

STRONGER TOGETHER:

University Hospitals and Cleveland Clinic –
COVID-19 Observations, Lessons Learned,
Partnership and Roadmap for the Future



Overview

Though much of the United States is re-opening in an attempt to “return to normal,” the cataclysmic COVID-19 pandemic that began in December 2019 and swept worldwide in early 2020 is not over. (Figure 1). And we do not know where this is headed. (Track the worldwide case counts and death tolls daily [here](#) and the Ohio data [here](#).) Until the pandemic ends, however, it is vital that we examine what we’ve accomplished and move forward with what we’ve learned as a way to prepare for the next pandemic or public health crisis. Additionally, the emotional toll has been profound and the economic impact has been devastating, which will be difficult to estimate until it’s over.

Academic medical centers, hospitals, departments of public health, extended care facilities and healthcare providers were caught off guard despite having programs and protocols in place for this sort of challenge. Response to the pandemic has often been frenzied and, in the beginning, lacked reliable scientific consensus and critical epidemiologic information.

Cleveland Clinic, University Hospitals (UH), the city of Cleveland and the state of Ohio faced many of the same challenges as the rest of the country. But, despite being competitive healthcare systems, Cleveland Clinic and UH collaborated in many ways to deal with the challenge. We also reached out to other regional hospitals, including Cleveland’s MetroHealth and St. Vincent Charity Medical Center as well as Firelands Regional Medical Center and Southwest General Medical Center, to work together on some initiatives. This necessitated collaboration across traditional silos, suspension of ego, and a willingness to explore creative relationships to address a set of immediate and critical needs. Of course disaster response plans were already in place, but our systems weren’t expecting a devastating event of this magnitude and duration to appear as fast as this one did. It is interesting that the previous Severe Acute Respiratory Syndrome (SARS), Middle East Respiratory Syndrome (MERS) outbreaks and the onslaught of COVID-19 each occurred about a decade apart. Despite the challenges we faced, we were able to find common ground for the benefit of our patients, local communities, and State of Ohio, by quickly forming a cooperation model. Throughout this process, we’ve learned a great deal about pandemics, public health, healthcare delivery, collaboration and how to better prepare for future public health challenges.

This white paper will review the Cleveland Clinic-UH collaboration while considering where we journey now and how we will continue this relationship post-COVID-19. An overview of our experiences will detail what we’ve done, what we’ve learned, and where knowledge gaps exist while providing a glimpse into our own response playbook that other health systems or communities may choose to adopt. We hope in sharing our experiences that the healthcare industry as a whole, as well as our respective communities, can be better prepared for serial COVID-19 waves and the inevitable next pandemic. We need to be better equipped to ensure a healthier community. The overarching theme is “stronger together.” (Tables 1 and 2).

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State of Ohio and Covid-19

What We've Accomplished, What We've Learned, and What Knowledge Gaps Exist

Weeks before the first three people in Ohio tested positive for COVID-19 on March 9, 2020, the Cleveland Clinic and UH teams stood up respective hospital incident command centers to ensure timely decisions were made regarding patient care, hospital management, supply needs, workforce planning, policy changes, communication and the ability to share data regarding resources. Cleveland Clinic and UH worked with the City of Cleveland, the Cuyahoga County Board of Health, boards of health across geographic footprints, the Ohio Department of Health (ODH) the Ohio Hospital Association (OHA), and the Ohio Governor's office, as well as other local healthcare systems. This resulted in a coordinated COVID-19 response. A unified approach and frequent detailed communication amongst these entities became essential for getting us through the initial pandemic waves and preparing us for subsequent ones. Additionally, we collectively identified specific individuals and/or teams to be on point for coordinating various response efforts and held regular and frequent "virtual" meetings to discuss status.

On March 9, 2020, Ohio Gov. Mike DeWine declared a State of Emergency, and through the Director of the Ohio Board of Health, issued three orders: On March 12 the schools were closed; on March 15, restaurants and bars were shuttered; and on March 22 a Stay-at-Home order was issued. The first order closing schools seemed to have the most impact reducing social interactions in the state by more than 70%. It is an important lesson learned that initiatives designed to create physical distancing, along with other initiatives (e.g., masking, handwashing, environment sanitation, etc.) worked to initially decrease infection transmission ^(1, 2, 3, 4). One could argue that the more draconian the isolation efforts, and enforcement of other maneuvers, the more effective the interventions became, as a decline in infection rate was apparent. The executive orders also halted non-essential medical care including surgery as of March 18. This was done to preserve personal protective equipment (PPE) and save hospital beds and other resources for the anticipated COVID-19 surge.

Surveillance and Modeling:

Using a University of Pennsylvania open-source model⁽⁵⁾, initial work by Cleveland Clinic's Enterprise Analytics team suggested an unrestrained outbreak may lead to a maximum census of nearly 8,000 patients in its 21-county market area. The Executive Team quickly mandated that Cleveland Clinic prepare for a worst-case scenario and made plans to triple its regular nursing floor and intensive care capacity. The largest increase in beds was seen by converting the Sampson Pavilion of the Cleveland Clinic - Case Western Reserve University Healthcare Education Campus (HEC) into the "Hope" Hospital, creating over 1,000 additional patient beds for surging COVID-19 patients. This decision was made based on predictions from a variety of observations of the pandemic's intensity in locations around the world but particularly in Northern Italy and New York City.

UH using its own modeling approach, in consultation with its infectious disease experts, quickly pivoted its daily operations and prepared for a 300% surge capacity across all medical centers, increasing available beds from 1,700 to 5,100. UH also advised the Governor to help define which

surgeries and procedures were essential, and should therefore be permitted to continue, in order to ensure Ohioans were properly cared for during the pandemic.

Additionally, on March 14, 2020, Cleveland Clinic and UH collaborated to speed the launch of one of the nation's first COVID-19 drive-through testing stations for Northeast Ohio residents, creating a model that was emulated by others.

Establishing Emergency Zones:

In late March, Gov. DeWine invited a small group that included Cleveland Clinic and UH representatives to meet with him in Columbus to discuss how the state should prepare for the pandemic. These participants, representing healthcare experts with particular knowledge in infectious disease, epidemiology and public health, suggested the state collapse its designated eight emergency situation regions into a more manageable three-zone system – Cleveland and the Northern Zone One, Columbus and Central Zone Two, and Cincinnati in the Southern Zone Three. Gov. DeWine appointed zone leaders to coordinate activities of local health departments, hospitals and health systems, as well as congregate living facilities. The Zone program created an umbrella mechanism under which healthcare systems could explore opportunities for collaboration.

On April 1, 2020, Dr. Robert Wyllie, Cleveland Clinic's Chief Medical Operations Officer, was appointed to lead Zone One, supported by UH's Dr. Eric Beck, Chief Operating Officer, and Dr. Sean Cannone, UH System Medical Director, as co-clinical leads. The goal of zone leads was to coordinate healthcare delivery in the state between congregate living facilities, county healthcare departments and medical care providers. As such, Medicaid Director Maureen Corcoran and the Medicaid Medical Director Dr. Mary Applegate joined the Zone One team along with Cleveland Clinic's Dr. Alice Kim and Dr. Brook Watts from MetroHealth, which is another large healthcare system in the Cleveland area.

Primary goals of the Zone One team were to provide emergent support for congregate living facilities in crisis; establish Health Care Isolation Centers (HCIC) and skilled nursing facilities throughout the zone that were certified by the Ohio Department of Health and Medicaid as designated care sites for COVID-19 patients; develop a skilled nursing facility (SNF) attribution model to establish a systematic approach to obtaining testing, PPE and staffing support from local hospitals and health systems; establish a communication tool for situational reporting; and coordinate zone-level mass testing of SNFs with the help from the Ohio National Guard. Discussions about the future of a vaccine and challenges of distribution occasionally arose. The Ohio Department of Health designated four approved COVID-19 testing sites in Zone One with nine designated sites in the entire state. Cleveland Clinic and UH partnered in further planning of testing sites and post-acute facilities management.

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Addressing Congregate Living Environments:

At the time, individuals living in a variety of facilities ranging from assisted living homes to skilled nursing operations nationally accounted for 7% of patients infected with COVID-19 but 40% of the fatalities. Both Cleveland Clinic and UH trained swab teams to go into congregate living facilities and test employees and residents while providing PPE and medical advice as needed.

Ohio houses approximately 50,000 people in a variety of congregate living environments with nearly 900 nursing facilities taking care of another 70,000 residents with a total of about 80,000 employees required. Zone One linked each of the facilities with a medical provider and the local health department, then coordinated testing of all employees and symptomatic residents. One of the first challenges in Ohio Zone One was the Elkton Federal Penitentiary in Columbiana County. They had several hundred COVID-19 positive inmates and guards; those requiring hospitalization quickly overwhelmed the local hospitals in Salem and East Liverpool. A cascading system of care was organized to send patients to Akron facilities first and then to Cleveland in order to decant the smaller local hospitals which were becoming overwhelmed. A similar situation occurred a few weeks later in the Veterans Home in Sandusky, Ohio. Often simply letting people know we were there to help alleviated fear, while assistance to those managing the outbreaks gave much needed reassurance.

UH created a Congregate Living Intercept Team that provided COVID-19 outbreak preplanning to management supporting long-term care facilities, and helped those facilities as they coordinated staffing, infection control and testing. The team was an interdisciplinary group of nurse practitioners, medics with specialized disaster preparedness/relief training, family advocates, nursing home administrators, and physicians with expertise in emergency medicine, epidemiology, population health and geriatric medicine. The Intercept team created a playbook consisting of guidance from governmental organizations such as the Centers for Medicare & Medicaid Services (CMS), the Centers for Disease Control and Prevention (CDC), the Ohio Department of Health (ODH), the National Institutes of Health (NIH), and the World Health Organization (WHO). Included were CDC- and ODH-approved protocols to assist SNFs as they prepared for COVID-19 outbreaks. In accordance with guidelines promulgated by the CDC, both Cleveland Clinic and UH additionally developed playbooks for K-12 and higher education facilities as these organizations struggled to develop “return-to-school” plans. Similarly, and also in line with CDC guidelines, guidebooks for businesses more generally were developed and many consulting relationships focused on safe return to their activities.⁶ This included recommendations for distanced or “virtual” employee activity. Studying the consequences of the various interventions will be important as we prepare for subsequent COVID-19 waves and the future post COVID-19.

Expanding Testing Capacity:

Both institutions have also focused on increasing testing capacity. Recognizing continued shortages in critical testing supplies and sites, UH demonstrated the validity of an alternate process using supervised, self-collected nasal swabs in drive-through COVID-19 collection sites. By April, UH had implemented several complex COVID-19 nucleic acid test methods, increased

its capacity substantially, and decreased time to results for critical patients from 30 hours to 30 minutes in many instances. UH also launched a mobile, self-contained testing center that visits underserved areas across the region, improving access to COVID-19 testing and returning results in 24-48 hours.

Similarly, Cleveland Clinic extended its testing capacity to the community by converting some Express Care sites to testing centers, which represented about 20% of all collected swabs for testing and supported the surgical reactivation pre-op testing program. In addition, Cleveland Clinic developed a home testing kit which facilitated screening of patients coming in for surgical and other procedures. This decreased the burden on drive-through testing stations. These kits can also improve testing at congregate living facilities and in populations needing testing more generally. Cleveland Clinic, for example, currently can perform in excess of 5,000 Covid-19 tests daily.

We believe that between Cleveland Clinic and UH sufficient testing capabilities are available and usage of testing capabilities will continue to be improved upon as the needs increase; however, we must be mindful of new challenges that may arise as new variants emerge. Because of our cooperative relationship regarding the pandemic, patients can rely on having both of us serving the community should one institution become overwhelmed and a more severe testing shortage ensues.

Statewide Surges:

On April 23, 2020, the first wave of COVID-19 peaked in Ohio, with 1,103 patients hospitalized, including 522 in intensive care units and 357 on ventilators (Figure 1). State interventions that decreased social interactions, among other things, seemed to correlate to a decrease in COVID-19, with just 512 hospitalized on June 20, including 203 patients in the ICU and 131 on ventilators. As cases declined, the Governor ordered a gradual opening up of the state that commenced on May 1.

However, on July 22 a second wave started where 1,122 individuals were hospitalized with COVID-19, occupying 348 intensive care beds and using 174 ventilators. The resurgence of cases lead the Governor to institute a county COVID-19 management policy and the Ohio Public Health Advisory System mandated a series of preventive steps designed to also mitigate disease spread. Ohio's 68 counties were graded on a number of infection parameters that led to a classification as one of four levels – yellow (least severe), orange, red, and purple (most severe). Initially 15 of Ohio's 68 counties were rated as red, which mandated that citizens limit activities as much as possible. Governor DeWine subsequently reinstated a mandatory mask rule for individuals in the state and a steady decline in COVID-19 cases and hospitalizations was observed (Figure 1).

In October, 2020, we faced the beginning of a third surge in Ohio with hospitalizations rising to a peak of 5,308 and ICU admissions increasing to 1,318 on December 15. The third wave presented a more distributed increase in COVID-19 cases across urban, suburban, and rural communities in addition to having a larger impact on health system caregivers that resulted in high rates of absenteeism. These factors concurrently contributed to multi-system capacity constraints across

a much larger geographic footprint. The need to ensure ongoing synchronization was imperative to support the communities that we serve in addition to assisting other healthcare organizations and populations beyond each organization's normal operating footprint. Appreciating that each organization has facility-specific surge plans, triggered by system and facility-specific thresholds, a one-size-fits-all approach has limited utility. Additionally, our experience to date has shown that each hospital and health system experiences capacity constraints asymmetrically.

Collectively Managing Staff, Space and Supplies:

Recognizing that collectively we have the ability to address patient surges based on the needs and constraints of the day, the leadership in Zone One established a shared framework to manage collective capacity – staffing, space, and supplies – and unify the coordination of their pandemic response activity. They developed a set of Guiding Principles, which can be found in Table 1. Daily meetings were held with the local systems to assess capacity for cooperative data to determine availability for transfer of patients within and amongst systems to help manage the hospitalization burden for Zone One. Within each health system, hospital staffing was managed to meet patient needs and resource availability by moving providers and support personnel. As both the Federal and State governments passed Interim Final Rulemaking (IFR), waivers, and emergency orders to deal with the public health emergency, remote patient monitoring also became more readily available to help mitigate staffing issues by caring for patients at home. And while multiple types of remote monitoring may be used in the home setting, the use of continuous home pulse oximetry with COVID-19 positive patients provides the ability to identify asymptomatic low blood oxygen levels, which has accounted for a large number of COVID-19 deaths and has also greatly impacted vulnerable minority populations. UH addressed this early on in the pandemic by working with Masimo, a global medical technology company, and serving as the first in the U.S. to test and deploy a home monitoring system to evaluate blood oxygen saturation, as well as respiration rate, pulse rate and perfusion index. Cleveland Clinic's COVID-19 monitoring program has monitored more than 27,000 COVID-19-positive patients through outreach and use of MyCare Companion app. This is the first time the app was used in an EPIC environment, and has since been launched in other organizations using EPIC. Successful contact with COVID-19-positive patients correlates with a decreased admission risk (10 days of engagement yields a 7.5% decrease in admission risk).

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What We've Learned in Ohio

There has been a scientifically driven evolution of our understanding of COVID-19 with the Cleveland Clinic and UH, and others providing important insights based on observation and experimentation. Though we still have more to learn, knowledge has driven our approaches to curtailing the pandemic. Significant insight has been gained in the following arenas:

Transmission:

First, and perhaps most importantly, we needed to understand the speed and method of human transmission of COVID-19. Indeed, many asymptomatic patients were infectious. Furthermore, early symptoms were generally not always related to significant pneumonitis or upper respiratory infections but can begin with seemingly insignificant anosmia and taste loss. We came to the understanding that an individual's ability to spread the illness to just two or three people was multiplied by "super spreading events." This reinforced the importance of masking, social distancing, limiting large groups, contact tracing policies, and sanitization efforts which are believed to have limited transmission significantly ^(1, 3, 4). The misguided belief that only ill patients should wear masks eventually changed to understanding that everyone needs to wear a mask in public.

Concerns about cardiovascular drugs:

There was early concern about commonly prescribed cardiovascular drugs –such as Angiotensin Converting Enzyme Inhibitors (ACEi) and Angiotensin Receptor Blockers (ARB). Based on scientific analysis published data analysis subsequently demonstrated that this fear was unwarranted. Switching patients from an ARB and ACEi to alternative drugs would have proved enormously difficult ^(7, 8).

Age and severity of illness:

Though 87% of the mortality in Ohioans occurred in individuals over the age of 65 (with mortality rates increasing with age), additional factors including hypertension, obesity, race and economic status defined high risk as well. The belief that children were largely spared gave way to concern about the possibility of a grave, generalized, inflammatory illness could develop, albeit infrequently ^(2, 8, 9).

Mortality:

Original estimates of COVID-19 death rates of 4% were tempered with mortality more recently being closer to 0.5% - 1% overall, however as the third wave intensified, mortality rates rose and became worrisome ⁽¹⁰⁾.

Therapeutics:

The early belief that no treatments were available evolved to the suggestions that remdesivir, dexamethasone and anti-spike protein monoclonal antibodies (e.g., bamlanivimab, Casirivimab/Imdevimab) seemed helpful in certain circumstances. However, the early hope for hydroxychloroquine and convalescent plasma as cures became doubtful when put to the test of properly designed and executed clinical trials ^(3, 4).

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Collaborating on Analytics, Legal Efforts, PPE, Research, Treatment, Vaccination, Community Outreach and Education

Analytics

Being able to understand the pandemic from an epidemiologic perspective has been critical. Data analytics was essential to decision making. Both UH and Cleveland Clinic have robust data analysis strategies and programs that support business and clinical operations through data-driven insights. In April, the two organizations executed data sharing agreements and began exchanging de-identified data on COVID-19 testing, results, and hospital resource utilization to further support the collaboration efforts addressed in this document. Each team brought unique strengths that when leveraged collaboratively brought a more holistic approach to the analytic foundation of their collective efforts.

Cleveland Clinic analytics were performed by the Enterprise Analytics group that originally adopted an open source University of Pennsylvania Model. The model was refined for Cleveland Clinic use. The 21-county referral area was modeled and provided data and predictions through Zone leadership and the OHA for the entire state. This model was then extended and operationalized through OHA across all state reported COVID-19 data through the ODH to enable any hospital or health system member to visualize forecasted risk in their zone or region.

UH worked with experts from the GIS Health & Hazards Lab at Case Western Reserve University (CWRU) in early March to support their COVID-19 analytics program with a concerted focus on Syndromic Surveillance. The team from CWRU developed a novel method for Geospatial Monitoring for Early Detection of Disease (GeoMEDD) with UH's input and guidance⁽¹¹⁾. This model provided an early warning system for cluster outbreaks at a local level and in locations of greatest vulnerability such as congregate living facilities (to include post-acute facilities). The GeoMEDD model was extended across the combined UH and Cleveland Clinic data set to gain a much more holistic view on the clusters and areas of greatest vulnerability and those areas needing early intervention across the region. This early warning system has been demonstrated to the State of Ohio. The Governor requested proceeding, with the OHA responsible for developing a statewide system that would alert hospital and health system leadership, local city and county departments of health, as well as municipal leaders, about potential outbreaks and help assess the severity of the pandemic at any particular point in time. This has been operationalized through OHA using statewide data from ODH in an interactive visualization that provides insights at the zip, census track, region and zone

This geospatial analytic method, published in Nature Scientific⁽¹¹⁾, has potential beyond COVID-19 and can be used to support efforts in addressing the Opioid epidemic in our state, identify other communicable disease outbreaks, and can also be used to help address the health disparities existing in our communities that impact the health and wellbeing of individuals. The organizations intend to continue collaboration beyond COVID-19 in these and other related use cases.

Legal Efforts

In the spirit of community service, Cleveland Clinic and UH initiated a standing call and task

force through collaboration with the law departments of MetroHealth, St. Vincent Charity Medical Center, Fireland Regional Medical Center, and Southwest General Medical Center with respect to challenging COVID-19-related issues. The UH and Cleveland Clinic Law Departments led this initiative. This involved the scheduling of and participation in regular weekly meetings to ensure continued COVID-19-related collaboration, such as discussing common approaches to the Federal IFRs, waivers, and State emergency rulemaking.

Personal Protective Equipment and Ventilators

No discussion about the pandemic would be complete without mention of the work associated with sourcing, procuring and preserving personal protective equipment (PPE) as well as other lifesaving equipment, such as ventilators, which were in short supply nationwide at the pandemic's beginning. Efforts focused on finding avenues for obtaining, decontaminating and re-using existing PPE. When the magnitude and projected impact of COVID-19 became clear, initiating an aligned and collective response to ensuring enough PPE was available to help protect our caregivers was crucial. Both Cleveland Clinic and UH pursued this goal aggressively. Cleveland Clinic developed approaches to ventilate critically ill patients with the Biomedical Engineering Department creatively assembling from scratch these machines and developing techniques to use single commercially available ventilators to support two patients simultaneously with one machine. UH invested in a domestic supplier of PPE to ensure ongoing availability of critical supplies and relied on its innovation engine, UH Ventures, to rapidly address this issue by bringing together manufacturers and other industry participants to collaborate and co-create solutions to PPE shortfalls.

Research

UH has launched more than 180 COVID-19-related clinical trials and research studies since the pandemic began while maintaining its non-COVID-19 related research programs with nearly 3,000 active studies underway. The Harrington Discovery Institute (HDI) at University Hospitals, with the aim of advancing medicine and society by supporting scientists in turning discoveries into medicines that improve human health, pivoted to a national call for research proposals and awarded 12 scientists from hospitals and medical schools across the Nation projects to develop novel antiviral therapies, next-generation vaccines, and vaccine alternatives for COVID-19. To facilitate COVID-19 research efforts across the UH system and provide investigators with access to de-identified data and biological specimens, the UH Clinical Research Center established a centralized biorepository and data repository that is used to help conduct observational studies about COVID-19. The purpose of this research is to obtain medical information and samples from participants testing positive for COVID-19 or suspected to be positive for COVID-19 and willing to donate blood, saliva, nasal swabs, urine, and other samples. The goal of the repository is to ensure patient safety, privacy, and compliance by having a centralized approach so that multiple researchers are not approaching the same patients for samples. Additionally, the UH Clinical Research Center aims to increase collaboration among UH investigators, reduce redundancy and preserve access to samples so each investigator will have an opportunity to obtain resources, samples, and information to support their COVID-19 initiatives. As of December 1, 2020, the UH

Clinical Data Registry had data on more than 37,000 COVID-19 positive patients within the UH health system. The COVID-19 Biorepository had more than 18,000 blood, respiratory and other samples obtained from COVID-19 positive patients.

At Cleveland Clinic, under oversight of the Lerner Research Institute, an early pivot to the COVID-19 pandemic included establishment of a COVID-19 Registry and a Clinical Interventions Program in March, 2020. The registry is approaching 150,000 total patients tested (with greater than 60,000 positive), and offers a robust population for studying those testing negative versus positive (approximately 60,000). Over 100 projects requesting data were evaluated with 59 approved and fulfilled resulting in over 30 peer reviewed publications. Studies addressed safety of cardiovascular drugs, infection risk of healthcare workers, safety of the flu vaccination during the pandemic, and predictive algorithms for estimating likelihood of a patient being positive and requiring hospitalization or intensive care unit admission. These models were embedded into Cleveland Clinic's Epic electronic medical record and used for patient management⁽⁹⁾. They are also being embedded in Epic nationally and internationally with a target user population of 250 million individuals. The Registry's publications are a subset of over 700 manuscripts related to COVID-19 published by Cleveland Clinic researchers since March and identified through PubMed, SCOPUS and Web of Science. Both UH and Cleveland Clinic science enabled better clinical decision making and helped to bridge the gap in available COVID-19 data.

A Cleveland Clinic Clinical Interventions program complimented registry activities. Over 100 clinical trials were vetted with many initiated in Northeast Ohio and Florida. These included inpatient, outpatient, and biorepository studies. Five inpatient clinical trials have completed patient enrollment. Inpatient studies focused on hydroxychloroquine, remdesivir, convalescent plasma, and a variety of inflammatory cytokine modulating agents. Outpatient studies have tested melatonin, zinc, vitamins and strategies to protect our healthcare workers, among others. A biorepository study has supported efforts to answer the important question of maternal-fetal COVID-19 transmission. The later program is being done in conjunction with the National Institutes of Health funded CWRU Clinical and Translational Science Collaborative (CTSC), which includes UH, MetroHealth, and Cleveland Clinic. Our Healthcare Delivery and Implementation Science Center assists with data translation and caregiving implementation.

The Lerner Research Institute created the Global Center for Pathogens Research and Human Health. The center, headquartered in Cleveland, spans Cleveland Clinic's national and international footprint which allows operation of a global innovation hub for pathogens research and human health. The center leverages the ongoing efforts in virology research and is unique because of the integration and collaboration of multidisciplinary teams across Cleveland, nationally and internationally. Several key recruits joined the Cleveland Clinic despite the challenges of the pandemic. The Florida Research and Innovations Center (FRIC) is now up and running and with its BSL-3 laboratories viral pathogens research relevant to COVID-19 challenges is emerging. Basic science research has focused on drug repurposing for COVID-19 treatments, improved diagnostic methods for viral detection, vaccines and better antimicrobial therapies. Substantial National

Institutes of Health supplemental grant support has been achieved supporting these activities at both UH and Cleveland Clinic.

COVID-19 Treatment

Both Cleveland Clinic and UH are clinical sites for a variety of interventional studies focused on different therapeutic targets. Treatment evolved over time with less intubation, more use of high flow oxygen, and “proning” (placing patients on their stomachs to facilitate breathing and gas exchange). In addition, two medications became available: remdesivir and dexamethasone for treatment of severe COVID-19 infections in hospitalized patients based on promising early clinical trials. Very early in the pandemic in Ohio, UH was the first in Northeast Ohio to participate in early remdesivir studies, monoclonal antibodies, as well as two vaccine studies (Pfizer and Astra Zeneca). Results of studies found remdesivir shortened the duration of hospitalization, but did not significantly affect mortality. In mid-May, remdesivir became widely available under an FDA emergency use authorization declaration and was subsequently approved by the FDA. It had been distributed to Ohio hospitals, prioritizing hospitals that had the highest number of ventilated patients and eventually to hospitals with the highest number of hospitalized COVID-19 patients. UH was also the first in Ohio to study the Lily monoclonal antibody Bamlanivimab, which now is approved under EUA by the FDA for non-hospitalized patients. Dexamethasone was also shown to benefit ventilated patients later in the course of the disease and reduce the frequency of lung complications. The use of the two drugs was associated with a mortality reduction in our oldest and most vulnerable population, those 65 and older, a group that accounted for nearly 80% of early fatalities. This has become standard of care in the treatment of COVID-19⁽³⁾.

In May, UH began to study convalescent plasma for the treatment of COVID-19 patients with evidence of heart damage. This study evaluated whether infusion of plasma donated from someone who has recovered from COVID-19 improved outcomes of patients with severe COVID-19 infection, typically those in the ICU. Cleveland Clinic trialed this approach in their Cleveland Clinic Florida operation more generally under the umbrella of a Mayo Clinic study. UH Cleveland Medical Center and several of the community hospitals at UH also enrolled individuals in another convalescent plasma study, using the Mayo protocol. There remains debate about the effectiveness of this therapy. Subsequently UH began an early phase clinical trial evaluating stem cell therapy (the Machovia study) for COVID-19 induced Acute Respiratory Distress Syndrome. The concept was to determine if stem cells could potentially dampen excessive inflammation and promote faster recovery of lung function. Similarly, other novel therapeutics aimed at dampening inflammation caused by COVID-19 were studied at UH, including one novel first in class fusion protein CD24fc, and the Granulocyte macrophage colony stimulating factor (GM-CSF) antagonist Gimsilumab.

Recently, treatment of COVID-19 has moved toward the goal of preventing hospitalizations. An oral agent, upamostat, a protease inhibitor given orally once daily, has shown very promising early data in blocking the entry of SARS-2 into cells. UH was chosen as one of five sites nationally to participate in this study. Similarly, ACTIV-2 through the AIDS Clinical Group at UH/CWRU is gearing up to start another ambulatory study where patients will be randomized to either monoclonal

antibody treatment, inhaled interferon, or oral camostat, another protease inhibitor.

As a result of these therapeutic intervention trials much has been learned about treatments. Important was the development of prediction tools for estimating the likelihood of a symptomatic or asymptomatic patient undergoing testing for COVID-19 being positive, and positive patients who were deemed low risk for clinical deterioration, or hospital and intensive care unit admission^(8, 9, 12). Leveraging preliminary predictive modeling allowed clinical assessment for deployment of continuous remote monitoring and real-time surveillance systems and protocols to enable patients to convalesce safely at home. The UH system was the first to expand beyond the capabilities of other remote monitoring systems available to actually transmit information on oxygen levels, respiratory and heart rate to a command center monitored by physicians and nurses who contact patients to return to the hospital if their vitals dip to concerning levels. UH held a webinar (promoted by the World Health Organization) and shared system implementation learnings with more than 800 healthcare institutions located in 66 countries⁽¹³⁾. To date, 1,600 UH COVID-19 positive patients or those suspected to have COVID-19 have safely recovered at home using the UH Remote Respiratory Monitoring System.

Vaccination

There are approximately 44 COVID-19 vaccines in clinical trials with over 150 in pre-clinical studies across the globe. UH began participation in Pfizer's global study of BNT162b2 against COVID-19 on August 26, 2020. This vaccine uses mRNA packaged with coronavirus spike protein which is believed to generate protective antibodies. There have been 180 individuals enrolled. The study aims to have a participant population of at least 10% Black and 38% Hispanic. Minimum age of subjects is 12 years. A new study of vaccination of pregnant women with the Pfizer vaccine will be conducted at UH soon. UH is also participating in AstraZeneca's clinical trial of AZD1222. This trial is funded by the National Institute of Allergy and Infectious Diseases (NIAID), part of the NIH, and the Biomedical Advanced Research and Development Authority (BARDA), part of the Department of Health and Human Services. AZD1222 uses a replication-deficient chimpanzee viral vector (virus) and completed enrollment on February 1, 2021.

One challenge of these vaccines is that they need cold storage. Initially the Pfizer vaccine required minus-70C and the Moderna vaccine minus-20C storage. Freezers to meet these requirements are in limited supply. However, Pfizer has created storage units with the vaccine packed in dry ice that can be stored at -20C. Johnson & Johnson's adenovirus vaccine simplifies some of the vaccine administration challenges, because it is a single-dose and only requires refrigeration, not the deep freeze that the Pfizer vaccine needs. On April 12, 2021, the FDA and CDC jointly announced they "are reviewing data involving six reported U.S. cases of a rare and severe type of blood clot in women aged 18-48 after receiving the Johnson & Johnson vaccine."¹⁴ The FDA and CDC convened a meeting of the Advisory Committee on Immunization Practices (ACIP) 11 days later to further review these cases (15 total) and assess their potential significance. It was decided to lift the pause on the J & J vaccine with a label added to warn about this potential side effect. Additionally, as of May 12, 2021, the AstraZeneca vaccine has not been approved for emergency

use authorization by the FDA. To date, there are more than 4,000 COVID-19 variants that have been identified, and UH's laboratory has been engaged in the sequencing. Some of these variants have increased the contagiousness and severity of illness from COVID-19 but appear to be protected against with the current approved U.S. vaccines.

Our Cleveland Clinic and UH collaboration has become even more important as we have worked with Ohio Zone leadership, the Governor's Office and the Ohio Hospital Association to coordinate vaccine distribution and administration. For example, when the Cleveland Clinic received its vaccine supply one week before UH, they invited the UH team to the Cleveland Clinic vaccination site to observe their process, and both teams collaborated on the best approaches for operational effectiveness.

As mandated by a statewide vaccine distribution protocol (see Figure 2), Cleveland Clinic and UH both started vaccinating their respective caregivers who wished to receive the vaccine. By January, both organizations began vaccinating the public, again in accordance with the guidelines established by the State. UH made the decision to make its vaccination clinic available to all members of the community, rather than only its patients, which made implementation much more operationally complex. In order to deploy, UH designed and executed a pre-registration process where community members who wished to receive the vaccine could sign up. However, this necessitated operationalizing a scheduling process that was not online, which required UH to quickly mobilize a new workforce and new workflows to make this happen. UH opened the doors to its public vaccination center on January 19, 2021.

UH has also taken a leadership role in Ohio's mass vaccination effort with one of its physician executives serving as the Ohio Department of Health's designated medical director at the Wolstein Center Federal Mass Vaccination site, where they are administering 6,000 vaccines per day.

Community Outreach

Cleveland Clinic and UH joined together to produce multi-lingual COVID-19 resource guides for help regarding food insecurity, mental health and coronavirus questions as well as fact sheets addressing COVID-19 protection measures. These resource guides have been provided to local city governments, churches, social service agencies, community nonprofits and other organizations to distribute to their stakeholders in under-resourced communities.

Cleveland Clinic, UH and MetroHealth joined together to assist then Congresswoman Marcia Fudge in creating public service announcements for local television and radio stations.

Messaging focused on thanking the community for flattening the COVID-19 curve, and noted that our hospitals are safe, and now it's time to contact your physician about your healthcare needs. Congresswoman Fudge wanted to get the word out that the risk in delaying examinations, tests, procedures and surgeries is a greater health concern than COVID-19 viral infection.

Individually, Cleveland Clinic and UH launched outreach efforts to our communities to ensure they were informed about latest developments with the disease, as well as educated on how to minimize risk of spreading or getting COVID-19 and where they could turn for more information and

COVID-19 testing. Both systems have also focused on the importance of receiving the influenza and COVID-19 vaccines, with special focus aimed at addressing myths concerning vaccines. The Cleveland Clinic COVID-19 Registry supported a community-based evaluation of disadvantaged populations and the epidemiology of infection as well as relationship to race. It was confirmed that Blacks and the disadvantaged were at uniquely high risk of infection and adverse outcomes. This drove more attention on these communities, resulting in development of better protocols for testing procedures and improved access to care. Subsequent analysis demonstrates some reduction in the proportion of Blacks turning COVID-19 positive and better outcomes. Much more work needs to be done.

With the start of the third wave, the Cleveland Clinic and UH joined together with the area's other health systems to author a joint letter and plea to the community about staying vigilant with regard to mask-wearing, physical distancing and hand-hygiene, especially as the holidays approached. This letter ran as an ad in the local papers and was supplemented with a social media and messaging campaign. (See Figure 3)

Education

When the pandemic appeared, there were important initiatives developed to educate our caregivers as well as outside individuals. Over 1,000 programs were created. Electronic education platforms and Continuing Medical Education (CME) programming allowed a focus on content delivery virtually rather than the traditional mode of in-person activities. The Cleveland Clinic Journal of Medicine launched a new section, COVID-19 Curbside Consults, to address caregiver questions. The demand for this type of education is reflected by the fact that there have been about 58,000 page views for the electronic versions which are widely available in the United States. Cleveland Clinic Lerner College of Medicine of CWRU, UH medical school programs, and CWRU at large converted live classes to virtual ones. Students also were trained to triage patients for COVID-19 testing over the telephone as part of an elective. The Center for International Medical Education (CIME) held webinars in China where thousands of healthcare professionals participated and focused on ICU care of COVID-19 patients. CME fast tracked approval for any COVID-19 educational activity throughout the enterprise. Over 77,000 certificates have been issued since Jan. 1, 2020. Workforce retraining modules were developed for a MyLearning platform in order to retrain caregivers for redeployment. Training modules were made available to users outside the organization with 19,000 page views from 85 countries. Over 600 Health Sciences students were on-boarded virtually in June. The simulation center trained over 3,000 caregivers in the nuances of PPE donning and doffing and safe care of COVID-19 patients. All undergraduate and graduate medical education programs were reactivated in June after having been paused in April.

University Hospitals initiated regular internal emails to caregivers informing them of the latest COVID-19 information; hospitalization trends; PPE supply and usage requirements; local, state and federal regulatory changes; and UH policy updates. Additionally this information was also posted to a centralized intranet site for quick access and reference under the banner "Your Single Source of Truth for COVID-19." To augment this information, UH built a library of training tools

on its UH Grow, Perform, Succeed (GPS) online training portal. Topics have included: Evolution of Infection Prevention During COVID-19; COVID-19 and Vaccines: Clinical Trials, Immunity and Immunization; Neuro Grand Rounds: Impact of COVID-19 on Stroke and Neurological Care; Keeping Kids Healthy During COVID-19; Eating Well to Improve Mood During COVID-19; and Improving Outcomes: Engaging Patients and Families During a Global Pandemic. It became apparent that regular, frequent, honest, and transparent education and information communicated to our employees and other constituents was critical to calming fears and stabilizing operations.

There is much work to be done and moving collaborations forward is essential to battling and ending the pandemic. Learning from the relationship formed between UH and Cleveland Clinic with its broad support from leadership [we can look at successes and failures and polish the paradigm](#)

Collaboration Beyond COVID-19

Collaboration Beyond COVID-19

Now that our work around COVID-19 has fostered a unique and effective response for our communities, Cleveland Clinic and UH have pledged to work together to address challenging public health needs in our region while advancing Cleveland as a nationally and globally recognized center of healthcare excellence.

While we will continue to compete, by joining forces for larger public health challenges, we can create powerful scale that can help us better solve issues facing our communities. Cleveland Clinic and UH will serve to advance the health of our communities by aligning on the issues and concerns that matter most in the lives of our patients and caregivers. We will first concentrate the combined strengths of our organizations on four additional key areas:

Battling the opioid epidemic:

For the past several years, we've coordinated a joint approach to opioid treatment and recovery in our community through the Northeast Ohio Hospital Opioid Consortium. We will build on our progress by identifying new opportunities and resources to assist individuals with opioid dependence, in alignment with the Consortium.

Expanding research:

Like COVID-19 and the opioid epidemic, our two institutions have a history of collaborating on research. Among successful current collaborations are the Case Comprehensive Cancer Center, the Cleveland Alzheimer's Disease Research Center, the Biomedical Engineering Alliance, and the Clinical and Translational Science Collaborative of Cleveland, which are achieved in cooperation with the CWRU School of Medicine. We will strengthen our relationship in research to ensure the most improved scientific impact. Imaginative new collaborations could include a biorepository integration, global health initiatives, machine learning and artificial intelligence research, community-based healthcare delivery, and the study of emerging pathogens.

Improving talent recruitment:

As two of the largest employers in the state, we have a tremendous impact on the culture of our community. We attract and retain top clinical, research and scholarly talent to Cleveland by creating a community of innovators, scientists, researchers, and medical personnel. We are fortunate to add the opportunity for scientific and service-driven collaboration across a large community to the tremendous cultural resources of Northeast Ohio, the diverse demographics across the areas we serve, and the academic resources of our area.

Bolstering training and creating jobs for Ohio:

To further strengthen the local talent pool, we each improve, and will continue to improve, job training for future clinical and non-clinical workers and create reliable talent pipelines that address future needs. Career opportunities in healthcare boost the community by providing family-sustaining wages and the potential for advancement, particularly for people of color. And through our collaborative initiatives, we are training the next generation of healthcare providers for healing in our community and around the world.

Recommendations

While there is still much work to be done, moving collaborations forward is essential to battling and ending the pandemic. Learning from the relationship formed between the Cleveland Clinic and UH, with its broad support from leadership, we can look at successes and failures and polish the paradigm (Table 2). We will continue creating teams, building frameworks, and setting goals. By joining others in Ohio, the Nation and the world to improve patient care, research, education, and operational opportunities, we will get through the challenge. The bottom line is that our community is stronger when we work together.

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Appendix

UH & Cleveland Clinic Healthcare Systems Overview

Founded in 1866, **University Hospitals** serves the needs of patients through an integrated network of 23 hospitals (including 5 joint ventures), more than 50 health centers and outpatient facilities, and over 200 physician offices in 16 counties throughout northern Ohio. The system's flagship quaternary care, academic medical center, University Hospitals Cleveland Medical Center, is affiliated with Case Western Reserve University School of Medicine, Oxford University and the Technion Israel Institute of Technology. The main campus also includes the UH Rainbow Babies & Children's Hospital, ranked among the top children's hospitals in the nation; UH MacDonald Women's Hospital, Ohio's only hospital for women; and UH Seidman Cancer Center, part of the NCI-designated Case Comprehensive Cancer Center. UH is home to some of the most prestigious clinical and research programs in the nation, with a total research portfolio exceeding \$265 million and more than 3,000 active clinical trials and research studies underway. UH Cleveland Medical Center is perennially among the highest performers in national ranking surveys, including "America's Best Hospitals" from U.S. News & World Report. UH is also home to 19 Clinical Care Delivery and Research Institutes. UH is one of the largest employers in Northeast Ohio with more than 30,000 employees.

Cleveland Clinic is a nonprofit multispecialty academic medical center that integrates clinical and hospital care with research and education. Located in Cleveland, Ohio, it was founded in 1921 by four renowned physicians with a vision of providing outstanding patient care based upon the principles of cooperation, compassion and innovation. Cleveland Clinic has pioneered many medical breakthroughs, including coronary artery bypass surgery and the first face transplant in the United States. U.S. News & World Report consistently names Cleveland Clinic as one of the nation's best hospitals in its annual "America's Best Hospitals" survey. Among Cleveland Clinic's 68,700 employees worldwide are more than 4,600 salaried physicians and researchers, and 17,700 registered nurses and advanced practice providers, representing 140 medical specialties and subspecialties. Cleveland Clinic is a 6,000-bed health system that includes a 173-acre main campus near downtown Cleveland, 19 hospitals, more than 220 outpatient facilities, and locations in southeast Florida; Las Vegas, Nevada; Toronto, Canada; Abu Dhabi, UAE; and London, England. In 2020, there were 8.7 million total outpatient visits, 273,000 hospital admissions and observations, and 217,000 surgical cases throughout Cleveland Clinic's health system. Patients came for treatment from every state and 185 countries.

FIGURE #1: DAILY COVID-19 NUMBERS IN OHIO (Ohio Department of Public Health; April 16, 2021)

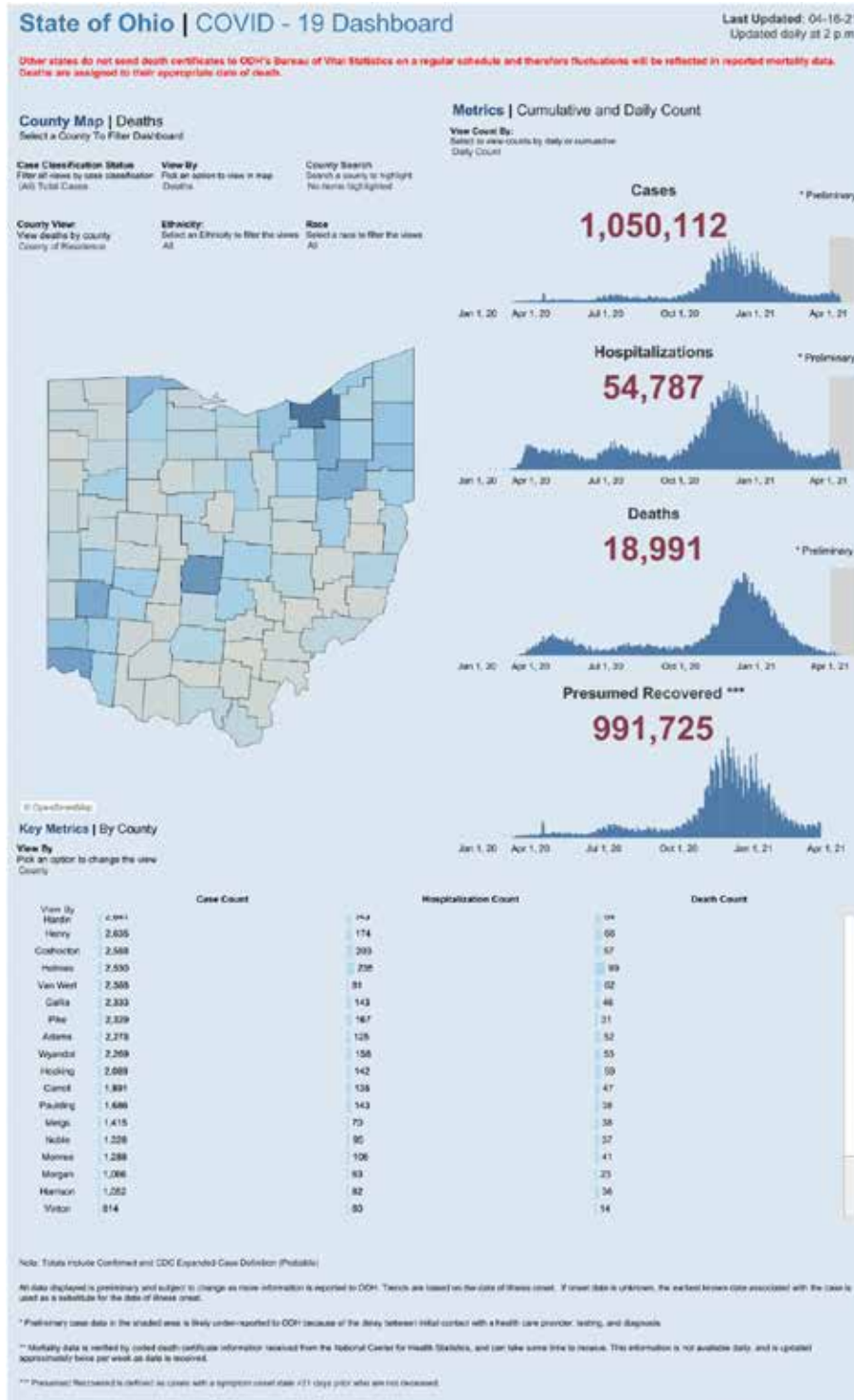
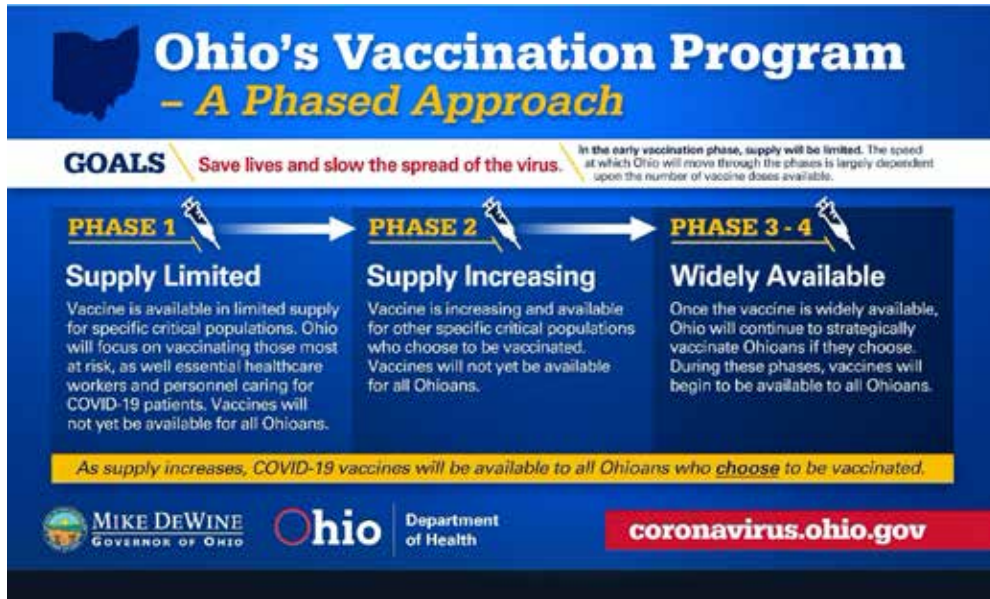


Figure #2: Ohio Phased Vaccine Protocol



COVID-19

Ohio | Department
of Health

COVID-19 Vaccine Fact Sheet

Priority Populations and Vaccine Distribution

Ohio is distributing safe, effective COVID-19 vaccines statewide to those who choose to be vaccinated. The COVID-19 vaccine development process included steps comparable with those used to develop previous vaccines, such as the flu or measles vaccine. Immediately after the first COVID-19 vaccine obtained emergency use authorization (EUA) from the Food and Drug Administration (FDA), the state began strategically and thoughtfully distributing vaccine to Ohioans most at risk, and developed a phased approach to vaccination while supply is limited. Ohio's distribution has been guided by recommendations from the Centers for Disease Control and Prevention (CDC) Advisory Committee on Immunization Practices (ACIP) and the National Academies of Sciences, Engineering, and Medicine (NASEM), and has been customized to meet Ohio's specific needs.

Ohio's Phased Approach

Ohio's main goal is clear: to save lives. While vaccine supply is limited, Ohio is following a phased approach to vaccine administration. In the first vaccination phases, priority is being given to individuals at the highest risk, as well as essential healthcare workers and personnel caring for COVID-19 patients. The speed at which Ohio will move through each of the phases is largely dependent upon the number of vaccine doses available. As vaccine supply increases, COVID-19 vaccines will be available to all Ohioans who choose to be vaccinated.

- **Phase 1 (Supply Limited)** – Vaccine is available in limited supply and will be available only for specific critical populations. Ohio will focus on vaccinating those most at risk, as well as essential healthcare workers and personnel caring for COVID-19 patients.
- **Phase 2 (Supply Increasing)** – Vaccine availability is increasing and can be offered to a larger group of specific critical populations who choose to be vaccinated.

Phase 1A

During Phase 1A, which began Dec. 14, 2020, priority was given to vulnerable individuals who live in close proximity and those who care for them. This phase includes:

- Healthcare workers and personnel who are routinely involved in the care of COVID-19 patients.
- Residents and staff in nursing homes.
- Residents and staff in assisted living facilities.
- Patients and staff at state psychiatric hospitals.
- People with developmental disabilities and those with mental health disorders, including substance-use disorders, who live in group homes, residential facilities, or centers, and staff at those locations.
- Residents and staff at our two state-run homes for Ohio veterans.
- EMS responders.

For more information, visit: coronavirus.ohio.gov

Phase 1B

During Phase 1B, which began Jan. 19, 2021, following a staggered schedule, the focus continues to be protection of Ohioans at the highest risk for severe illness or death from COVID-19, and ensuring K-12 students could return to the classroom. This phase includes:

- Ohioans, age 65 and up.
- Ohioans born with or who have early childhood conditions that are carried into adulthood, which put them at a higher risk for adverse outcomes due to COVID-19.
 - Sickle cell anemia.
 - Down syndrome.
 - Cystic fibrosis.
 - Muscular dystrophy.
 - Cerebral palsy.
 - Spina bifida.
 - People born with severe heart defects, requiring regular specialized medical care.
 - People with severe type 1 diabetes, who have been hospitalized for this in the past year.
 - Phenylketonuria (PKU), Tay-Sachs, and other rare, inherited metabolic disorders.
 - Epilepsy with continuing seizures; hydrocephaly; microcephaly, and other severe neurological disorders.
 - Turner syndrome, fragile X syndrome, Prader-Willi syndrome, and other severe genetic disorders.
 - People with severe asthma, who have been hospitalized for this in the past year.
 - Alpha and beta thalassemia.
 - Solid organ transplant candidates and recipients
- Adults/employees in K-12 schools that want to go back to, or to remain with, in-person or hybrid learning models.

PHASE 1B TIMELINE

Vaccinations in Phase 1B began the week of Jan. 19, 2021. Governor DeWine announced a schedule for offering vaccinations to the estimated 2.2 million people who are eligible for the vaccine under this phase, beginning with those who are 80 or older. With the addition of each new age group, vaccinations will continue for the previous age group. It will take a number of weeks to distribute all of the vaccine given the limited doses available.

- Jan. 19, 2021 – Ohioans 80 years of age and older.
 - Jan. 25, 2021 –
 - Ohioans 75 years of age and older
 - Those with a developmental or intellectual disability **AND** one of the qualifying conditions listed above.
- If you believe you fall into this category:**
- County boards of developmental disabilities will reach out to you to coordinate vaccination if you are already receiving services from the board and it knows that you qualify.
 - If you have not been contacted, or if you do not receive services through a board of developmental disabilities, you must reach out to the board in your county to coordinate your vaccination. A directory of county boards can be found [on the Ohio Board of Developmental Disabilities website](#).
 - The board will work with a children's hospital or a local health department to schedule your vaccination appointment.
 - Vaccinations will only be given at local health departments or participating children's hospitals in conjunction with the local boards. **Do not go to your local pharmacy for scheduling or vaccination.**
- Feb. 1, 2021 –
 - Ohioans 70 years of age and older.
 - Employees of K-12 schools that wish to remain or return to in-person or hybrid models.
 - Feb. 8, 2021 – Ohioans 65 years of age and older.
 - Feb. 15, 2021 – Ohioans born with or who have specific early childhood conditions that are carried into adulthood, which put them at a higher risk for adverse outcomes due to COVID-19, listed above.

For more information, visit: coronavirus.ohio.gov

- Ohioans with one of the above Phase 1B qualifying medical conditions may choose to receive the vaccine at the provider of their choice, but will be asked by their vaccine provider to verify that they are, in fact, eligible at this time.

Phase 1C

Vaccinations for Phase 1C began on March 4, 2021. This phase includes:

- Individuals who have additional medical conditions that may increase their risk of severe illness and death from COVID-19. The new qualifying conditions are not already covered through Ohio's age-based approach to vaccine eligibility.
- Ohioans who work in certain occupations, including child care services, funeral services, and law enforcement and correction services.
- Eligible individuals can receive a vaccine from the provider of their choice. Individuals may be asked to confirm during the registration or screening process that they are eligible to receive the vaccine based on a qualifying medical condition or based on their occupation.

MEDICAL CONDITIONS AND WOMEN WHO ARE PREGNANT

Approximately 141,000 Ohioans with the following conditions will be eligible to receive the vaccine.

- People with amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig's disease.
- Bone marrow transplant recipients.
 - These are sometimes also called hematopoietic cell or stem cell transplants, and these patients are undergoing treatment primarily for cancer and certain anemias, and they face an increased risk of severe COVID-19 illness.
 - This group does NOT include the kind of stem-cell injections people might receive for the treatment of orthopedic problems, especially for their knees.
- People with type 1 diabetes.
- Pregnant women.

OCCUPATIONS

- **Child care services:** Staff members at child care centers and pre-kindergarten programs who have regular, ongoing direct contact with children enrolled in these programs. There are approximately 40,400 eligible Ohioans in this category.
 - Administrators, lead and assistant teachers, and substitute teachers enrolled in [Ohio's Professional Registry](#) who are currently working in open child care or pre-kindergarten programs.
 - Licensing specialists employed by the [Ohio Department of Job and Family Services](#) or a county job and family services agency.
 - The program does NOT include parent volunteers, board members, or owners/administrators who do not provide in-classroom support.
- **Funeral services:** This group includes licensed staff and active apprentices in the funeral services industry. There are approximately 3,600 eligible Ohioans in this category.
 - Embalmers/morticians.
 - Funeral home directors.
 - Crematory operators.
 - Apprentices.
- **Law enforcement and corrections officers:** There are approximately 76,000 Ohioans eligible in this category.
 - This group includes sworn law enforcement officers and peace officers who have first responder or direct supervisory responsibilities. These individuals must be active duty, working a regular minimum of 20 hours a week. Eligibility does not include retired, "special," or reserve officers.
 - Police officers.

For more information, visit: coronavirus.ohio.gov

- Sheriffs deputies.
- Ohio State Highway Patrol troopers.
- Special jurisdiction officers: Other state or federal enforcement officers such as Ohio Department of Natural Resources (ODNR) enforcement staff, pharmacy board investigators, BCI agents, state fire marshal investigators, federal transportation security officers, and other federal law enforcement officers who do not have access to vaccination from federal sources.
- Corrections staff. Eligible are corrections staff, including probation and parole staff, who provide direct services to an adult or juvenile inmate or court-supervised individuals.
- Firefighters: Individuals who have a valid active firefighting certificate in the State of Ohio who are active members or employees of a recognized fire department. This does not include retired, emeritus or reserve individuals.

Phase 1D

Vaccinations for Phase 1D began on March 11, 2021. This phase includes:

- Individuals who have the specified medical conditions listed below that may increase their risk of severe illness and death from COVID-19.
- These individuals are not already eligible through Ohio's age-based approach to vaccine eligibility.
- Eligible individuals can receive a vaccine from the provider of their choice. Individuals may be asked to confirm during the registration or screening process that they are eligible to receive the vaccine based on a qualifying medical condition.

MEDICAL CONDITIONS

- People with type 2 diabetes.
 - This opens eligibility to approximately **172,000 Ohioans** under the age of 50 not otherwise eligible.
- People with end-stage renal disease (also known as end-stage kidney disease).
 - This opens eligibility to approximately **25,000 Ohioans** under the age of 50 not otherwise eligible.

Phase 1E

Vaccinations for Phase 1E will begin on Friday, March 19, 2021. This phase includes:

- Individuals who have the specified medical conditions listed below that may increase their risk of severe illness and death from COVID-19.
- These individuals are not already eligible through Ohio's age-based approach to vaccine eligibility.
- Eligible individuals can receive a vaccine from the provider of their choice. Individuals may be asked to confirm during the registration or screening process that they are eligible to receive the vaccine based on a qualifying medical condition.

MEDICAL CONDITIONS

Individuals with at least one of the following medical conditions:

- Cancer.
- Chronic kidney disease (CKD).
- Chronic obstructive pulmonary disease (COPD).
- Heart disease.
- Obesity.

This opens eligibility to approximately **766,000 Ohioans not otherwise eligible by age or other qualifying condition.**

For more information, visit: coronavirus.ohio.gov

Phase 2A

Vaccinations for Phase 2A began on March 4, 2021. Because the risk of more severe reactions and outcomes of COVID-19 increases with age, Phase 2A expands age eligibility criteria to age 60 and older. This opens eligibility to approximately **695,000 Ohioans age 60-65**. Eligible individuals can receive a vaccine from the provider of their choice.

AGE ELIGIBILITY

- Individuals age 60 and older.

Individuals age 65 and older previously eligible under Phase 1B who have not yet received the vaccine remain eligible under Phase 2A.

Phase 2B

Vaccinations for Phase 2B began on March 11, 2021. Because the risk of more severe reactions and outcomes of COVID-19 increases with age, Phase 2B expands age eligibility criteria to age 50 and older. This opens eligibility to approximately **1.2 million Ohioans** ages 50-59. Eligible individuals can receive a vaccine from the provider of their choice.

AGE ELIGIBILITY

- Individuals age 50 and older.

Individuals age 60 and older previously eligible under Phase 1B or Phase 2A who have not yet received the vaccine remain eligible under Phase 2B.

Phase 2C

Vaccinations for Phase 2C will begin on Friday, March 19, 2021. Because the risk of more severe reactions and outcomes of COVID-19 increases with age, Phase 2C will extend eligibility criteria defined by age to 40 and older. This opens eligibility to approximately **818,000 Ohioans** between ages 40-49. Eligible individuals can receive a vaccine from the provider of their choice.

AGE ELIGIBILITY

Individuals age 40 and older.

Individuals age 50 and older previously eligible under Phase 1B, Phase 2A or Phase 2B who have not yet received the vaccine remain eligible under Phase 2C.

Phase 2D

Vaccinations will be open to people 16 and older beginning Monday, March 29, 2021.

With parental or legal guardian consent, individuals ages 16 and 17 will be eligible to receive the Pfizer vaccine, which is the only COVID-19 vaccine currently authorized for use in people younger than 18.

Manufacturer-specific vaccine eligibility requirements

Vaccine recipients must be age 16 or older to be eligible for the Pfizer vaccine, and age 18 or older to be eligible for the Moderna and Johnson & Johnson (Janssen) vaccines.

For more information, visit: coronavirus.ohio.gov

How to find vaccine providers, schedule appointments

Ohioans can find providers participating in Ohio's Vaccine Program the following ways:

- Ohio's new vaccine appointment scheduling system, [Vaccine Management Solution \(VMS\)](#) – This one-stop resource for patients beginning the vaccination process will allow Ohioans to determine eligibility, find a provider, schedule appointments, submit health information, and receive updates and reminders. Visit [gettheshot.coronavirus.ohio.gov to get started](#). Find frequently asked questions, facts and training materials on the [Get the Shot page](#) at [coronavirus.ohio.gov](#).
- The **COVID-19 Vaccine Provider Locations** directory at [vaccine.coronavirus.ohio.gov](#) is a resource that shows providers who have received shipments of COVID-19 vaccines. The COVID-19 Vaccine Provider Locations directory is searchable by county and ZIP code.
- In addition, vaccine supply is also available through the [Federal Retail Pharmacy Program for COVID-19 Vaccination](#). Eligible Ohioans who want to find a participating pharmacy should visit the Centers for Disease Control and Prevention's [VaccineFinder](#). This is a free, online service.

Updated March 16, 2021.

For additional information, visit [coronavirus.ohio.gov](#).

For answers to your COVID-19 questions, call 1-833-4-ASK-ODH (1-833-427-5634).

Your mental health is just as important as your physical health. If you or a loved one are experiencing anxiety related to the coronavirus pandemic, help is available 24 hours a day, seven days a week. Call the COVID-19 CareLine at 1-800-720-9616.

For more information, visit: [coronavirus.ohio.gov](#)

Figure #3: Community Letter

Dear Neighbors,

As we approach the final weeks of the year, let's pause to reflect on all that we have been through as a result of the COVID-19 pandemic. Each of us has been changed and affected personally and professionally. Our communities, and indeed our world, have been changed.

We've made it to this point together. And that is exactly the reason for this message.

We start with pride for our caregiving teams who make patient care their top priority. Our gratitude goes to caregivers at the bedside and those behind the scenes who make our health systems succeed every day of every year.

We also extend our sincere thanks to those who have been steadfast in following the recommended guidelines to help slow the spread of COVID-19. You have been on the front lines in your communities each day, wearing masks in public and keeping physical distance. We see your efforts and are grateful for your support.

As vaccines are approved and distributed in the coming days, weeks and months, we have reason to be hopeful. We are confident that vaccines will slow the pandemic and help bring about its end, but until that day, we must continue:

- Wearing a mask when with other people who don't live in your home
- Washing hands frequently
- Keeping physical distance
- Staying home when sick
- Getting a flu shot

Those actions are in our control and effective. Choosing to follow the guidelines has helped your families, friends and the broader community stay healthy. We thank you for your persistence and ask that you continue these efforts, even during the upcoming holidays and celebrations.

Making sacrifices is not easy, but it is critically important as we work to better control – and eventually extinguish – this pandemic.

We have come a long way in fighting COVID-19, but our work is not done. If we stay vigilant and strong, we will have the opportunity to celebrate many special events and holidays to come.

Sincerely,

 <p>Akram Boutros, MD, FACHE President and CEO MetroHealth System</p>	 <p>Janice Murphy, MSN, FACHE President and CEO St. Vincent Charity Medical Center</p>
 <p>Cliff Devery, MD President and CEO Summa Health</p>	 <p>Jill K. Dietrich, JD, MBA, FACHE Executive Director, CEO VA Northeast Ohio Healthcare System</p>
 <p>Cliff Megerian, MD President University Hospitals</p>	 <p>Tom Mihaljevic, MD President and CEO Cleveland Clinic</p>

TABLE #1: Zone 1 Leadership Guiding Principles:

Ohio COVID Unified Command ZONE 1 – Cleveland (EMA Regions 1, 2, 5) Cleveland Clinic – University Hospitals – MetroHealth System – Saint Vincent Joint COVID-19 Response

- Define adjusted capacity as the actual staffed bed availability in each facility or system (reflective of the net impact of constraints and augmentation)
- Align on standard operational definitions, sharing occupancy and personnel status that may impact safe, efficient care for all patients.
- Increase the frequency of standing coordination calls as necessary to ensure timely awareness of adjusted capacity across the zone.
- Each hospital and health system will share plans for conventional, contingent, crisis standards of care
- Stand willing to accept inbound transfers based on available adjusted capacity in order to decompress other hospitals within the zone.
- Commit, to the extent able, to continue providing non-COVID-19 care to patients and communities (e.g. contracting or reducing services before ceasing categorially; tiering elective procedures to preserve capacity)
- Facilitate emergency privileges to physicians as clinically necessary to preserve the physician-patient relationship
- Share resources and expertise to amplify our collective impact and improve our effectiveness
- Share equipment and redistribute supplies to mutually reinforce our resiliency
- Share data, modeling and intelligence in real-time
- Create unified and consistent messaging to both internal and external stakeholders (e.g. aligned PPE guidance, return to work guidelines, vaccination prioritization, testing prioritization, OHA/ODH Zone COVID statistics)
- Enhance communication, coordination and collaboration to ensure the greatest good for the greatest number
- Jointly staff a transfer line to enable equitable distribution of patients and timely support of all hospitals within the Zone.

TABLE #2: RECOMMENDATIONS from WHAT WE'VE LEARNED

Responding to the COVID-19 Pandemic – Stronger Together

- Come together with existing regional, state & national healthcare resources
- Organize incident command centers that are matrixed and communicate well
- Exploit advantages of being a healthcare system (Hub and Spoke capabilities)
- Leverage institutional leadership and resilience
- Seek institutional and public trust
- Be mindful of healthcare disparities
- Create collaboration based on community need
- Capitalize on available expertise and resources
- Share rather than hoard knowledge – avoid hubris
- Respect, understand and embrace science
- Establish and share databases that can be appropriately set up to be plumbed for insight
- Leverage available basic and clinical science research programs and opportunities
- Develop analytic tools to characterize and help manage the challenge
- Learn to change and pivot rapidly when faced with new knowledge and events
- Balance evidence-based decision making with “expert opinion”
- Communicate constantly with constituencies including caregivers, staff, and the public
- Maintain confidence and hope in our abilities to end the COVID-19 pandemic

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