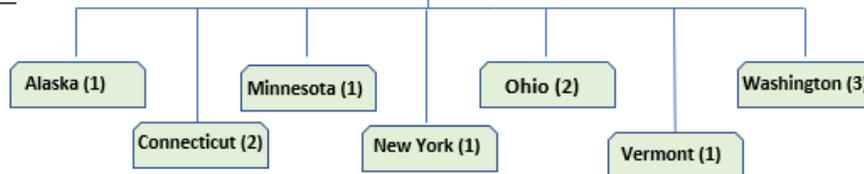
**Sample Characteristics:** Although ultimately a convenience sample, we were able to select sites with: heterogeneity in climate; demographics of community served, including rural and urban settings; testing methodology; testing criteria; testing capacity; type of medical center affiliation; and state/federal partnerships to gather a diverse set of perspectives. **Figure 3** represents the diversity of interviewees and the geographic spread of the OSCTC locations.

**Figure 3. Interviewee Role Diversification and State Representation**

**Interviewee Role Diversification**



**State Representation**



**Table 1** demonstrates that over 80% of the OSCTCs interviewed between March 26 and April 3, 2020 were in non-rural areas based on the Health Resources & Services Administration (HRSA<sup>18</sup>) rural definition. Over half of the centers required appointments and over 80% of the tests were performed on patients in a car. Over 36% of the centers limited their testing to healthcare workers, first responders and their families. Over 45% of the tests were sent to external testing labs for processing. Generally, the daily testing was low with over 90% of the centers indicating less than 100 tests performed daily. Over 90% of the centers were independently run.

**Table 1. Off-Site COVID-19 Testing Centers Characteristics**

Characteristic	N (%)
Rural designation (HRSA)	2 (18%)
Appointment required	6 (55%)
Tested patients in car	9 (82%)
Limited who was tested (healthcare workers-employees, first responders-household contacts of both & patients)	4 (36%)
Outsourced lab results	5 (45%)
Average number of tests per day	
<25	3 (27%)
25-100	3 (27%)
>100	4 (37%)
Unknown	1 (9%)
Self-run testing site	10 (91%)

## Emergent Themes and Corresponding Considerations

The results of this study are presented via overarching, emergent themes as dictated by the participants' responses during the in-depth interviews. ***These themes are presented as corresponding considerations based on lessons learned that other OSCTC leaders and administrators may find informative.*** A brief description of each theme and direct participant quote are included for additional contextual evidence. Participant quotes are indicated in italics and are based on the actual raw, unaltered, transcripts recorded. All identifying information regarding hospitals, locations, and individuals have been blinded to ensure confidentiality.

***Carefully consider your OSCTC leadership and partners.*** Many OSCTCs reported partnerships with their local or state departments of public health, local civic leaders and police, neighboring health care providers, as well as FEMA. Internal leadership also varied considerably, as demonstrated in Figure 3, and often relied on people learning to work together in new work groups.

FEMA and Federal partnerships came with too many limitations to provide support. One respondent emphasized the importance of recognizing the pros and cons of partnerships with FEMA, *"I think that the challenge of working through FEMA, they didn't have clear direction from their leadership, their requirements kept changing. As the week went on, the staffing was 2 public health reserve people, the flexibility to use pre-existing testing sites was removed, you had to set up new sites, the flexibility to use local labs was removed and you had to use the commercial labs that the Federal government has contracted with, the requirement to have a safety and quality officer attend the clinics was announced the day before the clinics went live"*. Another participant echoed, *"...so what the clinics had planned at the beginning was not what they were able to do and that was incredibly frustrating. The Federal process did not really provide the support that considered local public health and clinical capacity"*. Contrastingly, medical centers that ran their OSCTCs independently often reported the OSCTC implementation went very smoothly. *"...the state correctly has just gotten out of the way... All of these organizations are able to adjust, to pivot, to react quickly. There are a lot of smart people in healthcare, and you know what, they get the job done"*.

While some OSCTCs reported successful collaborations with neighboring healthcare provider OSCTCs, others reported struggling with competition, *"The biggest hurdle in all of this is I want to tell you right now it's health system competition. We were threatened legal action if they continue to allow drive through testing in the parking lot"*.

State and local partnerships with public health and municipal organizations added value. Involving the Department of Health can be helpful with mitigating concerns regarding competition and aligning with state public health priorities, *"I would say, work with your departments of public health. Cut out the hospital system and go directly to departments of public health...we needed the department of health to come and visit us and give us their blessing so we could open it"*. Another participant reiterated, *"I think the first success we experienced was good relationships with the Department of Health. Right, engaging them early and often with the key to our success"*. Respondents also recommended working with the town to ensure necessary permits are in place and to aid in traffic control.

Diverse, passionate, collaborative, and innovative clinical leaders are characteristics of successful OSCTCs. *"One reason why this has been successful is that it is an innovative approach and the collaboration between laboratory services and peri-operative services has*

*been made this process amazing along with support of the community.”* Priorities of OSCTCs may vary depending on whether your leadership is clinical or administrative. Balancing these priorities is critical in ensuring that all the needs are met, *“...the people running these organizations right now are businesspeople. We need physician and nurse leadership at the highest levels. The businesspeople taking over healthcare are a cancer. They are designed to maximize profits, which is why we have the PPE shortage that currently exists. They’ve had more than enough money to buy PPE. Instead they believed it was wasted money on the Ebola crisis, and therefore PPE reserves and budgets have been cut, at all system organizations. This could be avoided if we had leadership that is taking the risks and understands what we need”*.

***Different laboratories have different turn-around times for COVID-19 tests.*** OSCTCs often reported using a combination of state labs, healthcare facility labs, and commercial labs for sample processing. Respondents reported turnaround times varying greatly based on the type of laboratory -- anywhere from days to weeks: *“... 12 to 13 day turn around with one of the send out labs, which makes tracing and context kind of useless honestly”*.

OSCTCs may need to retest patients to support contact tracing in cases of significant delays, *“we had some that took so long to come back that we just retested the person”*.

Federal or state partnerships may require the use of certain laboratories. While OSCTC generally chose laboratories based on access to tests, *“...one of the requirements of the FEMA clinics was that they were required to use their contracts with LabCorp and Quest. This slowed us down”*.

***Consider the best ways to reach your patient population with their results.*** Due to the changing nature of the pandemic, implications of a positive result, and complexities of testing off-site, OSCTCs expressed the importance of thinking through how test results would be shared with patients.

Consider setting up daily telemedicine patient appointments to monitor ongoing symptoms until they receive their test results, *“They receive an email with a quarantine letter and a phone number to call for a telemedicine visit the next day. We do daily telemedicine visits with patients, daily telemedicine visits with patients until they receive results. Once they receive results and they are negative they receive one additional follow-up in 48 hours. This is to make sure they do not have a false negative, okay, if they continue to report symptoms, we offer to retest them and we tell them to continue the quarantine”*.

Some healthcare providers, such as nurses, may not feel comfortable giving positive test results to patients and will need a physician to step in. It is important to have the test results given to the patient’s primary care provider for follow-up, *“we’ve pushed all the results to primary care doctors as well and I’m kind of backing that up,”* and *“We have some scripting for the nurses just to make sure they give a consistent message about when they can return to work, and sort of symptom management. We treat a COVID positive as a “critical” result, and critical results we always send you a paper copy, or an electronic copy, but we always call and we document the call”*.

***Consider testing guidance of priority populations in context with severe limitations in testing supplies.*** Figure 4 describes CDC guidance on Priority for Testing Patients with Suspected COVID-19 Infection. There was heterogeneity in the populations tested by the sampled OSCTCs, which in many cases evolved over time, and varied based on availability of

tests and associated supplies. *“The biggest thing so far is not having a testing swabs, we would certainly be testing more people if we had more swabs,”* or *“The lack of PPE is a problem, lack of sampling devices is a problem, lack of rapid tests has been a problem”*.

With limited testing supplies, most OSCTCs are now only testing for COVID-19. During the first few days of our sampling period, some OSCTC were also testing for influenza, or a full respiratory panel. In instances where OSCTC were using other panels as a screener for COVID-19 in an effort to not waste resources, *“...our tests right now has been a respiratory viral panel and if negative, they weren't getting COVID - we're changing that tonight and the reason we did that initially was the shortage of COVID test kits”*.

Patients can be co-infected with COVID-19 and other respiratory illnesses. On March 11, researchers from China published an article detailing the possibility for co-infection with SARS-CoV-2 and influenza A.<sup>19</sup> CDC has urged clinical providers to consider testing for other causes of respiratory illnesses, but notes that a confirmatory influenza test may not exclude a positive COVID-19 test result. Our research shows this guidance has been adopted by OSCTCs as supplies allowed. With limited testing supplies, most OSCTCs are now only testing for COVID-19. Respondents interviewed in the latter half of our sampling period were either only testing for COVID-19 or testing for both perhaps due to broader dissemination of the evidence of possible co-infection *“RSV flu swab and COVID-19, not one or, they will get both”*.

If tests with a quick turnaround are limited, consider your priority populations. Many OSCTCs were following CDC guidance on Priority for Testing Patients with Suspected COVID-19 Infection (**Figure 4**) *“...we prioritize our health care providers, first responders, others in congregate settings to get their tests back first, so we have the fast and slow lab – the general public will get the slow lab if I have to pick and choose where the tests are going”,* and *“...we only test healthcare workers that have direct patient care, first responders, and then we're doing household contacts of either of those. So symptomatic household contacts, we are very specific with that as it has to be 24/7 but not a daycare where they're coming and going but jail, nursing home, homeless shelter and that sort of thing”*.

Testing innovations that increase capacity and turn-around time appear to be on the horizon. In late March, Abbott Labs received emergency use authorization from the FDA on molecular point-of-care tests for COVID-19 that deliver results in less than five minutes with reduced laboratory equipment. This development drew excitement from one laboratory director respondent. *“Apparently, Abbott which owns, which manufactures the ID Now is coming out with a cartridge which is going to be just like the flu and I'm being told I can get a result in 17 minutes. The other company that is coming out with cartridges is Cepheid. I have a gene expert in house, a gene expert infinity. This will allow me to do 48 tests at once. If both companies provide me the cartridges, I'm gonna be able to do the bulk of the work here.”*

Others referenced innovations in patient self-testing. *“The research lab that has the PCR test is pretty well-connected with others, the epi-research labs down at Baylor in Texas there's a protocol where they've actually studied the effectiveness of self-swabbing. We haven't tried it yet, but we might,”* and *“One of the reasons we haven't tried it yet is we wanted to get good at the first model we were trying first.”*

Figure 4. CDC Guidance on Priority for Testing Patients with Suspected COVID-19 Infection<sup>20</sup>

Coronavirus <b>COVID-19</b>		<b>PRIORITIES FOR TESTING PATIENTS WITH SUSPECTED COVID-19 INFECTION</b>		
<b>COVID-19 Symptoms: Fever, Cough, and Shortness of Breath</b>				
<b>PRIORITY 1</b>		<p>Ensures optimal care options for all hospitalized patients, lessen the risk of healthcare-associated infections, and maintain the integrity of the U.S. healthcare system</p> <ul style="list-style-type: none"> <li>• Hospitalized patients</li> <li>• Healthcare facility workers with symptoms</li> </ul>		<b>1</b>
<b>2</b>	<b>PRIORITY 2</b>		<p>Ensures those at highest risk of complication of infection are rapidly identified and appropriately triaged</p> <ul style="list-style-type: none"> <li>• Patients in long-term care facilities with symptoms</li> <li>• Patients 65 years of age and older with symptoms</li> <li>• Patients with underlying conditions with symptoms</li> <li>• First responders with symptoms</li> </ul>	
<b>PRIORITY 3</b>		<p>As resources allow, test individuals in the surrounding community of rapidly increasing hospital cases to decrease community spread, and ensure health of essential workers</p> <ul style="list-style-type: none"> <li>• Critical infrastructure workers with symptoms</li> <li>• Individuals who do not meet any of the above categories with symptoms</li> <li>• Healthcare facility workers and first responders</li> <li>• Individuals with mild symptoms in communities experiencing high numbers of COVID-19 hospitalizations</li> </ul>		<b>3</b>
<b>NON-PRIORITY</b>	<b>NON-PRIORITY</b>		<ul style="list-style-type: none"> <li>• Individuals without symptoms</li> </ul>	
<b>For more information visit: <a href="https://www.cdc.gov/coronavirus">coronavirus.gov</a></b>				

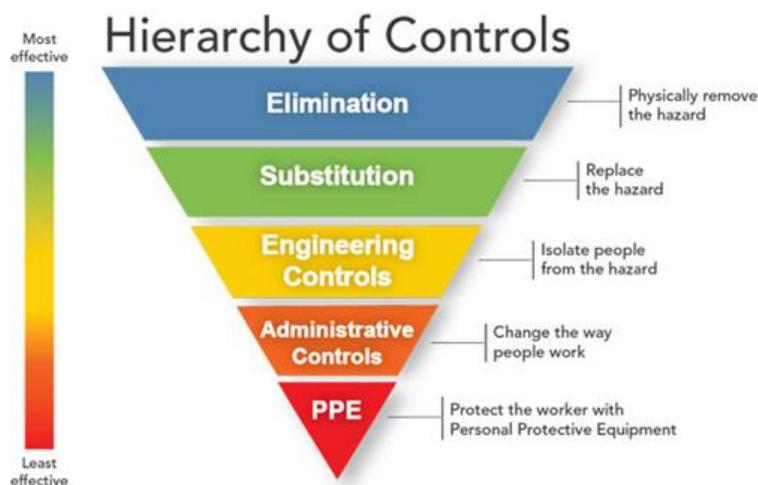
**Prepare for patients that require special accommodations.** Patients requiring testing may not have access to their own vehicle, may not speak English, or may have physical or mental limitations that present challenges for the standard protocol at your OSCTC.

Consider having a separate protocol that supports “walk-up” patients who are unable to drive, *“Our walk-up protocol is very similar protocol to drive-thru – minimize PPE use, minimize exposure, have them register beforehand if possible”*.

Provide materials in other languages and make provisions for patients with physical and mental disabilities. Respondents emphasized the importance of these, *“...other things we’ve been doing is using our cell phones in case we need interpreter services”*, and *“... for people who are hearing-impaired or English as a second language - having that information or some kind of visuals, like pictograms is really, really helpful”*.

**Weather and other external factors will impact your OSCTC.** It is important to be conscientious and think through how OSCTC staff will be staying warm, cool, or dry depending on the weather conditions. For example, one northern OSCTC participant reported, *“...our concern was with people in PPE with a heat source to try to keep them warm. Depending on what the weather’s like it can get cold, right, so, we want to rotate people in, too. So we have fish houses now ... a fish house at the end for the checkout, so those crews are a little warmer. We also need things like hand warmers”*. Another participant echoed the same sentiment, *“There’s been days that it’s been snowing and we’re in an open parking lot so the tent has a heater option in it. The tents have a carport over it because in our city it rains a lot and we have to deal with water and we don’t want our staff standing out in the rain”*. Difficulty with snow prompted participants to discuss how they prepare their sites with salt, sand, and encourage their staff to wear ice cleats, *“having people put on ice cleats because it’s, you know, so it is winter here and two weeks ago it was definitely a need as we had a lot of ice and snow”*.

**Figure 5. Traditional Hierarchy of Controls<sup>21</sup>**



**Engineering controls in your OSCTC can minimize risk of infection.** According to the National Institute for Occupational Safety and Health, controlling exposures to occupational hazards is fundamental to protecting workers. **Figure 5** describes the traditional hierarchy of controls that helps determine how to implement feasible and effective control solutions, with the methods at the top typically more effective and protective than those at the bottom. While elimination or substitution are

not options at this stage of the pandemic, engineering controls are very applicable and designed to remove the hazard (SARS-CoV-2) at the source, before it can infect the healthcare worker.

Keeping patients in their cars minimizes exposure points. All but one OSCTC had patients remain in their car for the testing, *“They are staying in their car, just rolling down their side of the window”*.

Consider tables without smooth surfaces to minimize surfaces where the virus can linger. Instead use pallets or wire, as one participant explained, “...all equipment is raised off the ground on either pallets or wire carts. We do not use large surface areas because virus can stick on large surface areas. Very important wire carts”.

**Administrative controls in your OSCTC may minimize risk of infection.** Administrative controls are another method of controlling SARS-CoV-2 exposure, as demonstrated in NIOSH’s Hierarchy of Controls in **Figure 5**.

Quicker visits within OSCTCs minimize healthcare worker exposure time with patients. Three minute maximum exposure time was reported by many respondents to be the threshold in which they were comfortable exposing their staff to patients and designed their protocol to incorporate the three minute exposure time, “We go no more than three minutes direct exposure maximum per patient, maximum. We started initially with 15 minutes slots. We are now down to 5-minute slots. So, we can accommodate the demand. So, every 5 minutes there is a new patient that drives up with their car. And within that 5 minutes, is the 3-minute window of exposure time”.

If space, testing materials, and staffing permits, having more than one drive-thru lane can increase efficiency and decrease waiting times, “We have the availability to use two lanes once they have made it past the screener.” One respondent explained that one lane was used to register patients with appointment slots, and the other was used for patients without an appointment, “We had two different pathways to go through it - both of which required an appointment, simply to control traffic and that sort of thing to screen a little bit”. This helped patients with an appointment move through the testing process quickly as they had their own, dedicated lane.

Triage and pre-registration in advance of the OSCTC visit reduce exposure time and risk. If this is done ahead of time, patients are required to show their identification to continue through the testing process. It also verifies that only patients who have been screened and recommended for testing are getting tested, “People are pre-registered. You don’t want random folks driving up”; “...if they aren’t triaged before, they could show up, and we’d have to send them away because our test kits are limited” and, “...the patients need to be clinically triaged in advance. We also want to be capturing patient demographics, screening patients for appropriateness, delivering telemedicine to identify people who maybe need to go to the hospital rather than be tested. Our pre-test work-up is robust”.

To decrease the risk of contamination through environmental factors, if patients need to fill out their own paperwork at the OSCTC, have patients bring their own pen, or supply pens for patients, “It’s significantly easier for us just to find single use pens and then let the patient keep those and not need to worry about replacing all of our PPE in between”.

Preparing test order documentation and labeling sample collection materials in advance can save time and reduce exposure risk. “They have also been registered in the EMR, and the test has been preordered for them not transmitted but preordered for them. So we can print out the requisition and place it into their sample bag ahead of arrival.”

In sites where screening and triage occur, consider allowing nurses to submit orders for testing under a physician, “...now in terms of ordering labs that can get very tedious. We have a nurse protocol order so that nurses can actually order it you don’t need a physician or to order it and the physician signs it after the fact as the authorizing provider. So, for those testing sites where you have large volumes of tests, you don’t need physician to enter every single order you can

*develop a delegated protocol to have staff do that for you. Sorry, just think that works very well. Saves a lot of time”.*

**PPE shortages and unique PPE needs within OSCTCs require creative solutions.** PPE comprises the bottom tip of NIOSH’s Hierarchy of Controls. Unfortunately, PPE shortages during the COVID-19 pandemic are affecting healthcare providers across the United States.

Many respondents referenced using CDC’s guidelines for extended and reuse of PPE. CDC has provided optimization strategies for PPE in situations where PPE supplies are stressed, running low, or absent, which is updated regularly. *“We are now moving toward a reuse protocol which is again approved by the CDC which is as long as the mask is covered so you can start using either a cover mask or an extended face shield in order to protect the mask and then allow it to be donned and doffed five times so those are the major measures that were doing.”*

Weather and patient demographics may impact appropriate PPE. Depending upon the climate and location of the OSCTC, there are many considerations for PPE. For example, one respondent reported that as her OSCTC is in the Pacific North West, face shields that are designed for surgery do not hold up against the elements, and were extremely cumbersome when used outside, *“Face shields. First is we are using them outside in our area so they are fairly flimsy and, you know, if there’s any wind that can kind of be an issue from time to time and was really hard to see what we’re doing”.* As the guidelines for PPE change frequently, respondents reported that they utilized the PPE they had on hand to the best of their abilities, understanding that availability and climate ultimately dictated how they used their PPE. Another respondent overseeing an OSCTC with a pediatric hospital mentioned that they were using gowns with pockets, because often there were testing multiple children within a vehicle and this helped organize the collection of multiple samples. *“So how do you keep track of 3 or 4 different sets of supplies in terms of swabs and viral transfer media... So, we went out and got gowns that have pockets in the front...that’s been a clever little adaptation.”*

**Consider ways to ensure the number of staff is adequate for OSCTC demand.** Staffing for OSCTCs generally consisted of trained healthcare *personnel* taking the sample, managing samples, and administrative staff handling check-ins and registrations.

Consider utilizing clinical staff that have the current bandwidth to staff the OSCTC. Getting staff to support OSCTCs was not reported as a challenge by most respondents. Many OSCTCs reported drawing on care providers whose workload had been reduced, including dentists, school nurses, and other specialty care providers, *“It has become clear is that you don’t need a doc to do this testing, but what you do have to do is make sure the people are trained properly...we pulled different people from different places to do jobs that need to be done”.* Another participant noted that at his site, he had *“created this common pool and that is how we get bodies into staffing the site”.* One respondent noted that this may require extensions in licensure (e.g. dentists).

Many OSCTCs required patients to schedule appointments to ensure they could plan appropriately for staffing needs. *“...the idea of having them scheduled is that we can print labels and for us we feel that it’s more predictable.”*

When OSCTCs were not using patient appointments, regular communication with providers ordering tests helped with planning and mobilizing their staff, *“We regularly communicate with our providers who are using telehealth at the end of each day so we have a good idea of how many people might be showing up at the drive-thru”.*

Consider how to handle surge capacity and ensure staff have adequate breaks throughout the day. Respondents also emphasized the importance of knowing how to get extra staff when patient numbers were high, noting the limitations of being in an OSCTC not co-located with a medical facility, *“...our site isn’t close to the hospital, so we don’t always have the staffing capacity we need and turnover is tough”*. Finally, it was reported that staff will need breaks throughout the day, and it is important to be thoughtful about how coverage should be handled, *“We have found that a 90 minute shift is adequate, our staff has to stand on hard asphalt and this seems to be a good amount of time that minimizes PPE but also gives our staff a break on their feet and backs”*.

**Work as a team.** OSCTCs often consist of professionals from varying disciplines working together for the first time. Teamwork in healthcare uses collaboration and communication to work towards a common goal.

Having a morning, or daily “huddle” with staff members to clearly define roles and responsibilities for the day helps with workflow, *“...it was very helpful to huddle just in the beginning to talk through the workflow every morning before the clinic starts”*, and, *“So every morning the team huddles, talks through the workflow, talks about number of patients that we’re going to be seeing today, run through the workflow and any changes in the workflow being clear on what the role of each of the members of the team is. We also have a debrief at the end of the clinic just to see what went well what didn’t go well, what do we need to change and sorta having a rapid process improvement every day has been very helpful”*.

Some OSCTCs have a dedicated “watcher” staff member, who is charged with monitoring all staff members that interact with patients or samples to identify potential contamination and the need to replace PPE, *“We have one person who will be monitoring just PPE usage and contamination. So, they’re kind of helping everybody just keep an eye on, you know, if you accidentally brush up against someone’s car, or whatnot, they’re out there watching for that and kind of giving you that advice, to hey-you know, I saw this happen we’re going to need you to change PPE”*.

**Consider how you inform the public about your OSCTC.** The timing and mode of publicizing your OSCTC will impact the number of people coming to your OSCTC.

A trial run with few patients may be a good place to start. Many respondents reported that the first few operational days of the OSCTC required working through some logistics, so it may be better not to heavily publicize the OSCTC until after the first few days, *“Things were great on the third day we were up and running. I’m glad we had a slow uptick, so we could have a few days to work out the kinks”*.

Developing patient appropriate educational materials relevant to OSCTCs (hotlines, media, handouts, billboards, etc...) benefits everyone. Utilizing local media on the appropriate messaging is important to ensure the patient population is informed of the OSCTC location and hours *“...engaging the press, educate, will help build our efforts”*. Hotlines have also been used in states to help triage questions from the public around testing, *“...we have a nursing hotline – education for coming in and who shouldn’t”*. Setting up a phone hotline could be an effective strategy to mitigate patients coming to the OSCTC who do not meet the testing requirements, and to answer the public’s questions, *“...the hotline has basic answers to basic questions, like communication of when to come to the drive-thru and the hours we operate”* and *“... for those that aren’t as computer savvy, using nurse careline 1-800 number, that goes to a recording that*

*gives a lot of information and then they can step it up to an in-person phone call. And I would say that somewhere between 1/2 and 2/3 choose to step up to speak to somebody but again, this onset of the e-visit is a lot of information and the onset of the phone call is a lot of information so a significant number that just stopped there and don't actually initiate more interaction”.*

**Reimbursement options are evolving.** With a new disease, and corresponding new diagnostic tests for that disease, coverage and reimbursement for testing have evolved greatly over the past two months. Most respondents felt that testing reimbursement was either working well or had this low on their list of priorities *“we haven’t even thought about getting paid for any of this”.*

For reimbursement for patients getting tested, CMS has developed two Healthcare Common Procedure Coding System (HCPCS) codes to bill for COVID-19 diagnostic tests, the first on February 13<sup>th</sup>, 2020 for CDC testing laboratories, and the second on March 5<sup>th</sup> for non-CDC laboratories. Several respondents referenced the new billing codes available for COVID-19 testing. *“We have set up the tests using the current CPT codes that were issued by CMS, I’m sure we are dropping bills using those 2 CPT codes, but I have no idea if we’ve gotten paid for any testing at this point.”*

Also be aware of Federal legislation around funding support. The Families First Coronavirus Response Act, passed on March 14, 2020, requires group health plans and individual health insurance plans to cover COVID-19 testing. Additionally, health insurance carriers are not charging copays or deductibles for COVID-19 testing. OSCTCs generally reported submitting reimbursement for testing to patients’ insurance carriers. When testing medical providers, OSCTCs generally covered testing for their employees as a likely medical exposure. *“We would say that through a workplace exposure we would just recover the cost of all the testing we wouldn’t normally bill that kind of stuff to insurance anyway from a workman’s comp and legal kind of framework. But if it was a commercial, or a community exposure I think we could bill insurance.”*

## **Discussion**

We were interested in understanding if statutory or reimbursement issues proved to be an impediment to testing and it was concluded that neither was identified as a significant barrier for our sample. More important to the success of the operations in our sample were predicated on the following: availability of supplies; the presence of good leadership; and the leveraging of community relationships that were needed to support the effort.

Turnaround time for testing was an identified barrier in our sample. This included concerns regarding patient awareness of their COVID-19 status – and subsequently their ability to adhere to best practices regarding social distancing, while managing their potential anxiety while waiting for results. In South Korea, text messages were sent to patients. In a United States environment that is concerned with respecting patient privacy and HIPAA laws, this notification is not easily met with simple technology-based solutions. According to our respondents, they their patients would prefer to speak with a provider rather than receive electronic communication. For future OSCTCs, it may be useful to think about how patients would best respond to receiving their results. According to our sample, the dissemination of information to the public must be coordinated. This ensures that the public is receiving up to date information that is consistent.

Respondents indicated that working with government entities was challenging. And while a coordinated effort to procure and supply testing equipment and associated testing materials may be best done centrally, healthcare typically remains local. As evidenced by our sample, the respondents know their communities and understands their unique challenges, barriers, and needs. Providing potential OSCTCs with general guidance that can be flexible to their individual community needs is essential for future OSCTC implementation.

Care for the OSCTC staff must be of highest priority. There was reported frustration of lacking adequate PPE. Having medical and nursing staff as OSCTC leadership is essential to success. Caring for the practical needs of the healthcare workers also extends past PPE. Considerations for frequent breaks, access to heaters, and safety gear in colder environments must be available for healthcare workers in the OSCTC. While proper PPE is critical to keeping individuals safe, it is still a reactionary-based protocol. The Hierarchy of Controls (presented in **Figure 5**) emphasizes the importance of tackling the broader issues regarding safety protocols and how changes at the broader level have the greatest impact. Moving forward, PPE should continue to serve as an important basic requirement for healthcare workers, but administrative changes can be made to have a significantly larger impact.

Inevitably, COVID-19 RT-PCR testing will improve and will result in faster testing times with higher yields. Serology testing is just now emerging and may help quantify population herd immunity. Eventually we will have an effective vaccine to support a prevention strategy. Until that time, scientists worldwide are working on and testing therapies to reduce or cure the infection. The onus is on us, and localized healthcare systems to better prepare for the next wave. **Attachment 1** is offered as a summary of our conversations with those early pioneers in the offsite centers across the United States. (**Attachment 2** is offered as an optional infographic to Attachment 1). The presented considerations are meant to be received as a working tool to identify gaps. These are not recommended best practices, for reasons indicated in the limitations sections (below). It is the hope that a set of best practices will emerge as OSCTCs and corresponding research continue.

### Recommendations for further research

This research provides an opportunity to offer hospitals and other healthcare organizations considerations on how to set up an OSCTC. It also provides a springboard to engage policy makers and leaders in the healthcare community in a discussion about emergency preparedness, and how to better respond to pandemics and testing in the future. **Table 2** presents a list of recommendations for further research.

**Table 2. Recommendations for Further Research**

1. Given optimal conditions and supplies, what might best practices recommendations look like?
2. How might the lessons-learned assist in preparing us for mass antibody testing and mass vaccinations?
3. How can health center-run-OSCTCs effectively partner with local and state public health entities to support population-wide surveillance? How much can they expand their testing capacity to meeting public health surveillance needs? What role will home-based testing play? What role can the “big box stores” play?
4. How might the recommended approaches assist local municipalities in increased testing in order to clear employees to go back to work earlier?
5. How should testing be handled in vulnerable populations including: rural populations, religious minorities, low SES, Indian reservations, and correctional system institutions?

6. How are healthcare workers conserving PPE? How are they sourcing it, how are they implementing CDC's guidelines, what innovations have they made based on their OSCTCs unique needs?
7. How does the type of OSCTC leadership impact how patients and staff are being cared for?
8. How can we support all OSCTCs having access to laboratories with reasonable turn-around times?
9. Are there sample quality concerns with testing in vehicles?
10. What would an OSCTC look like based on optimal conditions and no resource limitations?

## Limitations

Although this study has contributed to filling gaps in the understanding of how to implement OSCTC, there should be some considerations when interpreting the study's results. The sample in this study was limited to eleven sites, all of them geographically diverse, but did not include southern or southwestern states. It is possible the study did not capture all possible iterations of OSCTCs. Consequently, results from this study may not be generalizable to all OSCTCs in other regions of the United States, or internationally. Moreover, this study was based on the opinions and experiences of respondents, and they could have provided socially desirable responses.

## Conclusion

Despite some limitations, the qualitative approach used in this study is an advantage, considering the respondents were provided an opportunity to express their opinions and experiences with OSCTCs. As part of the sampling design with the diverse sample, the common themes presented from all OSCTCs signify the true experiences and commonalities across these organizations. The research team was able to conduct this study with no monetary or other incentives for the respondent. Overall, this study provided valuable information that can be used to help other organizations learn about how some sites are implementing OSCTCs.

## **Attachment 1: Off-Site Testing Considerations**

### **Step 1: Carefully consider your OSCTC leadership and partners.**

- FEMA and federal partnerships have their own limitations that could impact the OSCTC testing process.
- Neighboring healthcare providers may or may not offer collaboration.
- State and local partnerships with public health and municipal organizations are valuable.

### **Step 2: Determine testing capacity and follow-up process for results**

#### ***Different laboratories have different turn-around times for COVID-19 tests.***

- Federal or state partnerships may require use of certain laboratories.
- OSCTCs may need to retest patients to support contact tracing in cases of significant delays.

#### ***Consider the best ways to reach your patient population with their results.***

- Determine whether you are sharing the results directly with the patient or with their PCP.
- Consider setting up daily telemedicine patient appointments to monitor ongoing symptoms until they receive their test results.
- Some healthcare providers, such as nurses, may not feel comfortable giving positive test results to patients and will need a physician to step in.

### **Step 3: Determine who you are testing**

#### ***Consider testing guidance of priority populations in context with severe limitations in testing supplies.***

- With limited testing supplies, most OSCTCs are now only testing for COVID-19.
- Patients can be co-infected with COVID-19 and other respiratory illnesses.
- If tests with a quick turnaround are limited, consider who your priority populations are.

#### ***Prepare for patients that require special accommodations.***

- Consider having a separate protocol that supports “walk-up” patients who are unable to drive.
- Provide materials in other languages.
- Make provisions for patients with physical and mental disabilities.

### **Step 4: Plan a process that protects your staff**

#### ***Weather and other external factors will impact your OSCTC.***

- Think through how OSCTC staff will be staying warm, cool, or dry depending on the weather conditions.

#### ***Engineering controls in your OSCTC can minimize risk of infection.***

- Keeping patients in their cars minimizes exposure points.
- Consider tables without smooth surfaces to minimize surfaces where virus can linger.

#### ***Administrative controls in your OSCTC may minimize risk of infection.***

- Quicker visits within OSCTCs minimize healthcare worker exposure time with patients.
- If space, testing materials, and staffing permits, having more than one drive-thru lane can increase efficiency and decrease waiting times.

- Triage and pre-registration in advance of the OSCTC visit reduce exposure time and risk.
- If patients need to fill out their own paperwork at the OSCTC, have patients bring their own pen, or supply pens for patients.
- Preparing test order documentation and labeling sample collection materials in advance can save time and reduce exposure risk.
- In sites where screening and triage occur, consider allowing nurses to submit orders for testing under a physician.

***PPE shortages and unique PPE needs within OSCTCs require creative solutions.***

- Review CDC’s guidelines for extended and reuse of PPE.
- Weather and patient demographics may impact appropriate PPE.

***Consider ways to ensure the number of staff is adequate for OSCTC demand.***

- If OSCTCs require appointments, they can plan appropriately for staffing needs.
- If OSCTCs DO NOT require appointments, regular communication with local providers ordering tests helps with planning.
- Ensure staff have adequate breaks throughout the day.

***Work as a team***

- Having a morning, or daily “huddle” with staff members to clearly define roles and responsibilities for the day helps with workflow.
- A dedicated “watcher” staff member, charged with monitoring all staff members that interact with patients or samples, can identify potential contamination and the need to replace PPE.

***Consider how you inform the public about your OSCTC.***

- A trial run with few patients, prior to broadly publicizing, may be a good place to start.
- Developing appropriate educational materials around OSCTCs (hotlines, handouts, billboards, etc...) for patients benefits everyone.

**Step 5: Reimbursement options are evolving. Figure out how you will get paid.**

- Know how these tests are reimbursed by private and public insurers.
- Stay alert about changes in federal legislation around funding support (Families First Coronavirus Response Act).

## Attachment 2: Off-Site Testing Considerations Infographic

# OFF-SITE COVID-19 TESTING CENTER (OSCTC) CONSIDERATIONS

# 1

## IDENTIFY LEADERS AND PARTNERS

- FEMA and federal partnerships may come with constraints.
- Neighboring healthcare providers may or may not offer collaboration.
- State and local partnerships with public health and municipal organizations are valuable.



# 2

## DETERMINE TESTING CAPACITY & FOLLOW-UP PROCESS FOR RESULTS

### Different laboratories have different turn-around times for COVID-19 tests.

- Federal or state partnerships may require use of certain laboratories.
- OSCTCs may need to retest patients in cases of significant delays.

### Consider the best ways to reach your patient population with their results.

- Determine whether you are sharing the results directly with the patient or with their PCP.
- Daily telemedicine patient appointments following testing may help monitor ongoing symptoms and address anxiety.
- Some healthcare providers may not feel comfortable giving positive test results to patients.



# 3

## WHO YOU ARE TESTING

### Consider testing priorities in context with severe limitations in testing supplies.

- With limited testing supplies, most OSCTCs are now only testing for COVID-19.
- Patients can be co-infected with COVID-19 and other respiratory illnesses.
- If tests with a quick turnaround are limited, consider who your priority populations are.

### Prepare for patients that require special accommodations.

- Consider having a separate protocol that supports "walk-up" patients.
- Provide materials in other languages.
- Make provisions for patients with physical and mental disabilities.



# 4

## PLAN A PROCESS THAT PROTECTS YOUR STAFF

- Think through how OSCTC staff will be staying warm, cool, or dry depending on the weather conditions.

### Engineering and administrative controls can minimize risk of infection.

- Keeping patients in their cars minimizes exposure points.
- Tables without smooth surfaces may minimize areas where virus can linger.
- Quicker visits reduce healthcare worker exposure time.
- More than one drive-thru lane can increase efficiency and decrease waiting times.
- Triage and pre-registration in advance may reduce exposure time.
- If patients need to fill out their own paperwork, have patients bring their own pen, or supply pens for patients.
- Preparing test order documentation and labeling sample collection materials in advance can save time and reduce exposure risk.
- In sites where screening and triage occur, consider allowing nurses to submit orders for testing under a physician.

### PPE shortages and unique PPE needs require creative solutions.

- Review CDC's guidelines for extended and reuse of PPE.
- Weather and patient demographics may impact appropriate PPE.

### Consider ways to ensure the number of staff is adequate for OSCTC demand.

- If OSCTCs require appointments, they can plan appropriately.
- If OSCTCs DO NOT require appointments, regular communication with local providers ordering tests helps with planning.
- Ensure staff have adequate breaks throughout the day.

### Work as a team.

- Have a morning "huddle" with staff members to define roles and workflow.
- A dedicated "watcher", who monitors staff-patient interactions, can identify potential contamination.

### Consider how you inform the public about your OSCTC.

- A trial run with few patients, prior to broadly publicizing, may be a good place to start.
- Developing appropriate educational materials for patients benefits everyone.



# 5

## HOW YOU WILL GET PAID

- Know how these tests are reimbursed by private and public insurers.
- Stay alert about changes in federal legislation around funding support (Families First Coronavirus Response Act).



We want to hear from you! What challenges are you facing at your off-site testing sites?

What have you learned that will benefit others? Please share your feedback at [COVID19@nrhi.org](mailto:COVID19@nrhi.org).



[www.nrhi.org](http://www.nrhi.org)



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## **NRHI Description**

The Network for Regional Healthcare Improvement (NRHI) is a national organization representing nearly 70% of the United States with its Regional Health Improvement Collaboratives (RHICs) and State partner membership. These multi-stakeholder organizations are working in their regions and collaborating across regions to transform the healthcare delivery system and achieve the Triple Aim: improving the patient experience of care, including quality and satisfaction; improving the health of populations; and reducing the per-capita cost of health care. The RHICs are accomplishing this transformation by working directly with physicians and other healthcare providers, provider organizations, commercial and government payers, employers, consumers, and other healthcare related organizations. Both NRHI and its members are non-profit, nongovernmental organizations. Additional information about NRHI and its members can be found at [nrhi.org](http://nrhi.org).

## **Qualidigm Description**

With its corporate headquarters in Wethersfield, Conn. and representation in Maine; New Hampshire; Vermont; and Rhode Island, Qualidigm's mission is to transform the quality, safety, and value of healthcare by leading, collaborating, and aligning improvement efforts. Qualidigm provides quality improvement, project management, evidence-based education and learning sessions, evaluation, and technical assistance services to clinicians, healthcare organizations, and communities. To learn more, visit [www.Qualidigm.org](http://www.Qualidigm.org).

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