COVID-19 Response Interim Review

January 2020 through December 2021

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES

Comment on Scope of Report and Limitations

As of the time of publication, the COVID-19 crisis continues to affect individual residents and families of North Carolina as well as communities, schools, and businesses. Recovery from the pandemic will be a long road. The purpose of this interim review is to reflect on and encapsulate some of the emerging lessons learned from the first 20 months of the pandemic in North Carolina to help the North Carolina Department of Health and Human Services (NCDHHS) learn, identify opportunities for improvement, and begin the forward-looking work of strengthening our state's capacity to respond to future public health emergencies more swiftly and effectively.

NCDHHS, including its Division of Public Health along with multiple other divisions and Departmental leaders, has played a prominent role in guiding and implementing North Carolina's response. The focus of this review, informed by a series of interviews with NCDHHS employees and external partners and organizations, as well as document and data review, and where applicable, review of existing survey information, is largely limited to NCDHHS's roles and responsibilities. This report is not a review of actions taken by other state departments, other entities of state government, federal agencies, or private sector partners.

This review is not intended to be a comprehensive assessment for two reasons. First, the work continues as the pandemic continues. Second, no interim review could adequately capture the depth and breadth of the countless contributions and personal sacrifices made by NCDHHS employees, local health departments, health care professionals, community leaders, advocacy groups and convenors, and the myriad other local, state and federal entities that were integral to North Carolina's COVID-19 response efforts. While this review sought to obtain a broad and diverse range of perspectives, it by no means represents the perspective of all stakeholders nor of all North Carolinians.

Finally, it is important to note that while this report focuses on aspects of NCDHHS's role in the pandemic response as a lead agency in the state, NCDHHS is also a significant employer with over 17,000 employees. NCDHHS has grappled with many of the same challenges that all businesses across the state have navigated to implement policies and protocols to keep employees safe; transition to remote work when possible (including the rapid adoption of new technologies to support virtual collaboration and communications); support employees during periods of limited or no child care, school closures and other personal stressors; and ensure no disruption to the vital social and medical services that many in our state rely on each day. NCDHHS has a deep appreciation for the challenges, efforts and sacrifices made by our fellow residents and is proud to both serve and work alongside you.

Executive Summary

It has been two years since a new virus, "severe acute respiratory syndrome coronavirus 2," was identified as the cause of a disease outbreak known as COVID-19. The highly transmissible virus and the resulting global pandemic it caused has had a dramatic impact on the lives and livelihoods of North Carolinians, upending nearly every facet of life and laying bare the vulnerabilities of our health systems and communities. With the somber two-year milestone in the fight against COVID-19 approaching, the North Carolina Department of Health and Human Services (NCDHHS) has undertaken an "Interim Review" of the Department's efforts to respond to the COVID-19 pandemic. Based on interviews with individuals both from within NCDHHS and external stakeholders, and a review of appliable survey data and documentation, the goals of this review are to identify opportunities to strengthen the continued response and recovery efforts and to better prepare NCDHHS and our public and private partners for future pandemics.

To date, North Carolina has largely avoided the worst effects of COVID-19; as of late November 2021, North Carolina ranked 31st for cases per capita and 36th for deaths per capita attributed to COVID-19[1]. Even so, the pandemic has exposed significant gaps that left the state vulnerable: a chronically underfunded public health system; a fragile health care safety net; high rates of uninsurance; and inadequate behavioral health services, as well as longstanding health and economic disparities in rural communities and communities of color that compounded the pandemic's impacts. The state's early response was also complicated by two external factors: an uncoordinated federal response and the collapse of the global supply chain.

With these challenges in mind, NCDHHS made a concerted effort to center its COVID-19 response around the latest available scientific knowledge, real-time data, robust partnerships, and community input, while putting heath equity at the center of all efforts.

NCDHHS, with its partners at the North Carolina Department of Public Safety (DPS) Division of Emergency Management, set forth an overarching strategy to respond to COVID-19 focused on savings lives and organized around two primary pillars:

1) Mitigation and Prevention strategies to prevent or slow the spread of COVID-19 across the population in total (such as through public education and messaging, policy making and guidance, PPE procurement and distribution, and eventually vaccination); and
2) Response Mobilization, including both case-based containment (such as through identification/testing, case investigation and contract tracing, isolation, and quarantine protocols with wrap-around supports) and surge capacity planning and intervention.

NCDHHS's ability to mount an effective response evolved as the available public health tools and its supporting infrastructure evolved.

Evolution of NCDHHS's COVID-19 Response Efforts

Over time, NCDHHS developed new ways of measuring the effectiveness of COVID-19 prevention efforts and mitigating viral spread

Widespread Availability?	**Early Pandemic** ***Winter 2020***	**Limited Tools** ***Spring 2020***	**Pre-Vaccine** ***Summer-Fall 2020***	**Vaccine** ***Winter 2020 – Spring 2021***	**Delta Variant** ***Summer-Fall 2021***
PPE	X	X	✓	✓	✓
Testing	X	X	✓	✓	✓
Vaccines	X	X	X	✓	✓
Treatment	X	X	X	X	✓
Data Capabilities		Manual collection for high level case and hospitalization data	Enabled data/reporting automation Increased data transparency and granularity to identify local trends or variance in demographic groups	+ Death and hospitalization rates between vaccinated and unvaccinated	
As the pandemic evolved, new tools, infrastructure and policy were developed and operationalized.				+ **Vaccine** allocation and administration data Disaggregated demographics by race/ethnicity and localities	
Prevention and Treatment Tools		• Stay at home • COVID-19-like illness surveillance • Hospital capacity	• Testing case data • 3 W's: Wear, Wait, Wash • Remdesivir and Monoclonal Antibody (mAbs) Treatments	• Limited initial vaccine supply • Increased eligibility and treatment options for mAbs	• Strong vaccine supply • Increased treatment availability and supply
Infrastructure	• Strong partnership between EM and NCDHHS Hurricane Preparedness Experience	• PPE bidding wars • Ventilator supply concerns • Data collected manually • Regularly convening of industry sectors • Emergency system to keep child care open • Food access (P-EBT)	• Launched public Dashboard • Built easily accessible statewide testing infrastructure • Made PPE easily accessible, especially for child care and K-12 • Optimized data systems • Technical assistance teams for high-risk settings	• Built vaccine management system (CVMS) • Recruit and onboard providers • Ensure vaccine easily accessible for historically marginalized populations	• Treatment access system created • Extensive provider network for vaccine access • Utilized FEMA support to ease healthcare system burden for EMS and mAbs treatment
Policy	• Governor's Novel Coronavirus Task Force	• NC State of Emergency • Stay-at-Home • Standing order for testing • Hold on non-essential surgery to ensure hospital capacity • NCDHHS Testing Surge Workgroup • Historically Marginalized Populations (HMP) Workgroup	• Statewide mask requirement • North Carolina "Dimmer Switch" - data monitoring to guide lifting of restrictions • Restrictions eased • NCIOM Vaccine Advisory Committee • StrongSchools Toolkit	• Standing order for vaccines • Supplemented StrongSchools Toolkit to support in person learning statewide	• Standing order for mAbs • Vaccine/Testing Executive Order for state employees • Localizing decision making whenever possible

How Has North Carolina Fared?

Supported Hospitals and Health System Capacity

Statewide hospital capacity has not exceeded **81%**

Statewide ICU capacity has not exceeded **90%**

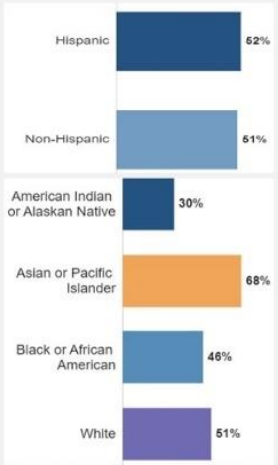
Percent of 10,000 state healthcare facility employees fully vaccinated **99%**

PPE items distributed to health care providers **47M**

Medicaid telehealth visits (as processed claims) **1.1M**

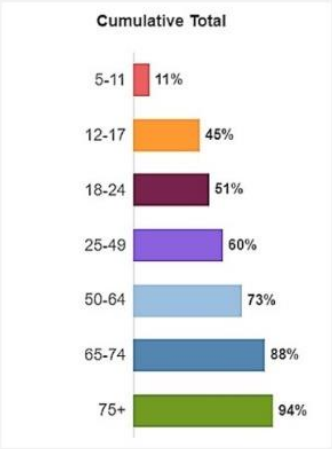
Reduced Equity Gaps in Vaccination

Percent of population vaccinated with at least one dose by race and ethnicity**



Recognized as top in nation for vaccinated 65+

Percent of population vaccinated with at least one dose by age**



Community Supports and Whole Person Care

$1.7B Food assistance benefits provided to families of 1.3 million children at risk of hunger

$34M Child care subsidies for essential frontline workers

76 Counties with non-congregantCOVID-19 shelter options

3,500+ Vaccine access points (including family clinics in regions with limited primary care access)

Emerging Lessons

The COVID-19 pandemic is by no means over as new SARS-CoV-2 variants and vaccine hesitancy indicate challenges to come. The pandemic has also shown a spotlight on deeply rooted systemic challenges across the fabric of our society and made it undeniably clear that a health care system focused on paying for medical costs does not fund the desired outcomes of a healthy and resilient population. However, much has been learned to date that can help inform efforts to continue the fight against COVID-19 and strengthen the resiliency of North Carolina in the future. Overarching emerging lessons to date include:

- **There is power in a unifying vision and purpose.**
- **There is no playbook for unprecedented.**
- **Communications in a time of crisis requires transparency and managing of expectations.**
- **That said, it is extremely challenging to build trust in government and public health during a time of crisis. Trust must be earned through intentional relationships, consistency, resources, and time.**
- **Centralized public health decision-making and authority is necessary and must come with accountability.**
- **Always be in a learning mode. State agencies need to be flexible, willing to hear and accept criticism, and pivot as the pandemic changes.**
- **Think about data first.**
- **Effective response to a pandemic requires simple, clear, easy to understand messaging that influences behavior change.**
- **Advancing health equity requires consistent effort and prioritization.**
- **A modern governmental health and human services agency must evolve its core competencies.**
- **Whole person care matters.**
- **NCDHHS agency coordination and collaboration to support long-term care facilities needs to be strengthened.**
- **Politization, misinformation and social media will continue to play a large role in the public discourse related to COVID-19 and future public health emergencies.**
- **Be prepared for a marathon.**

As more tools continue to become available to states and local communities to fight COVID-19, there must be a continued, unrelenting focus on equipping the public with compelling reasons to use them while not losing focus on efforts to shore up the health care delivery system.

There is no perfect way to respond to a pandemic or indeed to prepare for the next one, but there will be a next one. A defining feature of North Carolina's success in the future will be the resiliency of both our health care infrastructure and our communities.

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Introduction

North Carolina coordinated a rapid statewide response to COVID-19 that was originally rooted in established disaster and public health preparedness efforts but has grown to an unprecedented scope and scale. The response has been characterized by a deliberate and concerted effort to center decisions and actions around science, real-time data, partnerships with a wide range of critical stakeholders, community input, an understanding of the disparate impact COVID-19 is having on historically marginalized populations (HMPs) across the country, and the need to prioritize health equity across all its efforts.

To date, North Carolina has largely avoided the worst effects of COVID-19; in late November 2021, North Carolina ranked 31st among all states for cases per capita and 36th for deaths per capita attributed to COVID-19.[2] Even so, the pandemic has exposed significant gaps in the chronically underfunded public health system across the state, as well as ongoing disparities in health care delivery, employment, housing, and criminal justice.

As of December 3, 2021, over 1.54 million cases of COVID-19 have been confirmed in North Carolina,[3] a number that almost certainly undercounts the actual spread of the virus, given that many who had symptoms consistent with COVID-19 were never tested, and many have likely been infected but asymptomatic. Nearly 20 million COVID-19 tests have been administered across the state. In North Carolina, 61% of residents have received at least one dose of vaccine, including 94% of those over the age of 65, with 11.8 million total doses administered.[4]

Although vaccines and booster shots have become widely available, treatments such as monoclonal antibody therapy have helped many, and new oral antivirals have shown promise for some, the pandemic is far from over. As North Carolina still grapples with the delta variant of the severe acute respiratory syndrome (SARS)-CoV-2 virus (the coronavirus that causes COVID-19), a new highly infectious variant, Omicron, threatens to cause increases in COVID-19 cases and further burden an already stretched health care system.

Policymakers cannot predict the future, as the past 20 months have demonstrated. However, as we somberly approach the two-year milestone in the fight against COVID-19, it seems an appropriate time to take stock of NCDHHS' response efforts and to document emerging lessons from the road traveled to inform the road ahead.

TIMELINE OF EARLY ACTIONS

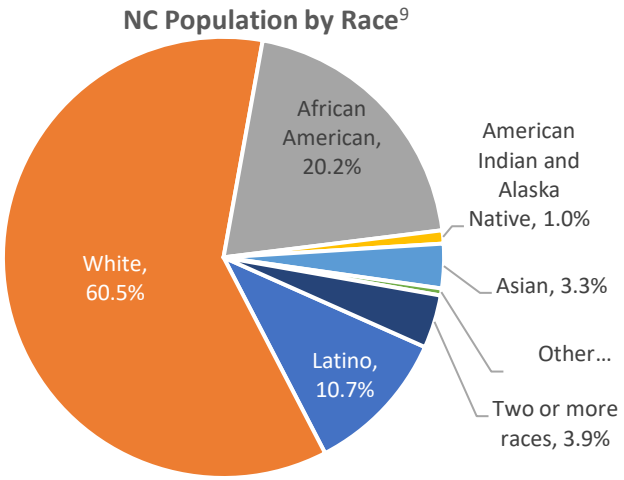
- January 7, 2020 – Chinese authorities identify and isolate a novel coronavirus as the source of recent illness.
- January 20, 2020 – The Centers for Disease Control and Prevention (CDC) confirms the first U.S. laboratory-confirmed case of what would become known as COVID-19 in the U.S.
- January 24, 2020 – NCDHHS announced it was investigating its first possible case of the virus (result was negative).
- January 31, 2020 - The International Health Regulations Emergency Committee of the World Health Organization (WHO) declared the outbreak a "Public Health Emergency of International Concern."
- January 31, 2020 - U.S. Health and Human Services (HHS) Secretary Alex Azar declared a public health emergency (PHE), allowing flexibilities to aid the U.S. healthcare community in responding to COVID-19.
- February 6, 2020 – NCDHHS announces monitoring protocols for international travelers arriving in the U.S. from China, in collaboration with the CDC.
- February 11, 2020 – North Carolina Governor Roy Cooper establishes a COVID-19 Task Force to begin coordinating the state's response.
- February 11, 2020 - The WHO announces "COVID-19" as the official name for the disease caused by the novel coronavirus.
- February 26, 2020 – NCDHHS and the COVID-19 Task Force release preventative measures guidance for individuals and families, businesses and employers, health care providers, schools, and child care providers.
- March 3, 2020 – NCDHHS announces the first confirmed case of COVID-19 in the state.
- March 3, 2020 – NCDHHS announces COVID-19 testing capabilities for the state's public health lab.
- March 10, 2020 – Governor Cooper declares a State of Emergency in North Carolina.
- March 10, 2020 – NCDHHS releases additional COVID-19 spread mitigation guidance.
- March 11, 2020 – The WHO declares COVID-19 a pandemic.
- March 11, 2020 – NCDHHS announces updates to Medicaid policy and new flexibilities in its efforts to help slow the spread of the virus.
- March 12, 2020 – NCDHHS releases additional individual and sector-specific COVID-19 spread mitigation guidance.
- March 13, 2020 – President Trump announces a national state of emergency.

Background

NCDHHS manages the delivery of health and human services for all North Carolinians, with a particular focus on children, elders and people with disabilities, and has a mission to improve the health, safety and wellbeing of all residents.[5] NCDHHS has oversight not only over the Division of Public Health and the state's Medicaid program (and related health services and benefits), but also social services, food and nutrition benefits, child development and early education programs, and other supportive services.

Background on North Carolina

With 10.4 million residents, North Carolina is the ninth most populous state in the country.[6] Its geography is diverse. Approximately one-fifth of the state's population resides in two counties: Wake and Mecklenburg.[7] However, as of 2019, 43% of residents live in areas that are considered rural[8] and 70 of North Carolina's 100 counties are deemed rural by the North Carolina Office of Rural Health.[9] During the pandemic, rural residents experienced distinct challenges in accessing tests, vaccines, and medical care, as well as the internet services many relied upon to stay connected and employed.



In the 2020 U.S. Census, nearly 40% of North Carolinians identified as a non-white race or ethnicity. [10]

According to the North Carolina Department of Commerce, the state also welcomes approximately 75,000 migrant and seasonal farmworkers each year, the majority of whom are Hispanic, and employs more than 30,000 poultry/meatpacking workers.[11]

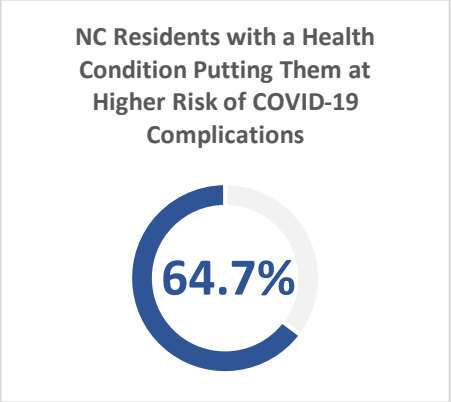
In recognition of systemic racism and other causes of longstanding health disparities, NCDHHS has included these and other groups in its definition of historically marginalized populations (HMPs). HMPs are populations that have "historically and systematically been denied access to services, resources and power relationships, which has resulted in poor outcomes across the spectrum. They are often identified based on their race, ethnicity, socioeconomic status, geography, religion, language, sexual identity and disability status."[12] As disparities became evident early in the pandemic, North Carolina policymakers adopted a number of policies intended to address them.

Environmental Context and Challenges

North Carolina's response to COVID-19 has been unprecedented. It has involved extraordinary partnership and efforts across all government and public and private sectors to meet the threat - not only from the disease itself but also from the social and economic disruptions that accompanied it.

As the COVID-19 pandemic unfolded, the experiences of other countries and states provided insight into the most vulnerable populations. Members of HMPs, the elderly, and individuals with multiple chronic conditions fared worse than the general public.

People who are over the age of 65 and people of any age with certain underlying health conditions were determined to be at higher risk for severe illness from COVID-19. According to the CDC, these conditions include chronic lung disease, heart conditions, obesity, diabetes, kidney disease, liver disease, and immunosuppressive conditions, including cancer treatment, smoking, and other immune disorders.[13] An estimated 64.7% of people in North Carolina had at least one of the underlying health conditions that put them at higher risk.[14]



Source: NCDHHS "Risk Factors for Severe Illness from COVID-19 Updated January 26, 2021," https://covid19.ncdhhs.gov/media/378/open

Nationally, members of HMPs were more likely to be essential workers; required to come to work in person and work in crowded environments; to live in crowded, multigenerational settings; and to lack access to paid leave that would allow them to stay home and rest if symptomatic or personal protective equipment (PPE) to protect them if they were well.[15] In addition, they were more likely to have comorbidities that would put them at added risk in the event of a COVID-19 infection.[16] In nursing homes and long-term care facilities, essential workers with limited ability to avoid exposure came into frequent close contact with vulnerable older North Carolinians living in a congregate setting.[17] Outbreaks in these facilities contributed disproportionately to North Carolina's COVID-19-related morbidity and mortality.[18]

North Carolina's high rate of uninsured people limited the state's ability to be prepared for the pandemic. In 2020, nearly 12% of all residents under the age of 65 – more than 1 million residents – did not have health insurance, the sixth highest number of uninsured residents in the country.[19] Lack of insurance meant that many North Carolinians' health needs had gone unmet for decades prior to the arrival of COVID-19 and these uninsured residents have low rates of primary care utilization and higher rates of having multiple chronic conditions.[20]

A related vulnerability was the fragility of North Carolina's health care safety net. Hospitals and clinics serving lower income populations and the uninsured operate on thinner margins, limiting their ability to invest in preparedness and other capabilities. North Carolina's rural hospitals in particular have been at financial risk, with at least seven closing since 2010.[21]

The state's mental and behavioral health access issues were also exacerbated by the pandemic. One analysis ranked North Carolina 44th among states for access to mental health care and 45th in the country for youth mental health.[22]

As in other states, North Carolina's governmental public health function has been chronically underfunded, leaving the state under-prepared for the enormity of the challenge of responding to COVID-19. Nationally, spending for local health departments dropped by 18% between 2010 and 2020.[23] In the same period, spending for North Carolina's 85 local health departments dropped by 27%, 50% more than the national average.[24] U.S. states spent $91 per person on public health services in 2020; North Carolina spent $61 per person, placing it in the bottom decile of state spending.[25] North Carolina has long had low levels of investment in public health compared to other states: A 2014 analysis found that North Carolina ranked 47th on state public health budget per capita.[26]

NCDHHS's early response was complicated by two additional factors: an uncoordinated federal response and the collapse of the global supply chain. While strong state and local leadership were essential, they were not sufficient to address the multiple challenges the pandemic had created.

The lack of comprehensive federal guidance, particularly in the early days and months of the pandemic, made local efforts harder. When federal guidance did emerge, it was, at times, confusing. A slow and flawed COVID-19 national testing roll-out[27] meant demand for tests quickly outpaced supply and manufacturers' ability to scale up production.[28]

North Carolina, along with other states, scrambled to find resources for local frontline workers as a supply chain shock began in late January and early February 2020 and national and state stockpiles were quickly depleted.[29] Cracks in the global supply chain had ongoing implications for North Carolina's operational flexibility, nimbleness, and ability to respond to COVID-19 surges with appropriate testing and other supports. Shortages extended to PPE (such as N-95 and surgical masks, gowns, gloves and other medical supplies) and to diagnostic testing supplies (including the materials to collect specimens, such as swabs, pipettes and viral transport media).

This put health care and other frontline workers at greater risk and further limited the nation's ability to test at the scale needed to understand how the virus spread. Intermittent scarcity of goods, including disinfectants and cleaning supplies also affected the response, as well as daily lives of North Carolinians across the state.[30]

At the same time, the federal government and the U.S. Congress acted quickly to ensure regulatory flexibilities, provide financial support, remove barriers to vaccine development, and ensure access to and payment for testing, treatment or vaccination. Civil servants at HHS and other federal agencies provided essential research and information to their state counterparts. The Federal Emergency Management Agency (FEMA) worked to build supply stockpiles and provide both on-the-ground support and funding to states, including North Carolina.

Looking Back on NCDHHS Response to the Pandemic

Despite the challenges North Carolina faced as it entered the pandemic, its COVID-19 response reflects many accomplishments and successes and offers many emerging lessons. The purpose of this interim review is to synthesize and document lessons learned that may help strengthen NCDHHS's pandemic response efforts in both the near term and the future.

For this review, NCDHHS sought input from within NCDHHS and across stakeholders. Interviewees were broadly supportive of the initiative and the timing of this review, even as the pandemic response continues, with several highlighting the dangers of "memory gaps" coupled with the very real issues of burnout and fatigue that might hamper future look-back efforts. Many interviewees noted that a summary of the overarching takeaways and major themes would be valuable to document at this stage, reflecting on the whole of the experience to date, particularly to inform forward-looking leadership decisions, policy-setting, and resource and capacity planning. Some suggested that NCDHHS and the state may wish to dive deeper into specific aspects of operations in subsequent after-action reviews with a narrower focus, and to engage in cross-sector planning exercises in the future as the benefit of

time may provide more perspective on outcomes or the effectiveness of specific actions and interventions.

Across more than 65 interviews conducted for this review, the overall feedback was remarkably consistent. Internal and external interviewees alike said that strong leadership is essential during a public health emergency and said that North Carolina benefited from strong and seasoned leadership from NCDHHS, both at the secretary level and across the response team. Interviewees noted the importance of Secretary Cohen's medical credentials, her large-scale government operations experience (including as the former chief of staff and chief operating officer for the federal Centers for Medicare & Medicaid Services (CMS)), and her visibility as an accessible public voice and face throughout the pandemic response, promoting data-driven decision-making and unity alongside the governor and other officials.

Equally important was NCDHHS's selection of stakeholder-facing COVID-19 response leads, who were experienced and respected leaders in areas of public health, epidemiology, emergency response and operations, communications, community engagement, policy, purchasing, information technology, Medicaid administration, and behavioral health, among other areas, and who had strong relationships across the state going into the pandemic. NCDHHS was widely lauded as being highly responsive to stakeholder requests for engagement.

There have been important differences of opinion over the past 20 months, but the majority of external interviewees commented that despite challenges, NCDHHS was a good partner and worked hard to serve the residents of North Carolina. The main points of tension included periods of resource scarcity (PPE, tests and vaccines) and planning for scarcity (such as ventilator planning and staged vaccine prioritization schema), changes in guidance and variations in the enforcement of prevention measures across the state, and the many challenges in the early months of the vaccine roll out, from limits related to the types of eligible vaccine providers, to allocation and distribution of vaccines, to changes in guidance to frustrations with the new vaccine administration IT system. Some felt North Carolina's requirements to mitigate infections (from capacity limitations to face coverings, to school closures to stay-at-home orders) went too far, while an equal proportion of those interviewed felt measures did not go far enough.

However, the majority of interviewees noted that despite the challenges of confusion, stress, and competing demands, NCDHHS leadership and staff worked tirelessly to break down silos and remove operational impediments. All interviewees provided insights in the spirit of ensuring the state's ability to combat future public health emergencies, with the counsel that future preparedness will need to be built from a strong foundation.

The following sections seek to organize and summarize observations on NCDHHS's approach during a time of extreme uncertainty and to distill emerging lessons learned.

I. Progress to Date in the Fight Against COVID-19
II. Building Trust During Crisis and Change
III. Collaboration in a Decentralized Model

I. Progress to Date in the Fight Against COVID-19

By January 2020, NCDHHS was actively monitoring a new, highly transmissible pathogen that was causing waves of severe acute respiratory disease in Wuhan, Hubei Province, China. The pathogen, quickly sequenced and identified as a novel coronavirus similar to the virus that had caused a global outbreak of SARS in 2003, was viewed with extreme concern by public health experts at the CDC and within NCDHHS. However, little was known at that point about key issues such as how efficiently and under what circumstances the virus transmitted itself.

On January 31, 2020, the secretary of the United States Department of Health and Human Services (HHS) declared a public health emergency to unlock key flexibilities at the federal and local levels to support actions to address potential threats from the virus. On February 11, North Carolina Governor Cooper established the COVID-19 Task Force to inform the state's preparedness plan and begin coordinating response efforts.

Over a four-week period, beginning March 10, 2020, Governor Cooper issued 11 executive orders, beginning with a declaration of a state of emergency to allow the coordination of necessary agencies and partners within state government and nonprofit and private sectors and to activate the state's Emergency Operations Center (EOC). Subsequent orders closed public schools and required nonessential workers to stay home when possible, among other actions, as a mitigation strategy to reduce the spread of the highly transmissible virus and to avoid overwhelming the state's hospitals as had happened in states first hit by COVID-19 case surges.

NCDHHS staff partnered with staff from the Department of Public Safety (DPS) Division of Emergency Management to launch North Carolina's response, working closely together in the EOC to develop processes and secure resources jointly. Senior leaders from NCDHHS relocated to Emergency Management and worked out of conference rooms and makeshift office spaces and desks, separated to adhere to distancing requirements, for over a year to ensure effective and efficient collaboration.

Heading into the pandemic North Carolina had both notable strengths to build on and daunting challenges as it faced the threat from SARS-CoV-2.

STRENGTHS

- Existing **flu surveillance** and **communicable disease systems**
- Focus on Whole Person Health – to address and meet individual needs to respond to and recover from COVID-19
- NCDHHS – consolidated state-level agency could align resources
- **Emergency Management** partnership (building off hurricane response)
- Relationships with **hospital systems**

CHALLENGES

- **Inadequate data infrastructure** for unique needs of COVID-19 and massive increase in facilities reporting information
- **New virus** – limited scientific information and tools
- No coordinated **federal response**
- **Supply constraints**
- Less healthy population
- High rate of insurance
- **Underinvestment in public health**
- Limited health care **access in rural areas**

The following sections describe the evolution of the state's COVID-19 response from early prevention efforts to the statewide vaccination effort underway today.

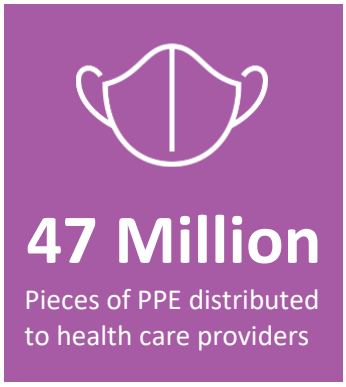
COVID-19 Prevention (Pre-Vaccines)

When COVID-19 tests were in limited supply and no treatments were available, NCDHHS launched a plan to distribute the limited tools available at the time to combat the virus: PPE and cleaning supplies. Initially, the distribution of these materials reflected early expectations that contact with droplets transmitted directly from an infected individual or on surfaces, rather than aerosols, drove the bulk of transmission; it also reflected the shortage of disposable masks. NCDHHS developed a system to allocate PPE to health care and non-health care settings, including communities where residents had a high risk of exposure. High-risk non-health care settings included occupational settings (for example, meat-packing plants), schools and child care providers, and congregate living settings such as long-term care facilities, housing for migrant farmworkers, and jails. NCDHHS also distributed PPE to locations where people were required to gather, such as court and administrative buildings and in-person voting locations, and proactively sent PPE starter packs to schools to prepare for in-person attendance.

PARTNERING ON PPE

To support COVID-19 prevention and spread mitigation, NCDHHS and Emergency Management implemented a central resource for North Carolina businesses that volunteered to produce PPE and partnered with them on distribution options and working with FEMA.

In all, more than 65 million pieces of PPE have been distributed, including more than 47 million pieces to health care providers.[31] In addition to tens of millions of face coverings and procedure masks, NCDHHS distributed more than 7 million pairs of gloves, 650,000 face shields, 600,000 shoe covers and 100,000 units of hand sanitizer.[32]



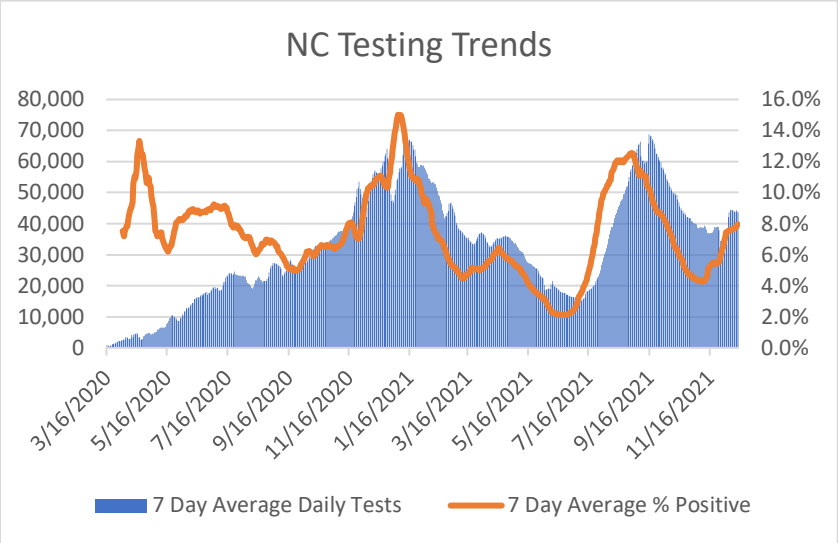
To build support for PPE use, NCDHHS launched its 3Ws campaign in May 2020.[33] The 3Ws (presented as *las 3Ms* in Spanish) emphasized the need to wear face coverings, wash hands and wait six feet apart. NCDHHS's campaign included TV, radio and print advertisements, as well as a full communications toolkit disseminated for local health department use.

Testing, Contact Tracing, Isolation and Quarantine

NCDHHS' efforts sought to identify cases and outbreaks early to prevent more severe spread across the state.

Testing

Testing is an essential public health tool to capture the current state of transmission and identify areas of emerging risk, in addition to the identification of infected individuals. As was true everywhere in the U.S., NCDHHS initially had very limited access to tests and experienced lengthy turnaround times. Initially, all U.S. testing was conducted at the CDC's laboratory in Atlanta. As public and private labs gained approval to begin testing, shortages of critical supplies and a lack of test kits hampered efforts nationwide. As the volume of tests dramatically increased not only in North Carolina but across the entire country at once, the turnaround time for results could be as long as 14 days.[34] Over time, North Carolina worked to expand access to testing; today, more than 20 million tests have been administered in the state. (This number



does not include the results of self-administered tests that may not have been reported to the state's data systems.) This volume of testing has at times pushed North Carolina's lab capacity to the limit, and test turnaround time has waxed and waned, largely reflecting fluctuations in disease transmission rates. NCDHHS has been able to reduce disruption by investing in equipment, staff, and supplies, and by coordinating among labs through the test surge workgroup.

After early weeks when available tests could be counted in the hundreds, NCDHHS oversaw drastic increases in the state's testing capacity and developed alternative approaches to monitor disease trends. At its peak, as many as 86,000 tests were administered in a day. This testing volume has been sufficient to keep the percentage of tests that are positive – an important indicator of testing adequacy – to below 10% more than three quarters of the time. To supplement individual testing, NCDHHS developed wastewater testing protocols to provide broad surveillance in regions across the state and supplement any potential gaps in clinical testing. As of June 2021, the state had tested wastewater samples at 19 sites across the state.[35]

To speed access to individual diagnostic testing, NCDHHS worked to minimize bottlenecks at each step of the testing process and to direct providers to the tests most appropriate for their patients' needs as new types of tests emerged. NCDHHS' initial testing capacity plan emphasized access to polymerase chain reaction (PCR) testing, reflecting the modality most widely available early in the pandemic. As more people sought testing in North Carolina and across the country, North Carolina labs experienced shortages of tests as well as reagents, swabs, and other equipment necessary for testing. In addition to limiting access to COVID-19 tests, these shortages limited access to other tests that relied on the same materials, such as tests for chlamydia.[36]

NCDHHS engaged with laboratories to share capacity data and jointly allocate supplies to avoid delays that limit the usability of test results in guiding isolation and quarantine. In addition, NCDHHS used federal funding to procure additional lab equipment, with a focus on ensuring redundancy in lab platforms so that shortages in reagents or supplies associated with any single area did not imperil overall lab capacity. The arrival of antigen tests in spring 2020 expanded capacity but added complexity, as these tests had different properties than their PCR counterparts. NCDHHS developed policies to guide providers and patients to the appropriate tests for a wide range of circumstances.[37] To maximize testing availability, the Department has rapidly distributed antigen tests around the state. As of December 2021, the Department had distributed 2,312,180 Abbott BinaxNOW antigen tests [38]to partners such as health departments, colleges, universities, and K-12 schools and 40,720 at-home testing kits to North Carolina residents. [39]

TEST SURGE WORKGROUP

NCDHHS convened a group of testing experts and other stakeholders to share information and discuss policy considerations around emerging testing technologies. Attendees include representatives of large academic and commercial labs, local health departments, health care groups and medical societies, and stakeholder groups representing national organizations and community groups. This group meets weekly to discuss testing trends, emerging technologies, and policies under consideration.

The group also helped develop best practices from lessons learned in real time. For example, successful strategies to support one university that experienced an outbreak cluster were documented and used to proactively support other universities in the state.

As part of its effort to promote equity in testing, NCDHHS launched the Community Testing High Priority and Marginalized Populations (CHAMPS) initiative. This initiative, which ran in July and August 2020, identified nearly 200 communities to be prioritized for testing, based on their lack of testing sites; high share of Black, Latinx and American Indian/Alaska Native residents; burden of chronic disease; and presence of high-risk worksites, such as migrant farm camps. NCDHHS recruited three contractors to provide high-throughput community testing in the selected ZIP codes, with the requirement that the contractors provide tests with a maximum 72-hour turnaround.[40] In addition to administering nearly 17,000 tests, the CHAMP initiative is notable for its use of a secret shopper program to confirm that the testing sites were attracting their intended audience and for its evidence-driven design, which identified sites and timing associated with the highest testing volumes.

As COVID-19 occupied NCDHHS' testing resources, NCDHHS paused its existing influenza surveillance network and is now beginning to rebuild it with a broader group of providers to return to routine surveillance for influenza-like and COVID-19-like illness in future years. In addition to its wastewater surveillance program and investments in local health departments and lab capacity, these efforts will make North Carolina better prepared for future pandemics.

Contact Tracing

NCDHHS developed an extensive contact tracing and case investigation program intended to rapidly identify contacts, monitor for symptoms, and arrange for testing as appropriate. For diagnosed individuals and symptomatic contacts, the program provided links to medical evaluation and care and ensured immediate isolation or quarantine precautions were implemented. These services required the timely availability of up-to-date, accurate and complete information for case reporting and contact tracing, as well as adequate staff.

As the transmission of SARS-CoV-2 increased, the need for contact tracers across the state quickly overwhelmed resources and capacity. Working in partnership with local health departments, NCDHHS developed an online contact tracing platform, the COVID-19 Community Team Outreach (CCTO) Tool, contracted with the Carolina Community Tracing Collaborative (CCTC), and supported training for the CCTC contact tracing workforce. Contact tracers used automated texts and emails to improve timeliness and isolation of quarantine notifications, enabling 80% of people diagnosed with COVID-19 to immediately be notified and asked to report to public health via text or email. At its peak, 3,657 contact tracers were deployed, although the CCTC workforce dropped to 1,300 as vaccines became available and the need for contact tracing declined. [41] CCTC's hiring process was intended to ensure that its contact tracers reflect the demographics of communities most affected by COVID-19. The current contact tracing workforce is 34% Black or African American and 23% Hispanic or Latino. CCTC maintained an average of 39% bilingual staff over 18 months.[42]

In addition to manual case investigation and contact tracing, North Carolina supported the development of SlowCOVIDNC in partnership with Apple and Google. This app, which allows users to provide

automated notifications of exposure and alerts other users who have been exposed, has been downloaded nearly a million times.

Isolation and Quarantine and Supports

NCDHHS published and regularly updated isolation and quarantine guidance for the general community in alignment with CDC recommendations, and provided additional recommendations for specific sectors, including child care, K-12 schools and congregate living.

COVID-19 Support Services Program (SSP): The state delivered services such as food, relief payments or primary medical care, to over 41,000 households that needed to isolate or quarantine. The COVID-19 Support Services Program (SSP)[43] was focused on "hot spots" throughout North Carolina, seeking to provide the most necessary services in the parts of the state with the highest rates of COVID-19 cases. Managed by NCDHHS's Division of Health Benefits and administered by vendors (including community-based organizations), the program provided resources to eligible individuals, including:

- Nutrition assistance, such as home-delivered meals and food boxes
- One-time COVID-19 relief payments to help supplement lost wages or the inability to look for work while in isolation/quarantine ($400 for individuals and $800 for families), to be used on basic living expenses
- Private transportation to/from testing sites, medical visits, vaccination sites (added in 2021) and to acquire food
- Medication delivery (with prescription)
- COVID-19-related over-the-counter supplies (e.g., face masks, hand sanitizers, thermometers, and cleaning supplies)
- Access to primary health care telehealth services to manage COVID-19 recovery, in conjunction with the Community Health Worker (CHW) program

The SSP was funded with $38.2 million ($22.7 million from federal Coronavirus Aid, Relief, and Economic Security (CARESAct)) funding, from September-December 2020, and $15.5 million in state funding for January-March 2021). NCDHHS surveyed community members to identify the services most needed. Eligible individuals lived in one of 29 counties and were directed by a health care professional, health department or contact tracer to quarantine or isolate for one of the following reasons: tested positive for COVID-19, had taken a COVID-19 test and was waiting for the results, had been exposed to someone who tested positive for COVID-19, or as a precautionary measure because the individual was in a high-risk group.

Non-Congregate Sheltering: In an effort to help protect the public by limiting exposure to confirmed cases of COVID-19, NCDHHS launched a collaborative effort among state, county and local partners with FEMA funding support to secure hotel and motel rooms for individuals with no other safe place to quarantine, isolate or socially distance due to COVID-19. Operating through September 2021, the program also provided essential "wraparound" services including laundry, meals, shelter for pets, transportation, cleaning/disinfecting, security, and supports for access to medical and behavioral health care. The program was operated at a county level and relied heavily on partners, including county emergency management, local health departments, county departments of social services, and nonprofit agencies. NCDHHS partnered with over 76 counties to provide non-congregate shelters serving over 10,700 individuals. [44]

Meeting Critical Individual Needs

NCDHHS immediately recognized the pandemic's risk to the health, well-being and financial status of North Carolinians who did not have the means to weather the disruptions of quarantine and isolation protocols, temporary shelter-in-place requirements, disruptions in employment and child care, and lack of access to some medical services. NCDHHS sought to align public health, health care delivery, supportive services, and funding to provide comprehensive supports to individuals in need.

Through an integrated, Department-wide approach, NCDHHS leveraged resources from across its divisions and programs, coordinated authorities, and combined federal COVID-19 relief funding made available to states, CDC funding and state funding, to support residents during the COVID-19 pandemic.

Increasing Support for Food and Nutrition Programs

With school and child care closures, a spike in economic insecurity, and the knowledge that food insecurity and poor nutrition compound the same chronic illnesses that put people at higher risk for the mores severe complications of COVID-19, access to food was an early priority in the COVID-19 response.

North Carolina was one of the first states to participate in the federally funded Pandemic Electronic Benefit Transfer (P-EBT) program, designed to help families with children who are unable to access free or reduced-price meals at school or in child care centers when they are not physically present because of COVID-19. As of July 2021, NCDHHS, in partnership with the NC Department of Public Instruction (NC DPI), had provided more than $1.7 billion in critical food assistance benefits to more than 1.3 million children across the state at risk of hunger due to school closures.[45]

As part of the P-EBT program, participants were able to use their benefits to purchase groceries online to support social distancing and to help families with transportation and mobility barriers. With many businesses closing to reduce the spread of COVID-19, work requirements for able-bodied adults without dependents were also temporarily and partially suspended during the public health emergency period.

Financial Support to Area Agencies on Aging and Organizations Serving Older and Disabled Residents

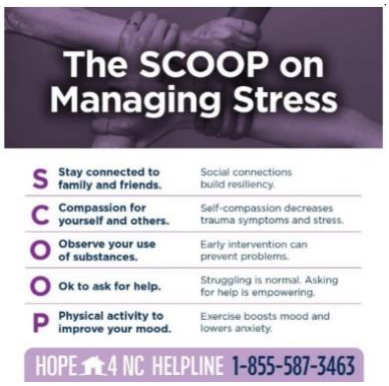
One in six North Carolina residents is aged 65 or older, and nearly 10% of these older residents have an income below the poverty level.[46] As of July 2021, approximately $100 million of federal funding from the CARES Act, Coronavirus Relief Fund, American Rescue Plan Act and other sources was distributed to support congregate nutrition programs, home-delivered meals, elder caregiver support, eligible services under the Older Americans Act and elder rights protection activities.[47] Funding supported greater flexibility for older adults, including a waiver that allowed meal delivery to individuals to provide foods typically served in congregate settings in the home or as grab-and-go meals.

Expanded Mental Health Services

Prior to COVID-19, 1.5 million residents over the age of 18 had a mental illness.[48] Survey data indicate that over a third of North Carolina adults experienced symptoms of depression and/or anxiety during the COVID-19 pandemic. To respond to these twin mental health crises, the state instituted measures to maximize tele-behavioral health, including allowing MD-to-MD consultation, psychiatric evaluation and management codes to be billed via telehealth, telephonic/patient portal with established patients,

psychotherapy to be done via telehealth (crisis, individual, group and family), research-based behavioral health treatment via telehealth, and inpatient psychiatry to bill subsequent and discharge visits via telehealth. In addition, enhanced behavioral health community services were permitted to use telehealth, such as Assertive Community Treatment, Community Support Teams, Multi-systemic Therapy, Intensive In-home Services, Mobile Crisis, and Peer Support Services.

North Carolina also launched three initiatives designed to raise awareness, manage crisis, and promote resiliency: Hope4NC Helpline, Hope4Healers Helpline and "the SCOOP on managing stress." Hope4NC Helpline connects North Carolinians to mental health and resilience supports and is available statewide, 24 hours a day, seven days a week during the COVID-19 crisis. The Hope4Healers Helpline provides specialized support for frontline workers, including health care and emergency employees, first responders and teachers who have experienced stress in their roles on the frontlines. Hope4NC and Hope4Healers received a combined total of nearly 10,000 calls for crisis counseling and behavioral health resource referrals.



Expanded Access to Telehealth for Medicaid Consumers

To maintain access to health services while minimizing the risk of COVID-19 transmission, NCDHHS quickly issued a series of bulletins to enact several telehealth flexibilities during the public health emergency and updated Medicaid clinical coverage policies to permanently expand access to physical and behavioral health services when delivered via telehealth, enable consumers to receive telehealth services from home and remove language requiring in-person visits prior to receiving care via telehealth. Notably, the state required that Medicaid pay for video visits at the same rate as face-to-face visits to incentivize providers to offer services via telehealth. The state also put in place other Medicaid flexibilities, such as waiving cost-sharing for testing services and treatments for COVID-19.[49]

Telehealth was quickly adopted; professional claims increased from 1,890 the first week of March 2020 to 57,857 the week of April 19, 2020.[50] During the week of April 19, 2020, nearly one in five behavioral health and primary care visits were delivered via telehealth. As of December 2021, NC Medicaid has processed claims for more than 1.1 million telehealth visits during the pandemic. Though NCDHHS created a flexible telehealth program for Medicaid consumers, the state does not have a law requiring similar payment parity or coverage requirements for video visits for other payers (e.g., commercial health plans).[51]

Maintaining Health System Capacity

Surges in COVID-19 cases have stressed the capacity of hospital systems nationally, negatively impacting health outcomes, including increased deaths.[52] Like most other states, North Carolina took aggressive actions early in the pandemic with the goal of "flattening the curve" to avoid overwhelming the state's hospitals and health care systems and ensure scarce resources were appropriately directed.

Even in the midst of large COVID-19 surges, North Carolina managed hospital capacity across the state. From March 2020 through November 2021, statewide hospital capacity never exceeded 81%, and statewide intensive care unit (ICU) capacity never exceeded 90% (noting, however, that many hospitals needed to take advantage of regulatory flexibilities to expand their ICUs).

As the state eased restrictions on gatherings and businesses through its iterative "dimmer switch"[53] policy approach to executive orders, ensuring hospital capacity was front and center. NCDHHS collaborated with experts around the state and supported a plan including tracking of key indicators, rapid testing and contact tracing, and careful monitoring of hospital capacity and the safety of the state's health care workforce. The Governor's 3-Phase reopening plan included tracking and public reporting on trends for key metrics including percentage of emergency department visits due to COVID-19-like illness, the number of lab-confirmed daily COVID-19 cases, the percentage of positive COVID-19 tests, and the number ofCOVID-19 hospitalizations.

NCDHHS also implemented regulatory flexibilities to increase the number of hospital beds that could accept critically ill patients and allowed ambulatory surgery centers to operate as temporary hospitals to ensure surge capacity.

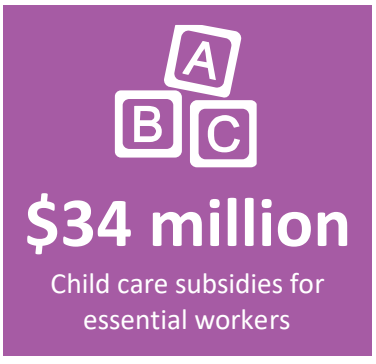
Because it was able to manage statewide hospital capacity, North Carolina was fortunate to be able to help other states grappling with COVID-19 surges by sending out additional ventilators and accepting out-of-state patients in need of treatment.

OpenBeds Critical Resource Tracker (OpenBeds CRT)

In spring 2020 NCDHHS implemented an automated acute care hospital capacity monitoring system to provide a complete, near real-time view of available ICU beds, ventilators, PPE, and other resources across North Carolina's hospitals. In past state emergencies, such as hurricanes, North Carolina's emergency management teams had developed a manual process for working with hospitals to understand available capacity. During the pandemic, a rapid statewide view of an increasingly complex set of information was needed. Manual tracking and reporting of data were unsustainable both for health care providers, who needed to direct all available resources to patient care, and for state personnel. In addition, federal reporting requirements were regularly changing, adding to hospitals' reporting burdens. One hundred and twenty acute care hospitals use OpenBeds CRT, with 80 hospitals automating their reporting to the state and federal governments.

Child Care for Frontline Workers

Statewide efforts focused on keeping child care centers open and care affordable, particularly for children of essential workers, starting with hospital staff. Child care subsidies for essential workers totaled $34 million.[54] The critical worker program provided pandemic child care payments for 36,247 children and provided emergency child care subsidies to over 20,000 children, including care for 7,700 school-age children of essential workers.



Support provided directly to child care facilities allowed them to offset lost revenues and cover costs of care during the pandemic. In April 2020, the state provided 4,200 child care facilities with operational grants and $124 million worth of PPE. NCDHHS also supported 30,000 child care teachers and staff with $38 million in bonuses.

In addition, as NCDHHS developed its COVID-19 dashboard and public reporting capabilities, it developed a capability to provide real-time information to frontline responders as to which child care centers were still operating in the state, by developing a process to ingest information from 6,766 public and private child care facilities throughout the state and automatically feed that information to its public dashboard.

Increased Medicaid Payment Rates to Sustain Safety Net Providers

Early in the pandemic, NCDHHS adopted several policies and identified funding to ease the financial pressures on critical and vulnerable health care providers. These funds sought to address both the increased cost burden of COVID-19 and the precipitous drop in revenues from delays in elective care and other factors.

To counter the financial impacts for safety net providers, NC Medicaid implemented rate increases for local health departments, Federally Qualified Health Centers (FQHCs) and Rural Health Centers (RHCs). The Department also provided targeted funding to support nursing homes and adult care homes to provide the intensive care needed for residents with COVID-19 and limit the spread of the virus to other residents and staff. In addition, NCDHHS expedited supplemental payments to hospitals to address cashflow concerns due to reduced patient volumes during the pandemic.[55]

"The increased payment from Medicaid was critical. When hospitals had to delay elective surgeries, we lost our entire post-surgery rehab service. The state support helped us get through a rough patch without having to lay off employees when we were already short-staffed."

– *Skilled Nursing Facility Interviewee*

ENHANCED FEDERAL FUNDING FOR STATE MEDICAID PROGRAMS AND "MAINTENANCE OF EFFORT" REQUIREMENTS

State Medicaid programs, including North Carolina's, received temporary enhanced federal Medicaid matching funds under the federal Families First Coronavirus Response Act (FFCRA) during the federal public health emergency (PHE) caused by the pandemic. As a condition of that funding, states must maintain enrollment of Medicaid beneficiaries until the end of the PHE, a date that will be determined by HHS. This "continuous eligibility" allows Medicaid enrollees to retain stable coverage throughout the pandemic and has resulted in an increase in the number of North Carolinians with health coverage. When the federal PHE ends, and because the state has not expanded Medicaid, many vulnerable North Carolinians will be at risk of losing their Medicaid coverage, adding to the ranks of the state's uninsured.

Vaccination and Treatment

Vaccination is essential to ending the pandemic more rapidly, and while the federal government led vaccine development and manufacturing efforts, states have been responsible for ensuring residents have access to COVID-19 vaccines. Planning for vaccine rollout began as soon as manufacturers released preliminary evidence of efficacy, but states had to develop their approaches with incomplete information. NCDHHS sought to prioritize both equity and speed in its rollout planning. Most critically, NCDHHS set a goal to ensure COVID-19 vaccination rates among historically marginalized populations equaled or exceeded the proportion these populations represent in each county across the state. Although equity and speed were not inherently incompatible goals, they did compete with each other in the earliest days of vaccine rollout, when vaccine supply was very limited and federal distribution and allocation schedules uncertain as production ramped up.

To reach its goal, NCDHHS needed to quickly develop systems and processes to ensure more complete and consistent collection and reporting of race and ethnicity data specific to vaccination efforts to direct the vaccine in a way that was both immediately equitable and fast. It also needed to establish new relationships with

VACCINATION INCENTIVES

Between May and August 2021, North Carolina offered $25 and $100 Summer Cards to encourage residents to get vaccinated. Cards were provided both to those who received the vaccine ($25-$100) and those transporting others to be vaccinated ($25). The pilot program operated in four counties and distributed $25 cards to 2,890 vaccine recipients and 1,374 drivers in two weeks. An evaluation of the program found the program "slowed the decline in vaccination and promoted more equitable distribution by alleviating barriers to vaccination."[a]

North Carolina also offered entry to a lottery to win $1 million for vaccination. Offering the lottery did not appear to affect vaccination rates.

a. Wong, Charlene A., William Pilkington, Irene A. Doherty, Ziliang Zhu, Hattie Gawande, Deepak Kumar, and Noel T. Brewer. 2021. "Guaranteed Financial Incentives For COVID-19 Vaccination". JAMA Internal Medicine. doi:10.1001/jamainternmed.2021.6170.

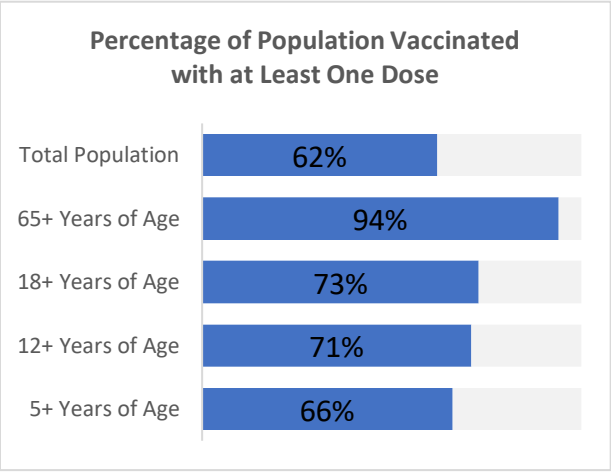
members of and advocates from HMP communities to understand where its efforts may fall short and develop strategies to most effectively reach the state's most vulnerable populations. In addition, in North Carolina, as with the rest of the nation, a history of health inequity and public health underinvestment meant that NCDHHS entered the pandemic with a trust deficit in some communities, and many people, including those in population cohorts highly vulnerable to COVID-19, wanted to observe the vaccination rollout before getting vaccinated. The state linked additional vaccine allocations for vaccine providers to progress against HMP vaccination equity goals, which interviewees noted as at times challenging to implement. Using a range of approaches, NCDHHS was ultimately able to speed the process of vaccine delivery while promoting equity. However, the process required rapid pivots in approach, and tested both stakeholders and policymakers.

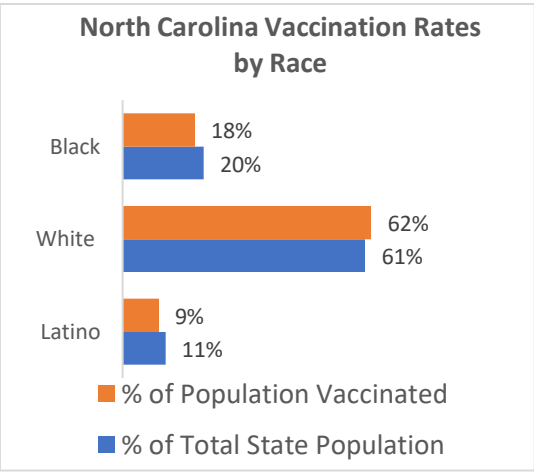
NCDHHS planned the initial statewide rollout with both public and private partners. Given the early emphasis on vaccinating health care providers as well the nature of early packaging and cold storage requirements, which required the ability to utilize large numbers of vaccines in a single sitting, hospitals played an important role in vaccination. Local health departments also oversaw county-level vaccination processes and individual sites; later, as storage requirements relaxed, delivery was broadened to include a wider range of providers and greater collaboration with community organizations. Delivery approach varied by county, with federal oversight of some mass vaccination sites. Given the scarcity of vaccines, even small setbacks such as weather-related delays (with the vaccine rolling out in the winter) and changes in federal allocation, had an immediate and measurable impact on vaccine availability at the community level, which often translated to frustration from providers and the community. The uncertainty about site allocation combined with the constant messaging from the state that people should seek vaccination as soon as it was available to them created confusion and frustration when sites did not receive their planned allocations.

North Carolina providers have successfully fully vaccinated 62% of the population, with 95% of people over age 65 being fully vaccinated as of December 17, 2021:

First of 2 Doses Administered	Second of 2 Doses Administered	Single Shot Doses Administered	Additional/Booster Doses Administered
6,062,133	5,656,919	465,285	2,079,046

While the state did not completely close equity gaps, it did narrow them significantly through intensive investment in outreach and incentives. In particular, NCDHHS developed a pool of vaccines to supplement its pro rata allocations to vaccine providers and offered them to providers who most effectively delivered vaccinations to populations that reflected their community demographics.





(Source: NCDHHS Vaccination Dashboard, 12/16/21, accessed at Vaccinations | NC COVID-19 (ncdhhs.gov))

Vaccine providers reported challenges operationalizing the original allocation process, which required differentiating among potential recipients based on their employment status and other risk factors. Interest in vaccination varied widely across the state; some counties struggled with overwhelming demand, while others' primary challenge was recruitment. In addition, providers required support with extensive federally required data entry. In some cases, NCDHHS was able to support providers through the use of temporary staff or National Guard members. As vaccine supplies increased and stabilized and vaccines became easier to distribute, NCDHHS was able to include multiple types of vaccine providers, including FQHCs and physician practices, and work with local health departments and community-based organizations to set up vaccine "pop-ups" to increase access and convenience for residents. (Most pharmacies were part of the federal retail pharmacy vaccination program.) Stakeholders reported that the roll out process for vaccines for children over age 5 and boosters was "much smoother."

Vaccine Advisory Committee

To inform the vaccine allocation approach, the North Carolina Institute of Medicine, (NC IOM) with direction from NCDHHS, convened a broad group of stakeholders in September 2020 to review its proposed approach and to provide detailed feedback on the developing initial vaccine prioritization plan. The group included public health experts, health care providers, advocacy organization leaders, and representatives of essential workers and at-risk populations.

> "The early COVID-19 vaccination rollout *was* clunky. We should have done more scenario planning and contingency planning on all the things that could go wrong with vaccine distribution – and done a better job communicating to our partners and stakeholders that things could change after our initial distribution prioritization planning. Every day during COVID-19 felt like a year and every day's delay of a life-saving resource was terrifying for our most vulnerable citizens."
>
> – *NCDHHS interviewee*

The Advisory Committee allowed stakeholders, many of whom went on to play roles in the outreach process, to feel ownership of the allocation approach. However, some workgroup participants developed an expectation – ultimately untenable – that workgroup deliberations equated directly to policy formation rather than informing NCDHHS' independent policy decisions. Some Advisory Committee members also expressed marked frustration when state guidance related to vaccine allocation changed after initial interim guidance was promulgated, suggesting communications around both federal and state policy and process changes could have been better managed.

The Advisory Committee has continued to meet and currently has a focus on sharing information within the stakeholder group and with NCDHHS about strategies to continue vaccine access and acceptance.

COVID-19 Vaccination Management System (CVMS)

North Carolina was one of 41 states that chose to develop its own vaccine administration system rather than wait for the federal government to roll out a national system,[56] in part due to uncertainty related to the federal effort, the insufficiency of the current state immunization IT infrastructure, and the complexity of local needs.

CVMS is a secure, cloud-based vaccine management solution for COVID-19 that enables vaccine management and data sharing across providers, hospitals, agencies, and local, state, and federal governments on one common platform. After an approximately six-week build, CVMS launched initial functionality on December 10, 2020, based on CDC requirements for data entry and the expectation that limited vaccine supply would require the state to allocate vaccine doses in phases. CVMS was developed to allow health care providers to enroll as vaccine providers, manage vaccine inventory and track overall vaccine administration data as well as patient-specific information, including dose administration and

frequency and timing of additional doses. NCDHHS also set a goal that race and ethnicity data be captured for 99% of all vaccine recipients.

The CVMS system is COVID-19-specific and was rapidly developed to support vaccine administration specifically. This has led to some unintended data challenges. For example, staff could not link COVID-19 test data to vaccination data due to the lack of an easy patient-matching feature to automate answering the important question of whether infections are breakthroughs.

In addition to its internal efforts to track vaccine availability through CVMS, NCDHHS launched a public-facing online resource center to provide vaccine information, frequently asked questions, vaccine locations and scheduling information, how to access support resources, and help desk information: https://covid19.ncdhhs.gov/vaccines.

Long-Term Care Facility Vaccine Support

On December 28, 2020, North Carolina began vaccinating residents and staff at long-term care facilities in partnership with vaccination teams from retail pharmacy chains CVS and Walgreens through the federal long-term care vaccination program.

In early January 2021, Governor Cooper announced he was activating the North Carolina National Guard to assist with COVID-19 vaccinations. Some local health departments set up multidisciplinary strike teams to help with vaccinations at nursing homes that did not participate in the federal vaccine administration program.

Mobile Vaccine Clinic

NCDHHS operated a temporary mobile vaccine unit that traveled across the rural areas in the western part of the state from July to December 2021 and administered 9,300 vaccinations. The mobile unit offered all three approved vaccines and administered 6,333 boosters, 2,054 first and second doses for adults, and 915 pediatric first and second doses. The unit provided up to 250 vaccines daily. To identify mobile vaccination sites, NCDHHS collaborated with the WNC Vaccine Acceleration Consortium, a group of more than 80 regional vaccine providers that includes the Mountain Area Health Education Center, local health departments, hospitals, and emergency management offices. FEMA contracted the mobile unit and staffed it to support this initiative. The unit also traveled to outdoor community events and festivals across the state.

"At Home" Vaccine Program

From the earliest days of the vaccine roll-out, NCDHHS tracked local health department and vaccine provider efforts to provide home visiting vaccine programs and published that information on its website. In many counties, community pharmacies, local health departments and hospitals developed different programs and options in collaboration with local disabilities advocacy groups, faith-based organizations, and seniors' organizations. By late spring 2021, however, many (at least a third) of North Carolina counties did not have at-home vaccination programs.

In July 2021, NCDHHS expanded free vaccine access for people with limited mobility who could not leave their homes. Through a partnership with the Piedmont Triad Regional Council Area Agency on Aging (PTRC AAA), building on its successful local program, at-home vaccinations were extended to ensure

statewide availability of a home vaccine resource. An at-home vaccine hotline and an online scheduling option were made available to enable individuals, caregivers, and providers to schedule appointments.

Some stakeholders felt at-home vaccine resources should have been developed earlier in the process with centrally coordinated, statewide coverage and that requirements for home vaccination should be less restrictive. Others felt that local community leaders were best positioned to identify residents in need and to provide on-the-ground options. Again, several noted that as vaccines became more widely available, many more convenient and creative access points were established.

Expanded and Improved Access to Monoclonal Antibodies and Other Therapeutics

NCDHHS established more than 200 sites for delivery of monoclonal antibodies, including five initial sites in partnership with FEMA,[57] to treat high-risk patients exposed to COVID-19 or people early in the course of their infections. (Monoclonal antibody therapies must be administered within 10 days of symptom onset for patients at high risk of progression.) These sites, which were selected to ensure equitable access to monoclonal antibodies across the state, offer treatment free of charge. NCDHHS issued a State Health Director Standing Order to promote access to treatment, and as of October 2021, almost 50,000 doses had been administered. NCDHHS has developed fliers and distributed scripts to ensure infected and exposed individuals are aware of their treatment options.

II. Building Trust During Crisis and Change

Response to the COVID-19 pandemic in North Carolina required all levels of government to coordinate promoting the safety of residents and mitigating the impact of the virus. This was especially true across NCDHHS, which quickly aligned leadership and operations to employ the full breadth of its leadership and capabilities regardless of traditional areas of responsibility or administrative silos.

From the earliest days of the crisis, specific priorities and competencies came into sharp focus as foundational to the Department's efforts: health equity and community outreach, strong stakeholder partnerships, meaningful guidance, clear communications, robust information technology, and rapid building of capacity.

Focus on Health Equity from the Start

The COVID-19 pandemic exacerbated inequities in North Carolina's health and economic framework, as it did elsewhere in the U.S. and in the world. As a matter of policy and operations, North Carolina sought to promote equity from the earliest days of its pandemic response.

A central tenet of NCDHHS's strategy was to develop partnerships with external individuals and groups to guide its approach and to identify trusted messengers who could meet the needs of varied communities.

NCDHHS used a range of tools to promote equity in its policies, including data analytics and stakeholder engagement. Where possible, NCDHHS used CDC's Social Vulnerability Index (SVI), along with other data elements, to prioritize geographic areas for PPE distribution, testing and vaccination, and other investments.

Of particular note, NCDHHS tracked stratified vaccination rates to inform ongoing vaccine distribution. North Carolina was one of the first states in the country to publish testing and vaccination data stratified by race and ethnicity and is recognized as a leader for the completeness of its data.[58] The state has also been able to substantially narrow the equity gap in vaccine delivery through a combination of policies, including the allocation of additional vaccines to providers that were able to demonstrate equity in vaccine delivery.

HMP Workgroup

In March 2020, shortly after the state's emergency declaration, NCDHHS formed the Historically Marginalized Populations[59] (HMP) Workgroup (HMP), comprising more than 75 individuals from the following agencies and organizations:

- NC Office of Minority Health and Health Disparities
- Governor's Council on Hispanic/Latino Affairs
- Governor's Indian Affairs Commission
- Advocacy organizations
- Community-based organizations
- Academic institutions
- Healthcare providers
- County health departments and agencies
- Various divisions within NCDHHS

The HMP Workgroup brought together internal and external participants to review policies under development and to propose additional policies. The Workgroup met weekly and was responsible for reviewing and modifying NCDHHS' outreach and other materials and the development of a procurement toolkit intended to diversify North Carolina's vendors. The Workgroup had five subcommittees (Prevention, Testing and Screening, Community Engagement, Health Equity Education and Empowerment, Economic Opportunity, and Employment Equity).

In addition to providing insight into overall response efforts, the Workgroup developed the Historically Marginalized Populations Engagement Toolkit for healthcare systems and providers to help ensure HMPs are appropriately engaged in all aspects of public health and healthcare delivery – from planning to evaluation, whether the efforts relate to emergency preparedness and response or to the provision of everyday programs and services.

Healthier Together – Health Equity Action Network

Launched in March 2021, Healthier Together is a public-private partnership between NCDHHS and the NC Counts Coalition to support equitable COVID-19 response throughout North Carolina. The initiative fosters cross-sector partnerships that advance solutions for communities facing systemic barriers, including Black, Indigenous, and People of Color, LGBTQ+, low wealth, immigrant, and other marginalized communities.

RACIAL AND ETHNIC EQUITY IN COVID-19 VACCINATION

NCDHHS set a goal to ensure COVID-19 vaccination rates among historically marginalized populations equaled or exceeded the proportion these populations represent in each county across the state.

Key strategies to support this effort included:

- Requiring all vaccine providers to collect and report race and ethnicity data
- Providing supplemental vaccine doses to providers who most effectively achieved equity in vaccine delivery
- Prioritizing FQHCs and rural and community health centers to onboard as vaccine providers
- Early activation point-of-care CVMS registration to vaccinate individuals without email

Healthier Together conducts outreach to promote vaccination and address barriers to access, coordinating local vaccine events at trusted and accessible locations, helping people schedule and get to vaccine appointments, providing on-site translation services, and helping people get to second-dose appointments. The initiative includes grants to community-based organizations to support this work and to hire regional health equity teams to ensure communities have the vaccine supply, outreach, and other resources they need to help people get vaccinated.

Engagement with the LatinX Community

By June 2020, North Carolina saw a sustained increase in its confirmed cases of COVID-19 among the general population and a disproportionately high percentage of cases statewide among historically marginalized populations. In particular, North Carolina's LatinX communities were being hit hard by the virus, representing 44% of cases statewide at the time, where race and ethnicity were known.[60] NCDHHS engaged with LATIN-19 (Latinx Advocacy Team & Interdisciplinary Network for COVID-19), a grassroots organization of medical experts and advocates that partnered with community leaders to share information on COVID-19 and advocated for the needs of North Carolina's Latino communities during the pandemic.

Over the course of the pandemic, NCDHHS developed capabilities to engage with the state's Spanish-speaking population more consistently and directly. While early in the pandemic only select resources were available in Spanish, the state shifted course to produce and widely disseminate Spanish-language communications and vaccination materials across the state, including a Spanish-language COVID-19 vaccination website and a Spanish-language video archive. NCDHHS launched several Spanish-language campaigns, including partnering with Latin American sports figures to increase awareness of the benefits of mask-wearing and other actions to slow the spread of COVID-19.[61] The state also engaged in media buys on Spanish-language television stations. In addition to large-scale communication, the state engaged directly with Spanish-speaking audiences. For example, Secretary Cohen hosted Cafecitos (Coffee Chats) and Tele-Town Halls for Spanish-speaking stakeholders with real-time Spanish-language interpretation.

Community Health Worker (CHW) program

During the pandemic, NCDHHS prioritized growing a trusted and culturally competent CHW workforce with recognized success in reaching historically marginalized communities, building on the foundations of a program started just prior to the COVID-19 pandemic. The state employed over 400 community health workers, 113 of whom were Spanish speaking, to connect over 180,000 North Carolina residents to services. Originally prioritized for high-need communities and hot spots, CHW resources were accessible in all 100 counties as of June 30, 2021. CHWs have provided education and support to their communities to address concerns related to COVID-19 vaccination, including helping people schedule appointments and find transportation to vaccination sites. They also connect residents affected by COVID-19 with medical and social support, including diagnostic testing, primary care, case management, nutrition assistance and behavioral health services. CHWs leverage North Carolina's innovative statewide technology platform, NCCARE360, to facilitate referrals to social supports.

NCDHHS contracted with vendors across the state to deploy CHWs, including community-based organizations and community health providers. To support program expansion, NCDHHS leveraged the CARES Act and state and CDC funding.

Additional Efforts

NCDHHS engaged with a wide range of external partners to inform the policy development process. These engagements were structured depending on the type of partners being engaged. In some cases, NCDHHS met regularly with external groups to solicit feedback on planned policies. In other cases, leaders from external groups joined NCDHHS on a more formal basis. This level of inclusion led not only to more informed policy development, but also to different ways of disseminating policy and information. Examples included Secretary Cohen's roundtables with faith and community leaders and standing weekly or biweekly telephone updates with community advocates and leaders for HMP groups.

NORTH CAROLINA FAMILY WALK-IN VACCINATION SITES

NCDHHS partnered with community groups to establish nine community vaccination event sites, such as churches and community centers, across the state, offering vaccines with formulations for adults and children (aged 5 and up) and boosters.

These sites, in areas with less access to pediatric services, have extended hours (including evenings and weekends), Spanish language interpreters, and community health workers to answer vaccine-related questions.

For two weeks in November, anyone bringing themselves or a family member to one of the nine sites to get their first dose received a $25 prepaid Mastercard to offset the time and transportation costs of getting vaccinated.

In an effort to support external groups providing educational messages and training, NCDHHS trained 176 employees who provided 278+ "COVID-19 101" presentations across the state, reaching an estimated 214,698 individuals. NCDHHS developed a series of additional tools and resources across all phases of the pandemic to support community providers, local health departments, community-based organizations and others, including a Best Practices guide for COVID-19 Community Testing in Historically Marginalized Populations and a research study with North Carolina Central University's Advanced Center for COVID-19 Related Disparities (ACCORD) on factors contributing to vaccine hesitancy among HMPs.

Looking ahead, to embed equity promotion in a stable framework, NCDHHS has developed a new Office of Health Equity and the new roles of chief health equity officer and assistant secretary of equity and inclusion.[62] NCDHHS recognizes that these new efforts will be closely watched, and levels of funding and support will be viewed as signaling the seriousness of NCDHHS' commitment.

Strong Partnerships

The impact of the COVID-19 pandemic is multidimensional and has implications far beyond public health. No one government agency or industry sector alone can control the spread of the virus or mitigate its impact on society.

Effective partnerships were essential to NCDHHS's response and spanned government and public-and private-sector stakeholders. Partnerships ranged from effectuating and leading a unified statewide response with DPS Emergency Management and the National Guard to collaboration with other state agencies (including the State Board of Education, Department of Public Instruction, Department of Agriculture, Department of Labor and Department of Transportation), to coordination with local health departments and county officials, to formal and informal collaborations with hospitals, community and industry leaders, and other stakeholders.

NCDHHS invested significant effort and dedicated senior leaders to developing ongoing bidirectional communications with stakeholders and partners. At the start of the pandemic, NCDHHS had strong, established relationships across a great number of stakeholders through its work in governing public health, Medicaid and social services in the state, while its partners in Emergency Management had a

broad and established stakeholder and first responders network for disaster preparedness. Even so, given the breadth and nature of the pandemic, NCDHHS needed to quickly establish new working and ad hoc relationships with many industry, government, workforce, advocacy, and community stakeholders. Given the rapidly changing course of the pandemic and the complexity of the situation, frequent, personal touchpoints were required across multiple stakeholder groups from informed leaders who had the capability and authority to problem-solve with partners.

The agency also worked with trusted independent organizations and convenors, including the NC IOM, to assemble multidisciplinary advisory bodies and work groups, including the Vaccine Advisory Committee, to leverage the immense intellectual capital across the state. Senior leaders from NCDHHS actively participated in such meetings.

Though stakeholders interviewed did not always agree with NCDHHS' decisions, they were broadly supportive of NCDHHS' effort at ongoing engagement and noted that the agency was highly responsive and willing to listen to and act on critical feedback. Some interviewees also raised a unique challenge in the early days of the response the need to gather personal cell phone numbers and other contact information for stakeholders as organizations grappled with transitions to remote work. They also noted that given the urgent need for quick responses, smart phone texting had emerged as an important communications and connectivity tool.

A few examples of partnerships with key stakeholders in the response effort are highlighted below.

Emergency Management

DPS' Division of Emergency Management leads the state's response and recovery efforts in times of state or federal disaster declarations. It is well organized, nationally regarded and has extensive experience in mobilizing hurricane response and managing other rapid response situations. Emergency Management has been a strong and important partner to NCDHHS throughout the entire pandemic response. The launch of the EOC and the infrastructure for collaboration across multiple government agencies was critical in the early days of the response. To combat the pandemic, highly specialized medical, science and epidemiology subject matter expertise were needed from NCDHHS, coupled with teams to work with a broad range of stakeholder groups and partners from across the state to address a constantly changing set of issues and needs coupled with providing centralized communications and on-the-ground response support. As it became clearer that the pandemic would not be a short-in-duration event, Emergency Management worked collaboratively with NCDHHS to build an integrated response governance structure and support infrastructure.

Health Care Community

NCDHHS had foundational pre-pandemic relationships with health care providers statewide due to its long history of collaboration and oversight. Early in the pandemic, NCDHHS developed a regular meeting cadence with providers in key sectors across the state, including hospital, local health department, and skilled nursing facility leaders, with standing meetings at least weekly (if not more frequently) to support information sharing, implementation of response strategies and management of COVID-19 surges. NCDHHS also regularly engaged with physician organizations and associations, FQHCs, and other frontline medical care providers.

Health care providers from across the state participated in public-private convenings and workgroups to ensure the state's leading clinical experts were providing advisory support. Most interviewees were appreciative that NCDHHS took their feedback seriously, was collaborative, and was open to considering

and implementing changes based on feedback from stakeholders; however, some felt policy did not always fully account for resource challenges, such as the lower availability of testing or differences in access to care, especially in rural areas of the state.

North Carolina's hospitals and health systems in particular played a vital role in the pandemic response. In addition to their role in providing essential medical care and serving as the nexus of the clinical response to COVID-19, North Carolina's hospitals expanded the state's COVID-19 testing capacity, served as local and regional convenor to share PPE, helped manage regional patient transfer needs, and to help support local response efforts, adopted new processes to support real-time data-sharing needs. They were also critical partners in the storing, tracking and administration of vaccine doses, among many other supports.

Institutes of Higher Education

To address COVID-19 related issues in higher education, NCDHHS partnered with leaders from public institutions of higher education, North Carolina's independent colleges, and community colleges. A workgroup comprising of university chancellors and NCDHHS met every two weeks to review data, identify outbreaks, and develop guidance for higher education. NCDHHS and higher education leaders worked collaboratively to update guidance to reflect the on-the-ground realities of higher education, such as guidance for outdoor graduation ceremonies and how to best house students who did not receive the COVID-19 vaccine. Higher education leaders were also concerned about domicile, nutrition, and travel implications for international students, given international lockdowns and travel bans, and worked closely with NCDHHS to understand their options.

NCDHHS also partnered with the state's public and private colleges, including historically black colleges and universities (HCBUs) to provide on-the-ground support. For example, in November 2020, NCDHHS provided 74,470 federally funded rapid antigen tests[63] to help bolster schools' student testing efforts in advance of Thanksgiving and holiday break to ensure students had access to testing before they traveled home or celebrated the holidays with people who lived outside their household. NCDHHS also worked with several local health departments to host community testing events near college and university campuses for students who needed tests before the end of the semester.

Within higher education, NCDHHS helped address the specific needs of different institutions of higher education. Those located in rural areas had a particular focus on their role as a large employer and safely helping people remain at or return to work. Community colleges offered more vocational courses that required in-person attendance, and the state collaborated with leaders to find ways to get students back into classrooms and labs.

For a discussion of NCDHHS's critical collaborations to support K-12 schools, see page 51.

Business Communities

NCDHHS primarily coordinated its outreach to the business community through large associations and representative organizations. In addition to formal outreach, NCDHHS also collaborated on policy clarifications, developing frequently asked questions (FAQs) on relevant guidance based on questions from the affected sectors. NCDHHS had formal and informal partnerships across industry sectors and sought to both understand the challenges of COVID-19 specific to different businesses and to support them in their efforts to safely operate.

"North Carolina was evaluating whether to implement one-way aisles in grocery stores and other retailers in an effort to support social distancing measures as several other states had done. One large grocer with stores in other states was able to share their experience from another state. An analysis found the inefficiency and confusion caused by one-way aisles actually significantly increased the average amount of time shoppers spent inside the facility and made keeping at least six feet of distance harder - the opposite of the concept's intent. NCDHHS was responsive to the request to share that experience and willing to evaluate it."

– Retail Industry Interviewee

One example of innovative industry partnership was Count on Me NC, a joint effort created by NCDHHS and NC State Extension in partnerships with industry leaders from across the state, including the NC Restaurant and Lodging Association Foundation and the Economic Development Partnership of North Carolina's Visit North Carolina.

Count on Me NC, launched in May 2020, provides free online training programs designed to help restaurants, hotels and lodging, attractions, and other businesses learn the best way to protect customers and employees from COVID-19 including evidence-based practices to protect people's health.

NC State Extension helped develop the training modules, leveraging its renowned team of experts in food safety training and adult education and anchoring the program on its existing system for online adult education to enable the program to rapidly launch. To build consumer confidence, the Economic Development Partnership launced a campaign to direct consumers to look for certificates and Count on Me NC logos for assurance that a business had completed the voluntary, no-cost training.

NCDHHS also partnered with the N.C. Cooperative Extension, the N.C. Department of Agriculture and Consumer Services, the N.C. Department of Labor, and the N.C. Agromedicine Institute to distribute more than 900,000 masks and other PPE and supplies to local farms and farmworkers.

Some interviewees suggested there may be benefit in joint public-private participation in simulation or drills to help the state prepare for a next pandemic or public health emergency to address issues around effective readiness of critical industries and to help identify infrastructure, data and communications gaps that can be proactively strengthened through collaboration.

THANKSGIVING 2020: PARTNERSHIPS WITH BUSINESS COMMUNITY

In advance of Thanksgiving in November 2020, NCDHHS issued updated guidance on safe holiday celebration. NCDHHS helped people celebrate safely by partnering with grocery stores across the state to host walk-up and drive-thru COVID-19 testing. Two North Carolina chefs appeared in a press conference with Secretary Cohen and shared safety tips for a safe Thanksgiving meal. The chefs' appearance was part of the broader Count on Me partnership between the Department and restaurants, hotels, and other businesses, which provided a free online curriculum for businesses to keep employees, guests, and visitors healthy.

NCDHHS also supported retail merchants on Black Friday and worked with stakeholders to develop guidance that allowed for safer in-person shopping on what has traditionally been the busiest shopping day of the year.

County Officials

While NCDHHS was deeply connected to local health departments, the Department did not frequently engage directly with county or municipal government officials prior to the COVID-19 crisis as it had established collaboration and communications channels through local health department directors. Throughout the pandemic response, NCDHHS worked to establish direct linkages to North Carolina's 100 county governments and participated in weekly county calls and numerous ad hoc briefings and Q&A sessions with county officials.

North Carolina National Guard

The National Guard is a highly valued resource and partner in all disaster response efforts in North Carolina. NCDHHS and Emergency Management, with their partners in state government, were deliberate in engaging the National Guard and sought to identify situations where and when they were uniquely needed. While the National Guard, including its medical teams, can be deployed during a crisis, many members hold civilian jobs as essential frontline workers, including in hospitals and in law enforcement, when not on duty. NCDHHS sought other partnerships and resources to, when possible, support on-the-ground operations or address temporary staffing needs for certain response efforts to ensure that critical personnel were not pulled from hospitals that relied on them. Governor Cooper did call on the National Guard to support the crucial and urgent work of vaccine administration for North Carolina's most vulnerable citizens, including residents of skilled nursing facilities.

Clear Guidance That Can Be Implemented

People look to government leaders in times of crisis for clear direction. Developing policy and promulgating guidance during a pandemic can be challenging. COVID-19 is a new disease, and guidance must be given and implemented in a highly uncertain, complex, and rapidly changing environment.

NCDHHS staff developed hundreds of actionable guidance documents, tools, and resources targeted to specific industry sectors, organizations, and businesses to support their safe operation. NCDHHS's experience throughout the pandemic reinforced that individuals – residents, business owners and employers, educators, community members – need concrete, targeted and easy-to-understand guidance to help advance public health objectives. Residents want to do their part, but they need direction that is specific to their individual situations and needs.

NCDHHS's approach to promulgating guidance was rooted in data. The leadership team actively studied disease surveillance, emerging science, and state, regional and national data and trends. NCDHHS engaged stakeholders with respect to specific questions or issues to ensure the feasibility of guidance on the ground.

NCDHHS issued detailed guidance on a range of topics including, for example, vaccination, social distancing and minimizing exposure, face coverings, cleaning and hygiene, monitoring for symptoms, testing, confirmed positive cases, protecting vulnerable populations, and water and ventilation systems. Examples of sectors for which NCDHHS developed specific guidance include:

- Child care settings
- K-12 schools
- Colleges and universities
- Businesses
    - General guidance for businesses and organizations
    - Public-facing businesses
    - Indoor and outdoor venues
    - Indoor fitness centers and gyms
    - Bars and restaurants
    - Overnight camps
    - Construction settings
    - Manufacturing and meat and poultry plants
    - Adult day care and adult day health programs
    - Hotels providing isolation and quarantine housing

- Migrant farm workers and their employers
- H2B seafood processors and housing providers
- Individuals, families, and communities
  - Individuals who have been vaccinated against COVID-19
  - Mass gatherings, including indoor and outdoor venues and holiday gatherings
  - People living with HIV
  - People who have disabilities
  - Faith-based leaders
  - Places of worship and religious services
  - COVID-19 testing events
  - Travel
  - Tribal communities
- Voting safety

Examples of comprehensive guidance publications that outline in detail what safety measures are required and recommended specific to certain sectors:

- StrongSchoolsNC Public Health Toolkit. North Carolina developed a detailed and extensive toolkit with specific prevention strategies and guidance to support K-12 schools across the state. The toolkit divided strategies among those that should be implemented, those that school leaders could consider adopting and those that were required. Topics include vaccination, masks, distancing, testing, and handling COVID-19 cases.
- ChildCareStrongNC Public Health Toolkit. NCDHHS created a detailed resource that specifies what child care providers are required to do as well as COVID-19 prevention strategies across topics and activities, including promoting vaccination, face coverings, cohorting and physical distancing, screening, and monitoring for COVID-19, returning to child care after exclusion, PPE, cleaning and hygiene, transportation, and ventilation and water systems, as well as helpful resources.
- COVID-19 Toolkit for Post-Acute Care Settings. Includes guidance on how to respond to COVID-19 cases in settings that include adult care homes, nursing homes, skilled nursing facilities and assisted living facilities, considerations for admission/readmission, and infection control guidance and measures.

In addition, NCDHHS issued *extensive* guidance across health care sectors, including local health departments, hospitals, physician clinics, dental clinics, behavioral health and long-term care providers.

While the CDC had also issued guidance to address some of these areas, this guidance was at times insufficient to support stakeholders' day-to-day decision-making; it described broad principles but fell short of advising how individuals and businesses should apply those principles in complex real-world situations. For example, CDC's early school guidance did not clearly state the point at which schools should shift to remote instruction. But this specificity in guidance was what stakeholders desperately wanted; their choices could mean the difference between their business remaining open or closing or between people keeping or losing a job. NCDHHS found that stakeholders needed concrete, specific advice that could support them in making hard calls.

Clear, Consistent Communications and Messaging

A core guiding principle for NCDHHS throughout the pandemic has been that transparent, accurate and frequent public communications are essential to building trust.

NCDHHS has been front and center in the state's COVID-19 response from day one. Prior to COVID-19, few North Carolinians likely could name the leaders of NCDHHS or the Division of Public Health, but within a matter of weeks, several NCDHHS leaders became household names. Secretary Cohen, in particular, quickly became the public face of the state's response efforts – participating in well over 150

press briefings alongside the governor – and other NCDHHS leaders also became prominent spokespersons.

Organizational Support and Enhanced Resources

NCDHHS's Division of Public Health regularly supports public health campaigns and has a foundational responsibility to provide education and disseminate public health information and findings of public health surveillance. However, public health agencies at both the state and local level are not typically structured or resourced to provide near real-time continuous information updates, rapid synthesis and disclosure of large amounts of data from a wide range of sources, dedicated media support, and extensive stakeholder and regulator briefings while also promulgating rapid behavior change campaigns.

To manage the depth and breadth of communication needs, NCDHHS quickly established a centralized communication strategy managed by a Departmental Office of Communications. The small office played a leading role in directing and coordinating multiple aspects of communications, leveraging the resources and knowledge of experts across NCDHHS. Communications functions include supporting messaging, website development and maintenance, social media, collateral and campaigns; responding to press inquiries and fact checks; development of toolkits and online consumer-facing tools (such as those related to symptom checking, testing locations, contact tracing and vaccine information); and leading efforts to combat misinformation. NCDHHS has provided resources and tools to local health departments and collaborated with stakeholder groups, particularly those working with HMPs, to develop highly customizable materials. NCDHHS also brought in outside expertise to support and expand its communications team, with a focus on partnering with firms that had experience in data-driven communications strategies and social and government sector issues.

Communicating About a Complicated Situation

Typically, NCDHHS plays a program management and administration role, which shapes its regular communication approach and style. North Carolina's emergency response infrastructure has extensive experience in emergency communications related to natural disasters and time-limited local or regional events. However, those incident-based communications strategies are often focused on warning and alert notifications, directives (such as evacuation or curfew), response status updates, and emergency assistance notifications.

The pandemic required new communications strategies and capabilities. NCDHHS needed to explain both its response to the crisis and the actions that would be required of North Carolinians while also translating complex scientific concepts spanning multiple disciplines from epidemiology to medicine to vaccine technology. In addition to broad public communications, NCDHHS needed to simultaneously engage in regular, bidirectional discussions with an extensive group of partners, local officials, and North Carolina business, community, and advocate stakeholders. This required dedicated staff with specialized skills to develop and nurture relationships even in the face of sometimes challenging conversations and to both problem-solve and escalate critical issues. Equally important, NCDHHS leaders established regular and effective communications channels with their own staff through a series of team calls/video meetings and all-Department emails.

Public Messaging and Campaigns

NCDHHS sought to elevate its public outreach and messaging through a multifaceted communication strategy rooted in behavioral science, with very simple and easy-to-understand messages. These campaigns were informed by the latest science and extensive data analysis describing North Carolina's residents and their needs.

Early in the pandemic, NCDHHS engaged with a multidisciplinary group of outside experts from local North Carolina institutions to solicit feedback and expertise on behavioral health change. Together with NCDHHS, that group developed the 3Ws message, which became one of the NCDHHS's signature campaigns to the public on how to fight COVID-19. It set the tone for NCDHHS's ongoing public health messages: short, easily understood, and memorable.

While critical safety messages about non-pharmaceutical interventions, COVID-19 testing and contact tracing continued throughout the response (and continue today), by late summer 2020 the hope of a vaccine was on the horizon. In anticipation of the vaccination effort, the Department further expanded its communication strategy through a partnership with a social impact marketing firm to develop and disseminate large-scale public health communication campaigns. Together with the vendor, North Carolina conducted market research to understand the reasons for vaccine hesitancy and identify messages that would overcome this hesitancy. Given the previously discussed disproportionate impact of COVID-19 on the state's HMPs, the communications research focused on those groups. NCDHHS used the findings of its research to develop a signature vaccination campaign: "You have a spot, take your shot." After the initial rollout, the state continually refined its strategy through further data analysis and adapted as conditions changed. The vendor also built an analytic tool to identify gaps in the statewide communication strategy and target further communications, and created internal-facing dashboards with administration data, outreach, and communications activities so that efforts could be appropriately tracked and refined.

Identifying trusted messengers and community partners to support vaccine outreach and communications proved a pivotal strategy. What began as a "phone tree" approach, reaching out to personal contacts and relationships, evolved into a network of over 3,000 individuals. The communications firm developed a customer relationship management (CRM) tool to capture the information of these contacts to facilitate outreach. The state trained 122 individuals to present Vaccine 101 presentations, from numerous state and local government offices, including the Division of Deaf and Hard of Hearing, Office of Rural Health, Medicaid, and Human Services. An impact analysis found that a community presentation such as Vaccine 101 is associated with a weekly average increase of 6,591 "dose one" vaccinations.[64] NCDHHS also developed presentation materials that were customized for individual communities.

Secretary Cohen and other NCDHHS leaders hosted vaccine fireside chats with key community leaders around North Carolina, including Rev. Dr. William J. Barber II, cochair of the Poor People's Campaign; North Carolina NAACP State Conference President Rev. Dr. T. Anthony Spearman; North Carolina Rural Center President Patrick Woodie; and Western North Carolina Conference United Methodist Church Bishop Paul Leeland. These fireside chats were broadcast on social media and reached over 97,000 people.[65]

NCDHHS produced several resources to support communications with local health departments, other state agencies and community partners, including:

- COVID-19 Communications Toolkit. Developed to support local health departments and community partners as they continue to inform and educate North Carolinians about testing, contact tracing, and preventative measures to "slow the spread." Published in English and Spanish.

- Social Media Vaccine Communications Toolkit. The toolkit allows individuals, organizations, and government entities such as local health departments, to easily share state-developed COVID-19 vaccine information on their own social media accounts. Additional options allow further customization. Published in both English and Spanish.

- COVID-19 Community Readiness: Helping Meet Needs for Persons Living with Behavioral Health Issues, Intellectual/Developmental Disabilities, and Traumatic Brain Injuries Toolkit. This resource organizes multiple services and supports community stakeholders in providing assistance to individuals and families needing mental health and substance use services during the COVID-19 pandemic in North Carolina.

- In addition to its own communications efforts, NCDHHS provided support for stakeholder-led resources. As one example, the NC State Extension in collaboration with the NCDHHS Office of Rural Health's Farmworkers Health Program, developed an educational tool and suite of resources for COVID-19 prevention and vaccination for agricultural workers.

Polarization of COVID-19 and the Role of Social Media

Extended periods of uncertainty and times of resource scarcity can cause tremendous stress, anxiety, and fear. The politization and polarization stemming from the pandemic, particularly related to activities required to reduce transmission and misinformation about vaccination, took many by surprise.

Both traditional and social media are critical channels for communicating with the public during an emergency, and they also have a material influence on public opinion. In one sense, with the proliferation of digital communications mediums, it's never been easier to quickly reach the public. But in another, it's never been harder to get your message heard.

Throughout the pandemic, North Carolina officials have been challenged at times to maintain public trust in the wake of misinformation, political division, and mistrust of science, amplified on social media and online platforms. Responding to the pandemic required NCDHHS not only to build infrastructure to monitor the spread of the virus, respond to cases and stand up a massive vaccine distribution and administration operation, but also to manage public anger, heated public meetings and in some parts of the state, protests and develop ways to clearly communicate evolving and complex information. Trusted messengers needed to be able to weather criticism and equipped to tackle challenging questions in the moment.

North Carolina's experience was not unique. Non-pharmaceutical interventions, including pandemic safety measures and limitations on the size of gatherings, have become a flash point across the country. Disinformation has made it harder to have open dialogues about the very real questions and concerns that underlie vaccine hesitancy. In extreme cases across the country, public health officials have been fired over differences of opinion with local government leaders[66] and even have been physically

threatened by members of the public.[67] Over half of U.S. states introduced laws to roll back public health authorities as of September 2021.[68]

Public health, hospital and physician, and business community interviewees alike noted the unprecedented role of social media and its potential to undermine response efforts or harm individuals and businesses (through the promotion of unproven and unsafe treatments or from COVID-19-related public shaming of persons or businesses, for example). Health care industry interviewees also noted the potential to more effectively engage with younger generations who have lagged in getting vaccinated and who, while at less risk for severe disease from COVID-19, share in the collective responsibility to help control the spread of the virus.

Social media platforms have the potential to help keep people informed and connected in an emergency, but public health has been slow to optimize those channels. At the start of the pandemic, NCDHHS did not have a robust social media strategy. While it quickly worked to expand its social media presence, it identified the need for a more comprehensive strategy to strengthen its ability to more effectively reach a broader audience.

Decisive Leadership – Decision-making During a Pandemic

Effective leadership during the pandemic required making good, fast decisions often without the benefit of complete information. Uncertainty and change were the only constants across the past 20 months. The public and stakeholders desired – and needed – clear, concrete guidance and recommendations but the dynamic nature of the pandemic did not always support certainty. NCDHHS focused on continually enhancing data to inform policy and steadfastly tracking the latest available science to balance COVID-19 risk mitigation and the broader consequences of policies. NCDHHS also worked to continually improve its ability to clearly communicate about the complexity of the situation.

Speed and the Ability to Pivot Quickly Essential

NCDHHS was able to not only make quick decisions, which was needed and highly valued by stakeholders and the public, but also to rapidly respond to emerging evidence and new science or data and to shift course to most effectively respond to the pandemic. This flexibility and authority were essential to NCDHHS's ability to guide a statewide pandemic response effort focused on mitigating the overall impact of COVID-19 and ensuring the state's health system capacity was not overwhelmed.

Changing guidance, sometimes frequently, could be a source of tension, but the delivery of continual and factual information to the public and the willingness to respond to that information was also essential for maintaining public trust and for advancing the response efforts.

Effective communications go hand-in-glove with public policy changes. NCDHHS learned it could not "proclaim" new guidance but needed to explain it to the public and key stakeholders in an accessible manner. Candor and setting expectations that changes were anticipated as science evolved with greater transparency into the decision-making processes proved critical. Internal and external interviewees both reported that NCDHHS improved in this regard over time though may have leaned into certainty and "absolute" direction too heavily early in the pandemic, resulting in pushback from some sectors when guidance changed. This required the development of new skills and capabilities, particularly in terms of data transparency and visualization, and culture change within the Department.

DAILY STAND-UPS AND WEEKLY MANDATORY MEETINGS

The pace of the pandemic made effective internal communication challenging.

As response efforts scaled, NCDHHS developed or adapted a series of meetings intended to maintain open lines of communication among its rapidly expanding and evolving teams.

NCDHHS held COVID-19 response leadership team meetings at 8:15am and 4:30pm every day. The morning meeting was smaller, focused on the critical issues requiring immediate leadership attention; the afternoon meeting was broader and included time for all NCDHHS pandemic response teams to report on their ongoing efforts. Partners from other state agencies, including Emergency Response, participated as well.

In addition to coordinating ongoing work, NCDHHS used meetings to monitor emerging transmission trends and other data. Three standing weekly epidemiology meetings provided regular opportunities to review and discuss testing data as it emerged.

An internal cross-workstream "business intelligence" meeting convened weekly to align efforts across epidemiology, major surveillance efforts, testing, data and informatics, vaccination, communications, HMP workgroup and others, as well as to review the experience of other states and countries and seek to develop forward-looking strategies and contingency plans.

Centralized Versus Coalition Implementation

Across all decision-making and policy-setting, NCDHHS had to weigh what authority it had and what level to invoke in every stage of the pandemic, in addition to how implementation of policy and response activities could most expeditiously be achieved. At times the response effort may have benefitted from NCDHHS having stronger central authority in some situations.

Throughout the pandemic, new responsibilities had to be negotiated across public health entities, health care partners, and other stakeholders. NCDHHS had access to more resources and the ability to leverage scale through centralized functions than the distributed local health departments did. The response efforts also involved a magnitude of stakeholders and partners. While a solid convening and coordinating function is critical to implementing effective policy in normal circumstances, it can also require more time and resources and be less nimble, which presented a liability during the pandemic.

In future public health emergencies, NCDHHS' efforts could benefit from a consideration of how its authority can be better matched to specific scenarios. For example, NCDHHS might temporarily take on greater authority in interactions with large, fragmented groups of stakeholders during the initial phases of public health emergencies, allowing for more inventories of capacity, the delegation of efforts, and the collection of data.

Cross-Functional Teams and Changing Roles

Incident Command Systems and related organizational structures are a hallmark of public emergency response preparedness. They are highly organized, top-down response structures that establish common processes, standards, and protocols for management of resources and a clear chain of command for response to disaster and other emergency situations. These approaches can be highly effective and historically have been used for events of shorter duration or more regionally contained crises.

COVID-19 tested many of the traditional disaster response practices due to its rapid viral spread. NCDHHS and its partners in Emergency Management quickly identified a core challenge of the pandemic response was influencing statewide behavior change, including the adoption of measures to slow the

spread of the virus even though at times the solutions created additional challenges for individuals, including economic insecurity or isolation. In addition, nuanced policies were required to ensure the already disproportionate impact of COVID-19 on HMPs was not exacerbated as well as the ability to pivot quickly to deploy new tools to combat the pandemic as those tools became available. It also soon became clear the pandemic would not be over in a matter of months.

The emergency response infrastructure was very helpful for some aspects of the pandemic, such as PPE procurement and distribution or resource monitoring, when operational leads were effectively paired with subject matter leaders. However, the right team at the right time focused on evolving and interconnected workstreams such as epidemiology, data strategy, surge capacity, communications, industry partnerships, vaccine strategy, and others, also quickly became a priority.

As the pandemic progressed, some NCDHHS staff had to change roles frequently in order to launch new programs. These changes, while necessary, generated confusion related to delineation of roles and responsibilities, especially in the early months of the response. However, over time, the cross-disciplinary "workstream" model to organize major response efforts was determined to be effective and flexible enough to empower teams to implement creative solutions in a fast-moving crisis while providing enough structure and points of leadership interconnectivity to ensure a coordinated response effort. At the same time, given the rapid pace of change during the pandemic, interviewees noted it often felt like the workstream teams were constantly in react mode and it was hard to proactively prepare for the next phase of need.

A related challenge was that crisis leadership requires certain skill sets for certain situations and the most effective response structure may not align with current organizational hierarchy, titles, or experience. Responding to COVID-19 has regularly required standing up whole cloth new programs and capabilities. NCDHHS leaders found they needed need to be willing to make difficult and sensitive decisions to ensure the right leaders were empowered at the right times, even if it meant temporarily upending existing teams or reporting hierarchies. A relatively thin leadership team wore many hats related to both the COVID-19 response and other responsibilities, which made balancing workloads challenging and made the sustainability of efforts feel tenuous.

Look Ahead, Not Only at the Present Crisis

In times of crisis, it is easy to get consumed by the urgent issue of the moment. With COVID-19, urgent issues were a constant. Several interviewees noted a strength of the NCDHHS leadership team and an unofficial principle was to maintain discipline and rigor in developing scenarios around what might happen next and what actions were needed to ensure NCDHHS and the state were prepared. This was not always easy as teams were stretched thin, but this proactive approach helped NCDHHS remain nimble and pivot quickly. NCDHHS also conducted frequent 50-state scans to stay abreast of novel approaches and promising strategies, for example, around new efforts to mitigate spread, support reopening efforts, and improve vaccination rates.

Speed of action, decisiveness, and the ability to pivot quickly as new science and data became available have been defining features of NCDHHS's COVID-19 response efforts. At the time of publication, a new provision was recently enacted requiring a larger state political consensus process related to emergency authorities that will compromise NCDHHS's and its government agency partners' ability to act quickly and nimbly to protect the public health.

Data as the Foundation to an Effective Response

NCDHHS increased access to data and ensured this data could inform NCDHHS's and the state's decision-making, and guide partners around the state and the public at large. During the pandemic, NCDHHS teams used data to hone response efforts and established an internal business intelligence capability to make data accessible across multiple teams managing components of the response efforts, but significant time, investment, and efforts were required.

Public health information and technology infrastructure has been chronically underfunded for decades, leaving the country unprepared to share data efficiently. Going into the pandemic, NCDHHS and its key public health partners lacked a scalable, flexible health information infrastructure and underlying technology, staff expertise, and processes to immediately stand up and manage a data-driven, statewide response effort.

EXAMPLES OF DATA SYSTEMS DEVELOPED AND/OR LAUNCHED SINCE MARCH 2020 TO RESPOND TO COVID-19

- NCDHHS Business Intelligence Data Platform (BIDP)
- Public COVID-19 Dashboards
- North Carolina COVID-19 Surveillance System (NCCOVID)
- OpenBeds Critical Resource Tracker (OpenBeds CRT)
- COVID-19 Community Team Outreach (CCTO) Tool
- SlowCOVIDNC Application Programming Interface (API)
- COVID-19 Vaccination Management System (CVMS)

However, NCDHHS had made modernizing information systems and increasing data transparency a Department-level strategic priority prior to the pandemic. In 2019, NCDHHS established a Data Office, which developed a data strategy roadmap and began foundational work toward stronger integration of data across disparate sources. The Data Office proved important in NCDHHS's COVID-19 response efforts, although as COVID-19 hit, the office had only four people on staff, including the chief data officer.

NCDHHS, including the Data Office and NCDHHS's Information Technology Services Division, immediately partnered with the Department of Information Technology Government Data Analytics Center and the State Health Information Exchange to implement a wide range of technology solutions to support the state's pandemic response.

Along with infrastructure, NCDHHS developed new processes to publicly release data around testing, hospitalizations, and mortality on a more frequent basis to support improved responsiveness. Similarly, NCDHHS sped the release of data on vaccination when it became available. This required not only new workflows but also quality assurance processes and extensive project management.

Discussion of significant IT and data systems developed by NCDHHS and its partners and launched over the past 20 months are discussed throughout this report, with additional detail in Appendix C.

To enable both internal and public-facing data sharing and visual dashboards with COVID-19-related case information and trends, NCDHHS stood up a secure, cloud-based data management and business intelligence tool in 48 hours that enabled the sharing, consumption, and analysis of data from multiple internal and external source systems and included dashboard, reporting and analytics capabilities. The Business Intelligence Data Platform (BIDP) evolved and expanded during the pandemic to function as a hub for the state's pandemic-related data.

Even prior to the pandemic, NCDHHS processed an extraordinary amount of data across its divisions on a daily basis. However, as in many large organizations, including government agencies, data collection

was (and is) spread out among disparate systems and collected in different formats for a wide variety of programs and uses. This variation made data collection and reporting an often arduous – and time-consuming – manual process. In many instances, NCDHHS's and its Division of Public Health's public reporting of data had to align with unique regulatory or grant-based requirements. This manual data cleaning, analysis, and reporting process also led to lags that affected the timeliness of data.

Once the pandemic began, North Carolina, like all states, faced, practically overnight, a new and unprecedented demand for real-time access to a sweeping set of data elements to track the effects and outcomes of COVID-19 across the state. A wide range of internal and external stakeholders as well as the public needed ways to visualize, interpret, and understand an ever-growing amount of data. NCDHHS needed a platform to enable the secure sharing and consumption of data from multiple internal and external source systems.

LACK OF NATIONAL COVID-19 DATA STANDARDS

A significant challenge across the COVID-19 response has been the reality of imperfect and incomplete data, exacerbated by a national failure to establish standard definitions for data collection and reporting related to SARS-CoV-2 and COVID-19. As federal agencies continually changed data submission requirements, states and local health departments stepped in to build capabilities to ensure data-informed local decision-making but, as a result, states ended up collecting and reporting data in different units with varying definitions. This has contributed to stakeholder skepticism about the accuracy of available data. For example, there remains confusion even today over whether a person dies "with" COVID-19 or "of" COVID-19. Race and ethnicity data were not uniformly collected or reported across states from the start of the pandemic. In addition, the country lacked uniform reporting of where patients presenting with COVID-19 originated from, which is crucial to identifying hot spots and being able to intervene in the event of outbreak clusters.

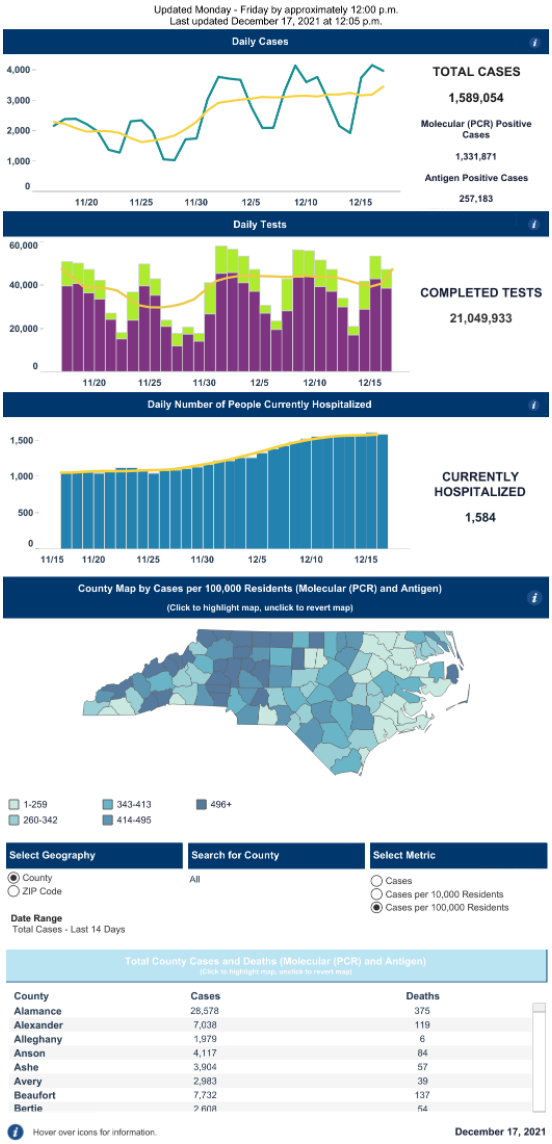
The NCDHHS BIDP is a Health Insurance Portability and Accountability Act (HIPAA) compliant, cloud-based business intelligence data platform to integrate data from multiple internal (North Carolina government agencies) and external (hospitals, labs, federal systems, health information exchanges and other) sources, and in different data formats (databases and flat files). It serves as a central repository, for data from numerous sources on disease surveillance, COVID-19, Medicaid, vaccination, hospital bed availability, and PPE. As such, the platform is being used to analyze and report on COVID-19 vaccine distribution, COVID-19 case trends by race and ethnicity, open hospital beds, clusters and outbreaks, contact tracing, and numerous other areas.

NCDHHS had begun designing the BIDP infrastructure several months before the pandemic. This foundational work allowed the platform to be built in record time and to a robust standard. On its first day, the public-facing COVID-19-case dashboard website maintained performance despite receiving more than 6 million hits.[69]

Public COVID-19 Dashboards

BIDP is the backbone of North Carolina's public-facing dashboards. Prior to the pandemic, the NCDHHS website primarily served as a passive information center housing administrative guidance, policy overviews, and contact information for NCDHHS-administered programs; the NCDHHS.gov website had one staff member assigned to manage updates. NCDHHS's web presence was not centralized on one platform. The Division of Public Health, for example, hosted several legacy web pages built to support specific programmatic needs; many were hand-coded and not designed with the expectation of frequent updates and heavy use.

NCDHHS launched its first coronavirus web page in March 2020 with limited functionality and released positive case information as it was received, but severely limited testing capabilities and lag times for test results meant this information was not a reliable guide to disease transmission. To convey a better sense of transmission trends and health care system strain, NCDHHS also tracked cough and fever-related emergency room visits through its existing syndromic surveillance North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT) and hospital admissions and posted information on empty staffed beds at hospitals. Many interviewees expressed frustration at the gaps in available data in the crucial early weeks of the pandemic at both the state and federal levels.



On May 20, 2020, NCDHHS released a new interactive dashboard and modernized website that provided an overview of the metrics the state was following to inform decisions to ease measures that slow the spread of the virus. That platform allowed the dashboard to grow and include additional data sets and more granularity over time. The updated dashboard included enhanced map capabilities, county- and ZIP-code-level search capabilities, and sections on COVID-19-like illness surveillance, cases, testing, hospitalizations, contact tracing, PPE and outbreak tracking in congregate living settings. A notable feature of the update was the ability to filter cases and deaths by demographic information (i.e., race, ethnicity, gender, and age).

The dashboard has been updated several times since and now includes robust vaccination information including vaccination rates by race for age groups and by ethnicity for age groups.[70] From May 2020 through early December 2021, the COVID-19 website has received over 96.5 million views, representing a 900% increase over NCDHHS website traffic in 2019.[71]

NCDHHS also made significant investments in both the state's and the local health departments' surveillance capabilities through its NCCOVID platform and to advance electronic data exchange. For example, NCDHHS received approximately 75% of all laboratory reports electronically at the start of the pandemic but today has achieved a reporting level of 97% of all COVID-19 PCR tests being reported electronically.[72]

North Carolina developed a new vaccine administration system, CVMS, in part because its existing immunization registry (NCIR) could not scale to handle the increased volumes and new provider types required for the COVID-19 response. To support ongoing COVID-19 vaccination management, the immunization data on residents of North Carolina will ultimately need to be deposited in a modernized state immunization information system for long-term storage and longitudinal tracking and aligned with information on all standard vaccine schedules, especially as vaccines evolve and new versions and administration schedules are developed.

Building a Culture of Data-Informed Decisions

In addition to regular review of data to understand overall trends in the spread of the virus and identify potential surges, NCDHHS developed a systematic, data-informed process to identify and assess more nuanced findings. For example, through a series of standing, structured weekly meetings to analyze and report on findings of epidemiological data to different internal leadership groups, NCDHHS identified and monitored the disparate impacts of COVID-19 – geographically, racially, and ethnically – and identified cluster patterns by industry (e.g., poultry processing, manufacturing, meat processing, incarcerated populations). It used these findings to inform the progress of activities and efforts to support these populations.

Other Critical Infrastructure Monitoring

NCDHHS and its emergency response partners developed online visualization tools to support proactive fatality management and other key monitoring functions across the state. For example, based on lessons learned from the international experience and prior disasters, NCDHHS prepared a restricted repository of statistics on morgue facility capacity and utilization in the event of large numbers of COVID-19 fatalities. While this capacity has not proved necessary to date, other states had to expand their morgue capacity.

Rapid Development of Organizational Capacity

The COVID-19 pandemic required all levels of the North Carolina government to coordinate in promoting the safety of residents and mitigating the impact of the virus. This was especially true across NCDHHS, which quickly aligned leadership and operations to employ the full breadth of its capabilities across the Department regardless of traditional areas of responsibility or administrative silos.

At the same time, much of NCDHHS's staff had to shift to remote working, which required immediate procurement of laptops and software to facilitate videoconferencing and other tools and a large-scale transition effort to ensure no disruption in services. Further, while the NCDHHS and Emergency Management initially coordinated response efforts from the state's Emergency Operations Center, the rapid transmission of COVID-19 and indoor spread risks of the virus also required a more distributed response team and the need to be able to securely monitor developments from remote locations.

NCDHHS entered the pandemic with a staffing crunch (NCDHHS had a staff of about 17,000 people, well below its allocated level of 18,000),[73] which was quickly exacerbated by the demands of the COVID-19 response, that required both additional personnel and new skill sets. NCDHHS's demand for human capital was heightened by the frenetic pace of cases and frequent changes precipitated by the pandemic and a growing shortage of trained clinical staff – the impact of which reverberated in health care settings throughout the nation.

The pandemic response activities required NCDHHS staff to take on new activities quickly and juggle multiple responsibilities, as the day-to-day work across the programs and services of NCDHHS did not pause during the pandemic. Often, staff members were also managing family or other personal demands related to stay-at-home orders and sometimes quarantine or isolation requirements.

The complex nature of NCDHHS's COVID-19 response required the Department to create new jobs and job functions to support the many new projects and workstreams. As some interviewees noted, in

normal circumstances, NCDHHS generally functions as an administrative agency, promulgating guidance, providing oversight and accountability for services under its divisions, and managing government funding, among other responsibilities. It is not traditionally a "retail operation," charged with the movement of large volumes of supplies and logistics management as well as the volume of contracts and procurements needed to support those efforts. NCDHHS needed to scale up an on-the-ground operation, in partnership with Emergency Management and local health departments, in addition to filling internal skills gaps.

NCDHHS identified a shortage of staff with specialized skills necessary for the COVID-19 response, including complex project management, communications, contract management and data integration. Data analytics was a particularly large gap, including analysis and modeling, data visualization, and distilling data into insights to inform policy and effective response.

As discussed above, NCDHHS needed to stand up new infrastructure to support multiple facets of the state's response against an unprecedented, compressed timeline. This included finding the extra capacity to manage IT systems integration and new technology development as well as vendor solicitations. NCDHHS also needed to augment staff expertise to monitor policy development and best practices in responding to COVID-19 across the country and to help translate policy into operations.

NCDHHS's workforce deficit, which predated COVID-19, was in part due to limitations NCDHHS faces in offering salaries competitive with the private sector, particularly for clinical, IT and data analytics staff. Several interviewees described the NCDHHS and state government hiring processes as lengthy and bureaucratic. Some staff members reported experiences with recruitment efforts that lasted months or a year and ended with the leading candidate choosing to accept a position elsewhere rather than continuing to wait.

NCDHHS's human resources department worked to address the agency's rapid hiring needs, developing a tiger team specifically for pandemic-related recruitment. However, given the scope of the Department's needs, NCDHHS also turned to temporary employees, contractors, and consultants, as well as a few clinical leaders who contracted with the state on an individual basis. These employees could be quickly identified, trained, set up with appropriate technology, onboarded and, unlike Department staff, could be paid only with time-limited dollars. In many cases, they brought skills the states had difficulty recruiting otherwise.

NCDHHS worked closely with contracted vendors, who themselves had to scale up quickly, to support many aspects of the pandemic response. As discussed earlier, for example, the existing case investigation and contact tracing infrastructure became overwhelmed quickly with the spread of COVID-19. NCDHHS's contact tracing vendor was hiring 35-40 people a day and more than a hundred each week during peaks. One significant challenge was hiring, training, and onboarding so many new people – including training on a newly developed IT system – to manage a new and constantly changing threat. NCDHHS staff also needed to be able to provide technical assistance and oversight.

At the same time, the expansion of remote work capabilities proved to be an asset for NCDHHS in some cases by allowing the state to leverage the talents of skilled workers living outside the Raleigh area. This was particularly beneficial in accessing highly skilled IT talent.

NCDHHS's Office of Procurement, Contracts and Grants, a necessary stop in nearly all efforts to secure additional resources, was understaffed, entering the pandemic with just four staff members. Contracting and procurement was a critical enabler of nearly all NCDHHS response efforts and required cross-

functional collaboration. The Governor provided temporary flexibility through Executive Order 116 to waive typical purchasing requirements and allow government entities to flexibly purchase supplies necessary to respond to COVID-19.[74] However, the executive order was not applicable to information technology contracts, which required a more extensive and, at times, lengthy approval process.

Going into the pandemic, NCDHHS did not have a pre-qualified vendor system to allow emergency response efforts to scale more rapidly, such as an IDIQ (indefinite delivery, indefinite quantity) contract. Such a model would likely have facilitated the Department's procurements and allowed vendors to provide support and resources more quickly and flexibly.

NCDHHS developed a program specifically to support small-business and minority vendors and vendors that could support on-the-ground COVID-19 response in the state's hardest-hit counties and communities with a high degree of linguistic and cultural representation. Intentional opportunities and processes to direct contracting dollars to these vendors were a critical element of NCDHHS's commitment to health equity. However, many organizations that might have been eligible to respond to requests for proposals or submit bids did not have experience in government contracting nor staff resources to support the contracting requirements. The Office of Procurement, despite its own capacity challenges, launched an effort to provide technical educational assistance to vendors that might otherwise have difficulty navigating the procurement process and demonstrating their capabilities. The Office of Procurement also sought to simplify and streamline contracting requirements. These efforts were viewed as successful in increasing the number of small-business and minority vendors and signaled a need to enhance supports in the future to enable more diverse contracting.

NCDHHS also worked to ensure flexibility in state contracts to allow local health departments to request staff quickly using a simple, uniform procedure.

III. Collaboration in a Decentralized Model

Across the country and in North Carolina, different levels of government have grappled with how to rapidly respond to the pandemic. The COVID-19 response effort has made clear that there is tension between the need for strong central governance with state-level authorities to set policies, direct resources, and manage the scale of need in responding to a global pandemic, and the reality of a distributed public health model and high variability in local circumstances, politics, and on-the-ground response capacity. NCDHHS sought to strike the right balance to empower local response efforts and provide leverage and uniformity in implementation but it proved challenging at times.

Local Health Departments

Each state is charged with protecting and promoting the health of its residents, but states have organized their governmental public health systems in different ways. Some states have a centralized organizational structure in which the state agency has direct control over local public health services, and others have mixed, or hybrid, authority models in which some local jurisdictions operate decentralized local public health agencies (most typically in metropolitan areas), while state agencies assume responsibility in other jurisdictions.

Like the majority of states, North Carolina has a decentralized public health system, meaning that many of its core public health functions and essential services are performed and administered at the county level by local health departments that are employees of local government.[75] Local health departments have considerable discretion over decision-making and service delivery and vary widely – nationally and in North Carolina – in terms of their jurisdictional size and responsibilities.

North Carolina has 85 local health departments serving 100 counties.[76] Local health departments are units of county government, and, as such, there are differences in size, resources, and available funding.[77] Some local health departments in North Carolina serve counties with urban centers and over a million residents, while others serve rural counties with a few thousand residents. Services also vary greatly; while all local health departments have responsibility for safeguarding against outbreaks of illness or disease and implementing local health promotion and prevention campaigns, some local health departments are also direct providers of clinical care services.

As noted earlier, North Carolina's public health system was chronically and severely underfunded heading into the pandemic due in part to funding cuts, tightening budgets, and unpredictable revenue streams. A compounding challenge was that public health services are often funded by a patchwork of grants and funds that must be used for specific purposes, not to broadly support foundational public health capabilities. Local health departments also often face significant limitations in redeployment of staff and resources.[78] [79]

In a decentralized public health model, while federal and state public health statutes and regulations guide services and minimum requirements related to public health emergency response efforts, each local health department is largely responsible for addressing the needs of its community. While this structure can be effective under more normal circumstances, promoting local control and local decision-making to address targeted community needs, it proved quite challenging in mobilizing a comprehensive, uniform, nimble and appropriately resourced statewide pandemic response.
The pandemic demonstrated a need for public health authorities to be able to make rapid decisions – frequently – that needed to be implemented fast. In addition, public health leaders needed the ability to quickly reallocate resources against priorities and pivot just as quickly as new priorities emerged. Given the magnitude and statewide impact of COVID-19, most pandemic response decisions needed to be made centrally and implemented locally and often simultaneously across the state.

This state-local dynamic caused tension, particularly in the early months of North Carolina's pandemic response. NCDHHS has a long-standing collaborative relationship with local health departments, built through a history of primarily consensus-based collaboration, which by its nature requires a lot of time and iterative process. Consensus-building in a decentralized public health model is important and creates buy-in and ownership of policies and decisions.

However, during this type of crisis, public health authorities do not have the luxury of time. NCDHHS and its partners in state government made significant decisions for the protection of all North Carolinians that had far-reaching implications for local health departments and required very rapid local actions. NCDHHS did not effectively communicate with and engage the 85 local health departments in early decision-making but relied on them for implementation of those decisions. Local health directors typically report to county government and a further complication was the time and resources they needed to ensure local government leaders understood new directives and policy decisions. While there were existing communications channels between NCDHHS and the local health departments, they were not adequate for the fast-paced and ongoing response effort. NCDHHS found a need to establish more frequent and robust communications protocols with additional dedicated staff, in newly created roles,

to support local health departments. For example, NCDHHS invested significant resources in convening and coordinating regular regional meetings that allowed local health departments to share local innovations and best practices. Local health departments indicated these meetings were useful both for immediate sharing of information and for long-term strengthening of relationships among local health departments. NCDHHS also built new relationships and participated in standing weekly calls with county government officials.

Interviewees from both NCDHHS and local health departments reported that communications and collaboration improved markedly over time, but it was "a bumpy road" at the beginning.

Local health departments were (and are) at the forefront of the entire COVID-19 response in North Carolina. They have responsibilities for testing, case investigation, contact tracing, provision of isolation supports, and large-scale vaccine administration operations as well as community outreach, county data collection, oversight of local compliance with directives, technical assistance for local organizations, and support for county-level decision-making. With every phase of or new development during the pandemic, more has been required from the already strained and under-resourced local health departments.

Some local health departments were better positioned than others to radically scale up and both guide and resource extensive pandemic response operations. However, it quickly became clear it was neither practical nor realistic for 85 local health departments to have to surge up capacity to take ownership of every need of the pandemic and compete, often with each other or local health systems, for talent and limited resources. There is an economy of scale and an efficiency in centralized support for key capabilities. As one example, NCDHHS supplemented local health department efforts by partnering with a vendor for a statewide contact tracing workforce to supplement and quickly enhance local efforts. The centralized approach allowed for centralized recruitment, training, and protocols and reduced the local/municipal human resources burdens to permit for very rapid hiring and deployment. The centralized approach also facilitated the ability to ensure certain linguistic and cultural competencies were represented across the new workforce. This applied to the ability to leverage technology to address the pandemic as well. In the case of contact tracing, for example, there was a clear need and benefit in having one statewide IT system to underpin tracing efforts that could be linked to other statewide surveillance and allow for automated notifications and text/email "push" information on the latest guidance and resources, which could be updated centrally rather than managed by 85 local jurisdictions.

NCDHHS provided technical assistance and other resources to support local health departments, which evolved as the pandemic evolved and areas of need were jointly identified by local health departments and NCDHHS. While local health departments provide health education and promotion, for example, the majority do not have access to ongoing communications and public relations support. NCDHHS, at local health departments' request, reviewed early local press releases and provided communication tools and resources that local health departments could adopt or customize in their work. NCDHHS also supported local health department data collection efforts, working to resolve inconsistencies with state data. In addition, NCDHHS provided resources and staffing support, including staffing contracts that NCDHHS established and maintained. Despite this support, limited staffing and challenging local environments meant that some local health departments remained unable to implement the full scope of efforts, such that that key public health priorities, such as isolation for infected individuals, were not consistently implemented.

While local health departments have received federal and state funding to bolster their COVID-19 response efforts, most of that funding is "one time" funding, which is very challenging for local health departments. One-time funding during a crisis can be directed at temporary resources but it is hard to

develop a sustainable public health infrastructure and ensure the ability to hire and support skilled staff without more secure and ongoing sources of funding. One-time funding also does not adequately address the deeper systematic public health infrastructure issues.

Finally, not unique to the pandemic, there often exists a dynamic tension between levels of government, including state-local governments. During the pandemic, this tension was particularly challenging for some local health directors, who were charged with following and implementing guidance from the state but who reported to local county government. This meant at times local health directors, their teams, and public health frontline workers were caught in the middle of varying perspectives on how to combat COVID-19.

Multiple interviewees across sectors commented on this tension. Local health departments were struggling to solve similar problems with limited resources a lack of clarity around when funding would be available, particularly in the early days of the pandemic, which led to variations in how quickly counties could invest in the infrastructure necessary to mount a response. As the pandemic progressed, many local health departments faced navigating difficult decisions while maintaining support of their local communities. County level variations in requirements of businesses and enforcement approaches to those requirements were frustrating. Several interviewees stated, upon reflection, more state level directives (rather than recommendations) would likely have been impactful, though also not without challenges to implement.

K-12 Schools

Education is one of state government's most important responsibilities, and one it shares with local governments. K-12 schools were among the sectors most affected by COVID-19 and posed the most complex policy challenges. North Carolina has 115 local public school districts and 2,500+ traditional public schools, as well as 148 charter schools.[80] Governance and oversight for schools are split between state and local authorities.

In addition to essential education services, K-12 schools provide important social, emotional, mental health and community supports (including food security) for students and their families and are major employers in their communities. They also play a critical role in allowing parents to work, by providing safe supervision during working hours, often including before and after school care programs based on school grounds.

In the early days of the pandemic, when little was known about the spread of the SARS-CoV-2 virus, K-12 schools closed across the country to help reduce opportunities for transmission. The first COVID-19-associated school closure occurred on February 27, 2020 in Washington state.[81] In late February, the CDC also warned schools to begin preparing for virus outbreaks.[82,83] By March 25, with cases emerging across the country, all 50 states had closed public schools at least temporarily and 48 states either ordered or recommended that schools remain closed through the end of the 2019-20 school year.[84] After initial closures, many schools pivoted to online education for the remainder of the school year.

On March 14, 2020, Governor Cooper issued Executive Order 117 temporarily closing K-12 public schools in North Carolina and in April announced schools would remain in remote learning programs through the end of the 2019-2020 school year.[85]

NCDHHS has worked extensively with the State Board of Education and NC DPI through an ongoing, highly collaborative process to ensure there were pathways rooted in science-based guidance for

schools to reopen for in-person learning for the 2020-2021 school year and remain open for in-person learning "to the fullest extent possible" while following health and safety protocols.

The benefits of in-person learning and school attendance were well known to NCDHHS and its partners at the State Board of Education and NC DPI. However, the nation's evolving understanding of school-age children's role in COVID-19 transmission made developing guidance and associated operational processes complicated and subject to frequent revision. Further, it became clear fairly early in the pandemic that risk of transmission of the virus was greater in indoor settings and many school teachers, administrators and employees, in addition to the families of students, were understandably concerned about their potential degree of risk and personal or family circumstances.

"The work to support schools was critically important. It was complicated by inequity; the disparities "cut both ways." Communities most severely impacted by COVID-19 were also ones in which children were most impacted by physical closures of school buildings and remote learning."

– NCDHHS interviewee

NCDHHS developed extensive, comprehensive, and highly detailed guidance specific to K-12 schools using CDC guidance and the latest scientific knowledge of the virus, which rapidly changed beginning in late Spring 2020.[86]

The StrongSchoolsNC Public Health Toolkit (K-12) was first released on June 8, 2020,[87] designed to help districts prioritize the health and safety of students and teachers as they reopened school buildings and delivered instruction for the 2020-2021 school year. It was updated frequently to ensure schools had the most current information on how to lower the risk of spread, particularly as differences in age-related transmission risk became known and there was a better understanding of how social distancing in schools could be modified when coupled with effective use of masks. The toolkit was developed collaboratively by NCDHHS and NC DPI with input from a range of stakeholders across the state, including local superintendents, State Board of Education members, the Governor's Teacher Advisory Council, and members of the Governor's COVID-19 Education and Nutrition Working Group.

The initial Toolkit detailed recommendations and requirements related to social distancing and minimizing exposure; cloth face coverings; protecting vulnerable populations; cleaning and hygiene; monitoring for symptoms; handling suspected, presumptive, or confirmed positive cases of covid-19; communication and combating misinformation; water and ventilation systems; transportation; and coping and resilience. The Toolkit was expanded to include Testing (including an ability for schools to implement a testing plan funded by NCDHHS at no cost to the school or the district that includes both screening and diagnostic testing), vaccination, and other considerations.

NCDHHS and DPI outlined three scenarios for reopening schools in the 2020-2021 school year, directing school districts to plan for each as operations may need to change if the state's COVID-19 metrics changed over time: Plan A "Minimal Social Distancing," with all students in school at the same time; Plan B "Moderate Social Distancing," with reduced occupancy in school facilities and transportation vehicles; and Plan C "Remote Learning Only." Each plan

EXAMPLES OF ONGOING NCDHHS GUIDANCE FOR K-12 SCHOOLS:

- StrongSchoolsNC: Public Health Toolkit K-12
- StrongSchoolsNC Toolkit Frequently Asked Questions
- COVID-19 in Schools: Legal Authority and Requirements
- K-12 COVID-19 Testing Program Guidance
- K-12 COVID-19 Testing Program – Communications Toolkit
- K12 COVID-19 Testing Program Guidance
- COVID-19 Contact Tracing Procedures for K-12 Schools
- Vaccine Operational Guidance for Schools

required enhanced health protocols, including face covering, as laid out in NCDHHS requirements and recommendations.

In mid-July 2020, Governor Cooper announced that public schools would reopen under Plan B, with local options to remain in remote learning only.[88] On October 5, 2020, kindergarten through fifth-grade students were allowed to return to full-time in-person instruction, while in-person instruction for middle and high school students remained subject to existing limitations on building capacity and distancing. Data consistently showed that children, especially younger children, were at lower risk of significant illness[89] or broad viral transmission while the benefits of in-person instruction over remote learning were significant.[90]

NCDHHS and its partners intensively monitored and evaluated data on both school and community spread. Evaluation of data from August 2020 to October 2020 included 90,000 students and staff involved with in-person instruction and found that proper wearing of a face mask was effective in limiting in-school transmission of SARS-CoV-2, even with increased population counts in school buildings, poor ventilation, high community transmission, and limited distancing.[91]

On March 11, 2021, the North Carolina General Assembly passed a law, signed by Governor Cooper, requiring public elementary schools to return students to classrooms under Plan A — all students in classrooms with minimal social distancing, with the option of having students in grades 6-12 in class under either Plan A or Plan B (a hybrid of in-person and remote learning).

In August 2021, all schools in North Carolina opened for in-person school five days a week for the 2021-2022 school year, with the ability for contingency plans based on changes to COVID-19-related metrics. As the pandemic evolved and more tools became available, including rapid COVID-19 testing and vaccines, NCDHHS updated the StrongSchoolsNC Toolkit and issued additional targeted guidance to support K-12 schools, students, and parents.

In addition to promulgating written guidance, NCDHHS leaders and local health department leaders have participated in hundreds of state and local school board and related meetings and regular webinars and stakeholder calls. Video-conferencing and virtual meeting platforms proved particularly helpful to allow NCDHHS subject matter experts to be more readily available to support local conversations and needs. NCDHHS set up a central COVID-19 rapid response center with a StrongSchoolsNC help desk. Questions sent to the help desk are triaged, connecting schools with NCDHHS experts to answer their public health questions. The help desk remains active and continues to be a frequently accessed resource. These new communications channels and the dedicated staff and resources to support the magnitude of change, guidance, and funding needs at the local level did not exist at NCDHHS prior to the pandemic and had to be stood up very quickly.

ABC Science Collaborative

North Carolina worked with the ABC Science Collaborative, an initiative that extends across 14 states, connecting scientists and physicians with school and community leaders to help understand the most current and relevant information about COVID-19 and to help leaders make informed decisions about returning to school. The ABC Science Collaborative is coordinated by the Duke Clinical Research Institute at the Duke University School of Medicine and funded by a grant from the National Institutes of Health and includes partners from UNC School of Medicine and other leading universities and academic health systems.

The Collaborative supplemented North Carolina's COVID-19 data evaluation efforts. For example, as directed under the state's March 2021 school reopening legislation, the Collaborative collected and analyzed data from all North Carolina elementary, middle, and high schools operating under Plan A from March to June 2021. The data represent 100 local school districts and 14 charter schools comprising more than 1,280,000 students and 160,000 staff and found that North Carolina schools were highly successful in preventing the transmission of COVID-19 within school buildings.[92]

"North Carolina schools did an outstanding job preventing within-school transmission of COVID-19."

"Schools that follow the strategies in the NCDHHS StrongSchoolsNC Public Health Toolkit (K-12) and adhere to the mask mandate effectively mitigate within-school transmission of COVID-19 in Plan A."

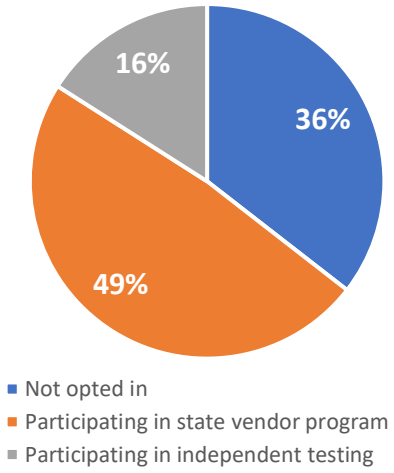
– *"The Reopen Our Schools Act of 2021" (S.L. 2021-4) ABC Science Collaborative, Final Report, June 2021*

COVID-19 Testing

In an effort to help school districts proactively monitor for COVID-19 cases and help prevent outbreaks, NCDHHS established a K-12 testing program, supported by federal funds[93].

StrongSchoolsNC: K-12 Testing Program: Between December 2020 and June 2021, 58 school districts, charter schools, and private schools participated in NCDHHS's COVID-19 School Testing program, receiving over 70,000 rapid tests, to perform diagnostic and routine screening testing. Schools reported that testing increased confidence from families that in-person learning was safe and allowed schools to rapidly identify and quickly quarantine suspected cases of COVID-19, which got students and staff back into the classroom faster.[94]

StrongSchoolsNC K-12 COVID-19 Testing Program



Source: NCDHHS Analysis.

For the 2021-2022 school year, NCDHHS expanded the program options, both at no cost to schools, to include: 1. a State-Contracted Vendor Testing Option, under which schools could choose to use a state-contracted vendor available to all schools performing testing of students and staff; and 2. an Independent Testing Option, under which schools could choose to perform testing on their own or in partnership with a non-state sponsored vendor. Participating schools choose whether to test on an as-needed basis (diagnostic testing), weekly screening tests only, or both. As of November 19, 2021, 94,983 test results have been reported through this program, with a 1.4% test positivity rate.[95]

Additionally, public schools participating in either testing option were eligible to receive funding for temporary school health staff, including funds to hire a registered nurse (RN), licensed practical nurse (LPN), and/or unlicensed assisted personnel (UAP) to support student health and help fulfill the requirements of the testing program.

Test to Stay: In Fall 2021, NCDHHS launched the "Test to Stay in School: COVID-19 Testing Following Exposure in K-12 School Communities" research program and pilot study in collaboration with the ABC Science Collaborative. The pilot program includes diagnostic testing at specific intervals for enrolled

students and staff who have been exposed to COVID-19 in the school setting, and who would otherwise be required to quarantine. The results of the study will help inform NCDHHS's and DPI's future policies.

Pandemic-Electronic Benefits Transfer Program Implementation

As discussed earlier, North Carolina was an early adopter of the temporary federal Pandemic – Electronic Benefits Transfer (P-EBT) program, designed to help families purchase food for their children while schools are closed due to the coronavirus pandemic, supplementing meals distributed by the school district. Eligibility criteria are based on guidance from the U.S. Department of Agriculture; eligible families receive money on a new or existing EBT card to help make up for these lost meals. The P-EBT program is administered by NCDHHS, which manages the Food and Nutrition Services (FNS) program food assistance benefit, in partnership with NC DPI, which manages school nutrition programs, including the National School Lunch program. There is no application for the P-EBT program, rather families were automatically determined to be eligible if approved for the National School Lunch Program (federal criteria changed for the 2021-2022 school year, to base eligibility on the attendance of an individual student, not the circumstances of the school). Of note, these linked eligibility requirements for P-EBT required a new method and process for data-sharing between the two Departments, including across platforms that were not originally designed for this purpose, which required significant collaboration, time, and resourcing.

Strengthening School Public Health Resources

In addition to immediate COVID-19 response, NCDHHS worked with DPI and its Local Education Agencies (LEAs) to reimagine how school health infrastructure could support student needs post-COVID-19. Currently, schools use several models of health care staffing - some have no dedicated health care staff, many have a school nurse (usually a state or county employee), and a few have an on-site school-based clinic run by an outside health care practice. Interviewees said these staffing models were frequently insufficient to support school-based public health interventions prior to COVID-19 and would almost certainly be inadequate to meet the physical and behavioral health needs of students and school communities in a post-COVID-19 environment. To support school health staffing, NCDHHS created a comprehensive resource to help schools navigate the hiring and onboarding process for nursing support staff, including job descriptions, hiring processes, job duties, and training resources.

Several interviewees commented on the unforeseen amount of time and level of dedicated resources that were required across state and local governments to develop effective strategies and both support school reopening and community needs. Interviewees also noted the emotional nature of the work due to the vital role public schools play in society. Public health leaders participated in local school board and community-level conversations, as well, and noted they were among the most challenging experiences of the pandemic, due to the complexity of public health tradeoffs involved, families' extreme distress about school closures, and misinformation and disinformation related to proposed policies. Interviewees noted that a NCDHHS – NC DPI working group or other structure should be activated immediately in the event of a future pandemic threat.

Long-Term Care Facilities

Supporting residents and staff of nursing homes and other long-term care and congregate living facilities has been a priority for NCDHHS during the pandemic. Long-term care settings include skilled nursing facilities (nursing homes), adult care homes, family care homes, mental health group homes, and intermediate care facilities for individuals with intellectual disabilities.

There are more than 3,000 state-licensed long-term care facilities (including over 400 skilled nursing facilities with approximately 36,000 residents and more than 30,000 staff) across the state. They are private businesses subject to state and federal regulations. Some are individually owned and operated; some are part of a larger conglomerate that may own and operate multiple facilities.

At the start of the pandemic, NCDHHS formed a dedicated Long-Term Care COVID-19 Response Team. The team worked with facilities, local health departments, industry associations, advocacy groups, hospitals, and others on a multi-prong strategy of prevention, capacity, testing, managing outbreaks and oversight. NCDHHS sought to provide support to long-term care owners and operators as they responded to COVID-19 to ensure their residents were safe and receiving appropriate care.

COVID-19 is highly contagious and easily spread in congregate-living settings among both residents and staff. A central challenge for management and staff of long-term care facilities throughout the pandemic has been the reality that people can have the virus and not have symptoms but still infect others.

NCDHHS and its partners provided more than 3,500 long-term care facilities with PPE, including a 14-day supply of face shields, procedure masks, gloves and shoe covers to support facilities as they built their supply network, and it prioritized congregate care facilities for state-sponsored PPE distribution.[96]

Skilled nursing facilities, in particular, were hit hard by the COVID-19 pandemic, including the first known outbreak in the U.S. at a skilled nursing facility in Kirkland, Washington, but data on long-term care setting outbreaks was hard to obtain, making it impossible to understand the full extent of the crisis. While the federal government did not require nursing homes to report cases and deaths from COVID-19 until May 24, 2020,[97] Governor Cooper issued an executive order on April 9, 2020,[98] requiring skilled nursing facilities and all long-term care facilities in North Carolina to report new resident cases and resident-staff clusters.

In June 2020,[99] NCDHHS, in partnership with CVS Health, implemented an innovative universal COVID-19 testing strategy within skilled nursing facilities, requiring baseline testing for all residents and staff in addition to screening tests in facilities where there was at least one confirmed case of COVID-19. As part of the strategy, NCDHHS removed a key financial barrier to universal testing by committing to be the payer of last resort for all screening tests for those without symptoms.

To help fill staffing shortages, NCDHHS partnered with the East Carolina University School of Nursing to match registered nurses and certified nursing assistants with health care facilities, with an emphasis on long-term care facility needs, seeking to urgently hire staff. Over 5,000 individuals were referred for temporary, part-time, and full-time staffing needs. NCDHHS also adopted an emergency rule granting reciprocity to nurse aides certified in other states to work as nurse aides in North Carolina and allowed facilities to exceed the number of licensed beds if needed to provide temporary shelter and services to adequately care for residents with COVID-19. As of October 2021, 675 nurse aides had been granted reciprocity in North Carolina.[100]

As noted earlier, NCDHHS instituted an increased Medicaid rate to support the general COVID-19 response, including increased staff pay, hours and training for long-term care facilities, and provided child care and other supports for essential workers, including congregate care facility workers. As a part of the 10% additional rate increase, all long-term care facilities were required to submit updated infection control plans.

Standardized long-term care infection control and prevention measures developed prior to COVID-19 had been insufficient to stop the spread of COVID-19 in long-term care facilities during the pandemic. Long-term care facilities are particularly challenging sites for infection control, as many residents require close physical contact with nurses, aides, and other health care workers, who may work in more than one facility. In addition, some residents may have challenges understanding or complying with prevention measures, such as residents in dementia care facilities.[101]

To provide technical assistance to long-term care facilities, NCDHHS conducted remote infection prevention and control consultation with skilled nursing and other long-term care facilities across the state through a partnership with the CDC and the North Carolina Statewide Program for Infection Control and Epidemiology (SPICE). Local health departments, in partnership with NCDHHS, created 10 regionally based infection prevention control teams that conducted over 1,200 infection prevention visits.[102]

In addition, NCDHHS developed a toolkit to support long-term care facilities in preparing for and responding to COVID-19 outbreaks in their facility. The toolkit contains an infection control assessment, infection staffing worksheet, infection prevention educational resources and other tools. NCDHHS partnered with the North Carolina Area Health Education Centers Program (NC AHEC) to provide virtual trainings for more than 2,000 staff working in long-term care sites.

Vaccination

Residents and staff of long-term care facilities were prioritized in the top tier for vaccination efforts, with vaccinations starting in December 2020. While reported COVID-19 outbreaks in long-term care facilities increased in the state during July through September 2021 as a result of the SARS-CoV-2 delta variant, average weekly cases decreased by 89%; hospitalizations decreased by 93% and deaths decreased by 95% when compared to November and December 2020, when most long-term care residents were not vaccinated.[103] As of mid-October 2021, more than 80% of long-term care facility residents had been fully vaccinated.

Visitation Policies

The pandemic took a tremendous toll on long-term care facilities, their residents, and staff. Most palpable was the tension around visitation policies, given the conflicting need to protect residents from COVID-19 by severely limiting visitors inside facilities and the documented positive impact of connection to loved ones and the broader world.[104] Long-term care facility residents around the country endured months of isolation from loved ones while facilities were closed to visitors.

NCDHHS actively monitored state data, science related to indoor versus outdoor transmission, and emerging lessons from long-term care facilities in states that had experienced early COVID-19 outbreaks. In addition to actively promoting technology to ensure residents in long-term care had social supports, but recognizing in-person visitation was essential for both residents and their loved ones, Secretary Cohen issued an order on September 1, 2020 allowing outdoor visitation, with preventative measures, for residents in long-term care facilities that meet certain public health criteria.

After indoor restrictions were loosened, in accordance with federal guidance, some interviewees noted an unintended consequence for residents in shared rooms versus those in single rooms. In many facilities, residents in shared rooms were often required to continue forgoing visitors or to encounter a much more complex scheduling process to ensure visitation access to larger rooms or common spaces

that could accommodate social distancing, which inadvertently disproportionately impacted Medicaid enrollees, who were more likely to reside in shared rooms.

While many restrictions were federally imposed, in October 2021 Governor Cooper signed the "No Patient Left Alone Act," passed by the North Carolina Senate and House, which requires nursing homes to permit residents to receive visitors "to the fullest extent permitted" by CMS, the CDC, or federal law.[105]

Additional Challenges

Long-term care facility staff, many of whom have low pay with few benefits, had to provide hands-on care for residents at high risk of COVID-19 from the beginning of the pandemic, a time when PPE was in short supply, few treatments were available and case fatality rates were less well understood. Understaffing was endemic before COVID-19 and worsened as workers became ill or left their jobs in search of safer opportunities.

The long-term care industry in North Carolina is highly fragmented and includes a large number of facilities distributed across the state. Despite efforts of NCDHHS and local health departments to provide multiple levels of assistance, many long-term care facilities raised that it was challenging to navigate where and how to get timely technical assistance and that many small independent organizations struggled with bandwidth in trying to simply maintain daily operations. Long-term care facilities also reported, however, that the vaccination rollout ran relatively smoothly and was well-communicated. As the pandemic continued, many long-term care facilities reported that health departments visits and inspection increased dramatically but these interactions were largely seen as punitive rather than supportive. Skilled nursing facilities in particular faced challenges in navigating shifting guidance and requirements from multiple agencies, including the CDC, HHS, and state and local health departments. One example shared was surprise inspections citing very granular local requirements that differed from federal guidance, such as the appropriate storage of N-95 masks.

While oversight of infection control and other operational measures are important responsibilities of state and local health authorities, the pandemic has highlighted the vulnerabilities of the long-term care system and opportunities to reexamine whether state and local government and private sector resources are sufficiently aligned to optimally support these facilities during a time of crisis.

Enforcement

North Carolina public health authorities have responsibility to protect the health, safety, and welfare of persons within state borders. The unique and unprecedented circumstances of the pandemic have required statewide application of preventative measures to reduce transmission and spread of COVID-19 to protect public health and safety and to ensure the state's hospitals and frontline responders have capacity to provide life-saving resources.

Throughout the pandemic, there has been tension at times between enforcement of public health laws intended to protect the public from COVID-19 and individual rights and preferences across the country. While evidence continues to suggest that tools such as temporary stay-at-home orders, restrictions and capacity limitations on businesses, limitations on large gatherings, and face-covering requirements are effective[106], compliance at times requires sacrifices. It is incumbent upon public health officials to take action against foreseeable threats - but only out of necessity - and to strive for the least restrictive measures needed. Through the state's "dimmer switch" reopening policy and NCDHHS's extensive

guidance tailored to individual industry sectors and communities, NCDHHS continually and intentionally strove to strike a balance between risk mitigation and the least restrictive response measures.

NCDHHS and its partners across state agencies sought first and foremost to promote - and heavily relied on - voluntary compliance with COVID-19 guidance through education, communications, and science-based, data-driven decision-making. However, due to the highly contagious nature of the Sars-CoV-2 virus, success of prevention measures relied on broad compliance with guidance. Effective enforcement was also needed.

While the majority of residents, businesses and organizations in North Carolina actively worked to comply with COVID-19 regulations, like all states, there were also outliers whose actions potentially jeopardized the health and safety of others. A particular challenge for NCDHHS was that its enforcement tools were primarily limited to public health enforcement actions such as imminent hazard abatements or injunctions to protect public health.[107] These actions, while very important, are very blunt in nature. An imminent hazard, for example, is a situation that, if no immediate action is taken, an immediate serious threat is likely. An injunction under the public health code involves obtaining a court order mandating behavior change based upon a violation of those public health laws.

NCDHHS sought to use those actions very sparingly when a threat to public health was evident due to action or inaction. However, NCDHHS lacked less extreme and intermediate options, such as fines, to promote compliance, and hampered its ability to intervene quickly.

Interviewees also noted tensions between state guidance and local-level enforcement. NCDHHS policies and guidance established a minimum or baseline set of requirements for spread-mitigation efforts. County and local governments were permitted flexibility to do more, in recognition of variations in local circumstances related to COVID-19. At times, this flexibility, combined with the varying inputs of county and local officials, left individual businesses and organizations in the position of making important decisions about how to interpret and implement guidance.

Interviewees noted this was particularly challenging for certain business sectors. Early on, stakeholders had difficulty when different rules appeared to contradict each other or contradict other principles; for example, a local curfew rule and variability of enforcement might mean that grocery stores, which were expected to stay open, could not unload trucks that arrived unpredictably in overnight hours due to supply chain difficulties. Some stakeholders reported that different businesses in the same communities took contrasting approaches, for example, businesses that followed occupancy and masking rules more faithfully perceiving that they lost customers to peers that took a more relaxed approach.

Other entities also played important roles in policy enforcement, including local law enforcement and public safety officials, though their approaches varied in different counties.

These challenges contributed to confusion on the ground and overall frustration with North Carolina's response efforts, as the public writ large does not generally have a nuanced understanding of how the state's public health system or enforcement authority is organized.

Discussion of Emerging Lessons

The COVID-19 pandemic is by no means over as new SARS-CoV-2 variants and vaccine hesitancy indicate challenges to come. However, much has been learned to date that can help inform efforts to continue the fight against COVID-19 and strengthen the resiliency of North Carolina in the future.

NCDHHS's overarching strategy to respond to COVID-19 centered on savings lives by focusing on two primary pillars:

1) Mitigation and prevention strategies to prevent or slow the spread of COVID-19 across the population in total (such as through public education and messaging, policymaking and guidance, PPE procurement and distribution, and, eventually, vaccination)
2) Response mobilization, including both case-based containment (such as through identification/testing, case investigation and contract tracing, and isolation and quarantine protocols with wrap-around supports), and surge capacity planning and intervention

Nearly two years into the pandemic, this core approach seemingly was sound, though complicated and made more challenging by a host of factors, some within and some outside NCDHHS's control.

In reflecting on the myriad emerging lessons, as informed through this interim review, a few themes rise to the top: the need for strong leadership, a focus on equity, effective communications, engaged partners, actionable data, and organizational capacity within government with the right skill sets to respond to a crisis, as well as the undeniable reality that a health care system focused on paying for medical costs does not fund the desired outcomes of a healthy and resilient population.

The overarching emerging lessons to date include the following:

- **There is power in having a unifying vision and purpose**. Responding to a pandemic is not only a "whole of government" response or a public health response; it is a "whole of North Carolina" response. It has required the collective efforts of government agencies, elected officials, business leaders from every industry, school officials, entertainment and sports leaders, health care providers, community leaders and individuals to pull together to defeat a common enemy threatening our society. That enemy is a virus.

- **There is no playbook for unprecedented.** NCDHHS and the DPS Division of Emergency Management had proven experience in responding to disasters and public health emergencies and had existing plans developed with stakeholders and experts, including a pandemic flu response plan. However, COVID-19 required a wholly new playbook. Experienced leaders, alignment around a shared vision and goals, sufficient data and IT infrastructure, and flexibility and authority to remove bureaucratic barriers and rapidly procure resources are as necessary as a preparedness plan (though a plan is an important resource).

- **Communications in a time of crisis require transparency and managing of expectations**. The COVID-19 pandemic demonstrated that leaders must be candid about the degree of uncertainty in the moment and the likelihood for circumstances – and related guidance – to change. NCDHHS had a mixed track-record in terms of appropriately setting and managing expectations across both key stakeholders and the public at large. Honesty builds trust, and leaders must give partner organizations and the general public the benefit of the doubt that they will understand

the changing nature of the situation. While NCDHHS has learned and evolved across the pandemic, there is room for improvement going forward.

- **That said, it is extremely challenging to build trust in government and public health during a time of crisis. Trust must be earned through intentional relationships, consistency, resources, and time.** Given the complex challenges NCDHHS faced, virtually no resolution could have satisfied all stakeholders. Government leaders must become comfortable with being the harbingers of "rarely good news," provided that information and guidance are reliable, pragmatic and enforceable.

  With regard to historically marginalized populations in particular, the pandemic shone a spotlight on many long-standing health inequities and disparities as well as the struggles marginalized communities face. Outreach to HMP communities, advocates, religious leaders, and others should have begun earlier in the response process. Similarly, NCDHHS's efforts to research and address the root causes of vaccine hesitancy for all persons across the state began too late. Communications and outreach can inadvertently "preach to the choir" and not effectively reach people in all phases of readiness with the information and tools they need to make informed decisions.

  The partnerships and relationships formed during the COVID-19 response can and should also be built upon to improve North Carolina's ability to support communities during any emergency events.

- **Centralized public health decision-making and authority is necessary and must come with accountability**. Fragmentation in public health policy-setting and implementation creates tremendous complications in terms of effectuating a uniform and targeted pandemic response and in terms of issues such as scarce resource acquisition and deployment, crisis communications, testing, social distancing measures, and vaccination. Centralization is important not only for efficiency but also for nimbleness. North Carolina's decentralized public health system was not prepared to respond to a global pandemic nor was it most efficient nor effective for all local health agencies to seek to scale up to meet each demand of the response. Transparency and justification of decisions and actions is equally important.

- **Always be in a learning mode. State agencies need to be flexible, willing to hear and accept criticism, and pivot as the pandemic changes.** The uncertainty and newness of the virus – which will be the same for any new public health threat – means that missteps and mistakes are guaranteed to happen. Further, new information and developments in science mean strategies will inevitably need to change. Being willing to course-correct is essential. This also requires having the right team at the right time and a willingness to make difficult calls to ensure people with the right capabilities and competencies to address the challenges at hand are given the responsibility and authority to do so.

- **Think about data first.** Data have been critical to shaping policy decisions, directing resources, and designing effective countermeasures. The pandemic has shown that data to inform the response is not always perfect and, in fact, can be quite challenging. Given the reality of highly decentralized systems – across public health, human services, and health care delivery – gathering data in a way that allows for actionable, informed, and scalable decisions is really hard.

NCDHHS worked to optimize underlying infrastructure to allow data to be shared and analyzed to enable and empower a coordinated response but its efforts largely happened through rapid builds, developing solutions in response to the unfolding situation. NCDHHS had started to modernize internal data infrastructure prior to the pandemic, including beginning the process to move to cloud-based solutions, but even those efforts were behind where the state needs to be. There is significant risk that the one-time bolus of funding from COVID-19 will be used for near-term solutions to an immediate problem that do not adequately scale to meet larger infrastructure needs. Focus on sound data strategy must be a priority not only for pandemic response efforts but also for NCDHHS's larger public health and health outcomes improvement goals. Effective data systems will also make government health agencies smarter and more effective purchasers of health services through Medicaid and other state-sponsored programs.

- **An effective response to a pandemic requires simple, clear, easy-to-understand messaging that influences behavior change**. Simple and repetitive communications are effective, and leaders should not underestimate how important repetition is to effectuate change and save lives. Well-produced, simple visuals and graphics are even stronger tools – a picture captures a thousand words.

  Explaining individual risk is hard. Predicting individual risk with a novel virus is harder. NCDHHS launched very effective public health campaigns but they also architected a strategy as the pandemic unfolded, constantly seeking to get ahead of the next threat or needed message. NCDHHS's initial experience with targeted messaging response research related to its vaccination campaign was important. Going forward, NCDHHS - and other public health leaders - needs to invest in sophisticated behavioral change research to be able to help the Department move from education and ensuring awareness of a problem in a time of public health crisis to mobilizing populations to take actions, some of which may require personal sacrifice.

- **Advancing health equity requires consistent effort and prioritization.** The higher rates of disease and death among historically marginalized populations from COVID-19 are the result of generations of health inequity and will require the state – along with federal and local partners – to invest in solutions that advance health equity. During the COVID-19 pandemic, NCDHHS built on existing relationships and worked to improve the state's outcomes and incorporated health equity as a core pillar of the response framework. While significant, the work completed to date is only a small part of the work necessary to improve the health and health outcomes of North Carolina's historically marginalized populations. Efforts are only successful if they are supported and funded, and an ongoing, meaningful representation of HMPs will be essential to promulgating effective policy.

- **A modern governmental health and human services agency must evolve its core competencies.** Much of the pandemic response has focused on crisis management and short-term patches to address resource and capabilities gaps, both within NCDHHS and across its partners. Data analysis and business intelligence capabilities must become a table stake for government agencies, especially public health. While a balance will need to be struck, remote work capacity presents new opportunities for government agencies to engage highly specialized talent. Even as COVID-19 persists, crisis operations are not a sustainable business model. NCDHHS will need to find new ways to scale up operations when needed, through flexible contracting and other mechanisms, and effectively scale down to provide efficient, high-value services in times of normalcy.

- **Whole-person care matters.** Individual, and ultimately population, health is not just about medical care, though access to high-quality, safe, and effective physical health care is essential. However, whole-person care means that the social, behavioral, financial, spiritual, and other factors that contribute to well-being are supported in meeting individuals where they have needs. COVID-19 has clearly demonstrated that many fellow residents have limited resources and reserves to deal with catastrophe and, further, that our public support systems are very challenging to navigate. North Carolina has been a national leader in using its health care and social services resources to advance whole person care, which were essential capabilities in North Carolina's efforts to mitigate the impact of COVID-19 on residents. Making whole-person care a core pillar of disaster response efforts going forward is a necessary element of fulfilling civic duties to serve residents.

- **NCDHHS agency coordination and collaboration to support long-term care facilities need to be strengthened.** Responsibility and supports for long-term care facilities are fragmented in state government, with regulation and inspection responsibilities typically being the primary driver of interaction between the facilities and the government, with limited avenues for technical assistance. In addition, long-term care facilities are usually not linked to a larger system of care or regional infrastructure. Long-term care facilities are chronically understaffed and often lack robust health information technology. As these facilities will most certainly present ongoing challenges during the COVID-19 pandemic, and congregate living settings will present vulnerabilities in most imagined future public health emergencies, there is an urgency to build a more resilient and prepared long-term care system.

- **Politization, misinformation and social media will continue to play a large role in the public discourse related to COVID-19 and future public health emergencies.** This will have lasting implications well into the future for public health, the ability of officials to respond to health emergencies, and the ability to attract top talent into leadership roles.

- **Be prepared for a marathon.** Traditional disaster response, such as hurricane response, is designed in short, intense bursts. In these scenarios, resources are used intensely, and people have dedicated roles that end fairly quickly. COVID-19 has created the need for a new kind of extended disaster response framework, in which government can provide the services the public needs while maintaining the capacity and strength of its own resources. In all aspects of the response, strive to find the simplest and most effective solution.

Concluding Thoughts

North Carolina entered the pandemic with a safety net health care system that was and is extremely fragile. A significant factor in both the state's ongoing efforts to respond to COVID-19 and its ability to address future public health emergencies will be a more stabilized base to work from, inclusive of the full range of medical services, mental and behavioral health access, residential and home and community-based services, and social safety net supports.

Further, the pandemic has shown that many of the health care providers that serve low-income and uninsured individuals are far too financially fragile to weather another disaster.

As we begin 2022, hospitals, skilled nursing and long-term care facilities, emergency medical services (EMS), and other essential providers of health care services face serious and potentially debilitating workforce shortages. The pandemic has also further highlighted significant gaps in North Carolina's behavioral health system at a time of exponentially growing need.

North Carolina is one of 12 states that has elected not to expand Medicaid coverage to provide health insurance coverage to low-income, nonelderly adults. While the debate about how to protect low-income North Carolinians from the cost of illness continues, the state's high uninsured rate means that hundreds of thousands of residents are likely delaying preventive care with harmful consequences. The health insurance coverage gap coupled with insufficient access to affordable care disproportionately impacts HMPs. These populations have also experienced worse outcomes than others under COVID-19. Significant efforts have been launched to better serve these communities, but they represent just the tip of the spear in terms of need.

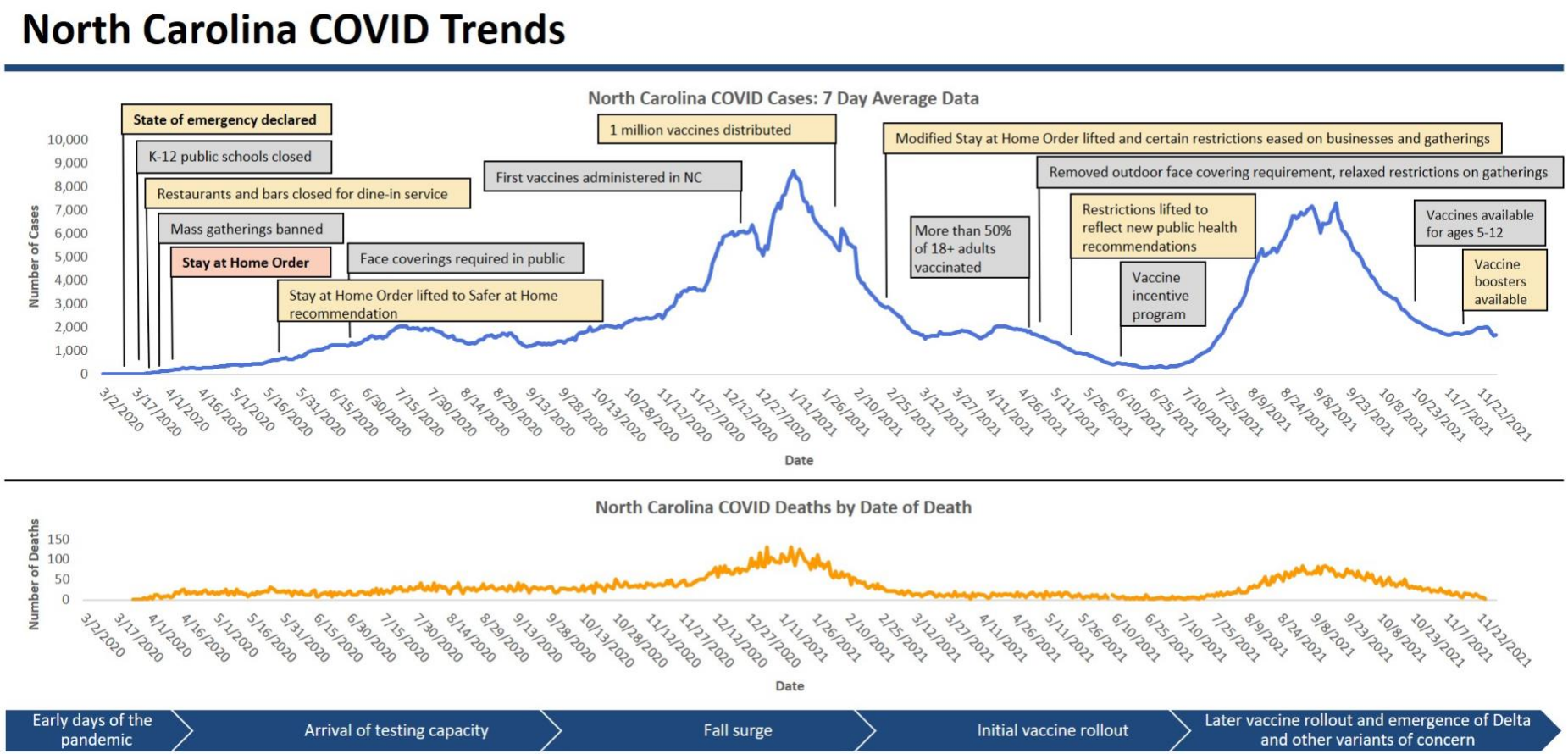
So much work remains to be done – including preparing for the next wave of infections – but NCDHHS and its government agency partners, like many sectors of the North Carolina economy, must also grapple with workforce burnout and turnover as a result of a singularly intense and challenging time.

There may be a light at the end of the tunnel. Many indicators suggest COVID-19 will evolve to become endemic, rather than pandemic, meaning the virus will continue to circulate but become less lethal over time as vaccination and treatments become more effective. More tools continue to become available to states and local communities to fight COVID-19 – the focus now must be on equipping the public with compelling reasons to use them while not losing focus on efforts to shore up the health care delivery system.

There is no perfect way to respond to a pandemic or indeed to prepare for the next one, but there will be a next one. A defining feature of the state's success in the future will be the resiliency of both our health care infrastructure and our communities.

Appendices

Appendix A: COVID-19 Phases and Response Timeline



Appendix B: Summary of NC COVID-19 Executive Orders

Date	Executive Order	Description
2021 EXECUTIVE ORDERS		
Oct. 4, 2021	Executive Order 236	Extends certain health and human services provisions in previous executive orders and delegations of authorities.
Sept. 24, 2021	Executive Order 234	Provides flexibility in certain health assessments and immunization requirements due to impacts of the COVID-19 pandemic.
Sept. 2, 2021	Executive Order 232	Directs the issuance of a statewide standing order to expand access to monoclonal antibody treatment for COVID-19.
Sept. 2, 2021	Executive Order 231	Reinstates certain unemployment insurance requirements.
Aug. 31, 2021	Executive Order 230	Extends transportation-related provisions in previous executive orders.
Aug. 31, 2021	Executive Order 229	Extends measures to facilitate vaccine administration, COVID-19 testing and the vaccine verification policy for cabinet agencies.
Aug. 27, 2021	Executive Order 228	Provides flexibility regarding certain law enforcement training courses.
Aug. 6, 2021	Executive Order 225	Extends certain health and human services provisions in previous executive orders and delegations of authority.
July 29, 2021	Executive Order 224	Implements measures to address COVID-19 and related variants.
June 16, 2021	Executive Order 221	Further extends processes to expedite payment of unemployment insurance claims.
June 11, 2021	Executive Order 220	Extends COVID-19 pandemic response measures in Executive Order 215.
June 10, 2021	Executive Order 219	Establishes an incentive program to encourage vaccination against COVID-19.
June 1, 2021	Executive Order 217	Extends transportation-related provisions in previous executive orders.
May 21, 2021	Executive Order 216	Reinstates work search requirements for unemployment insurance benefits.

May 14, 2021	Executive Order 215	Lifts COVID-19 restrictions to reflect new public health recommendations.
May 10, 2021	Executive Order 212	Reissues prior executive orders on remote shareholder and nonprofit meetings during the COVID-19 state of emergency.
May 10, 2021	Executive Order 211	Extends certain health and human services provisions in previous executive orders and delegations of authority.
April 29, 2021	Executive Order 210	Further extends the authorization of delivery and carry-out of services and products as an alternative to on-site consumption and receipt.
April 28, 2021	Executive Order 209	Removes the outdoor face covering requirement, relaxes restrictions on gatherings and extends the capacity and social distancing measures of Executive Order 204.
March 30, 2021	Executive Order 207	Extends a previous executive order expediting the processing of unemployment insurance claims through June 30, 2021.
March 30, 2021	Executive Order 206	Extends North Carolina's statewide residential eviction moratorium through June 30, 2021.
March 30, 2021	Executive Order 205	Extends the North Carolina Alcohol and Beverage Commission's authorization to permit the delivery or carry-out of mixed beverages as an alternative to on-site consumption through April 30, 2021.
March 23, 2021	Executive Order 204	Further eases restrictions on businesses and gatherings.
March 1, 2021	Executive Order 200	Reinstates work search requirements for unemployment insurance benefits for new claimants.
Feb. 26, 2021	Executive Order 198	Extends prior executive orders related to remote shareholder and nonprofit meetings during the COVID-19 state of emergency.
Feb. 26, 2021	Executive Order 197	Extends and amends certain transportation-related provisions in previous executive orders.
Feb. 24, 2021	Executive Order 195	Lifts the Modified Stay at Home order and eases certain restrictions on businesses and gatherings.
Feb. 9, 2021	Executive Order 193	Extends certain health and human services provisions in previous executive orders and delegations of authority.
Jan. 27, 2021	Executive Order 192	Reissues certain transportation-related provisions in previous executive orders.

Jan. 27, 2021	Executive Order 191	Further extends until March 31, 2021, North Carolina's moratorium on evictions for non-payment of rent.
Jan. 27, 2021	Executive Order 190	Extends until at least March 31, 2021, the authorization of delivery or carry-out of mixed beverages as an alternative to on-site consumption.
Jan. 27, 2021	Executive Order 189	Further extends the Modified Stay at Home order until at least Feb. 28, 2021.
Jan. 6, 2021	Executive Order 188	Extends Executive Order 181's Modified Stay at Home order.
Jan. 4, 2021	Executive Order 185	Extends prior executive orders related to remote shareholder and nonprofit meetings during the COVID-19 state of emergency.
2020 EXECUTIVE ORDERS		
Dec. 30, 2020	Executive Order 184	Extends through Jan. 31, 2021, North Carolina's moratorium on evictions for non-payment of rent.
Dec. 21, 2020	Executive Order 183	Authorizes the delivery or carry-out of mixed beverages as an alternative to on-site consumption.
Dec. 8, 2020	Executive Order 181	Implements the Modified Stay at Home order and requires nighttime closure for certain businesses and activities for all North Carolinians during overnight hours.
Nov. 23, 2020	Executive Order 180	Increases face covering requirements to prevent the rapid spread of COVID-19.
Nov. 13, 2020	Executive Order 177	Extends certain Health and Human Services provisions in previous orders and delegations of authority.
Nov. 10, 2020	Executive Order 176	Further extends the Phase 3 order and implementation of additional measures to protect public health.
Oct. 30, 2020	Executive Order 173	Extends prior executive orders on remote shareholder and nonprofit meetings during the COVID-19 state of emergency.
Oct. 30, 2020	Executive Order 172	Further extends deadlines for certain health assessments and immunization requirements as a result of impacts of the pandemic.
Oct. 28, 2020	Executive Order 171	Clarifies the U.S. Centers for Disease Control and Prevention's eviction moratorium to prevent unwarranted evictions and help struggling communities.
Oct. 21, 2020	Executive Order 170	Extends Executive Order 169, keeping the state in Phase 3 of lifting COVID-19 coronavirus restrictions.

Sept. 30, 2020	Executive Order 169	Revises prohibitions and restrictions that move the state into Phase 3 measures.
Sept. 21, 2020	Executive Order 165	Extends certain Health and Human Services provisions in previous orders and delegates authority of long-term care facilities to the secretary of the N.C. Department of Health and Human Services.
Sept. 14, 2020	Executive Order 164	Extends certain transportation-related measures in previous executive orders.
Sept. 1, 2020	Executive Order 163	Revises prohibitions and restrictions that move the state into Safer at Home Phase 2.5 measures.
Aug. 31, 2020	Executive Order 162	Extends Executive Order 153, which restricts late-night service of alcoholic beverages.
Aug. 31, 2020	Executive Order 161	Extends prior executive orders on remote shareholder and nonprofit meetings during the COVID-19 state of emergency.
Aug. 14, 2020	Executive Order 157	Extends certain transportation-related provisions in previous executive orders.
Aug. 11, 2020	Executive Order 156	Extends proof-of-immunization and health assessment documentation deadlines for students enrolled in public, private or religious educational institutions, including child care facilities, K-12 schools, colleges and universities.
Aug. 5, 2020	Executive Order 155	Extends Executive Order 141's Safer At Home Phase 2 measures until at least Sept. 11, 2020.
July 28, 2020	Executive Order 153	Restricts late-night service of alcoholic beverages.
July 24, 2020	Executive Order 152	Extends certain Health and Human Services provisions in previous executive orders and returns regulatory authority for skilled-nursing facilities to the secretary of the N.C. Department of Health and Human Services.
July 16, 2020	Executive Order 151	Extends Executive Order 141's Safer At Home Phase 2 measures until at least Aug. 7, 2020.
July 14, 2020	Executive Order 150	Extends certain transportation-related provisions set in previous executive orders.
July 2, 2020	Executive Order 149	Reissues prior executive orders on remote shareholder and nonprofit meetings during the COVID-19 state of emergency.

June 26, 2020	Executive Order 148	Extends certain health and human services provisions set in previous executive orders.
June 24, 2020	Executive Order 147	Extends Executive Order 141's Safer At Home restrictions and requires people, with some exceptions, to wear face coverings in public when social distancing is not possible.
June 19, 2020	Executive Order 146	Extends certain transportation-related provisions in previous executive orders.
June 5, 2020	Executive Order 144	Extends certain health and human services provisions in previous executive orders.
June 4, 2020	Executive Order 143	Addresses disparities in communities of color that historically have had less access to health care, housing, economic opportunity and more.
May 30, 2020	Executive Order 142	Extends the prohibition of utility shut-offs and implements a moratorium on evictions.
May 20, 2020	Executive Order 141	Lifts the statewide Stay at Home Order and moves the state to a Safer At Home recommendation.
May 18, 2020	Executive Order 140	Extends Executive Order 133 related to transportation.
May 12, 2020	Executive Order 139	Provides additional regulatory flexibility to help ensure capacity in the state's health care system and improve its ability to effectively respond to the COVID-19 pandemic.
May 5, 2020	Executive Order 138	Effective 5 p.m. May 8, 2020, eases some restrictions on travel, business operations and mass gatherings.
Apr. 23, 2020	Executive Order 135	Extends until May 8, North Carolina's Stay At Home (Executive Order 121) as well as other orders regarding the closures of restaurants for dine-in service, bars and other close-contact businesses.
Apr. 20, 2020	Executive Order 134	Allows furloughed employees to be eligible for unemployment benefits.
Apr 17, 2020	Executive Order 133	Extends certain provisions in previous executive orders that are related to transportation.
Apr. 9, 2020	Executive Order 131	Issues stronger social distancing requirements for retail stores still operating, makes earlier COVID-19 guidelines mandatory for nursing facilities and issues changes to speed up certain benefit payments to those who are out of work.

Apr. 8, 2020	Executive Order 130	Provides more access to health care beds, expands the pool of health care workers and orders essential child care services for workers responding to COVID-19 pandemic.
Apr. 7, 2020	Executive Order 129	Creates more flexibility in law enforcement training schedules during the state of emergency.
Mar. 31, 2020	Executive Order 124	Prohibits utilities – including electric, gas, water and wastewater services – from disconnecting customers unable to pay during the COVID-19 pandemic and from collecting fees, penalties or interest for late payments. The order applies for the next 60 days and gives residential customers at least six months to pay outstanding bills.
Mar. 30, 2020	Executive Order 122	Helps schools and local governments access state surplus property to help bridge gaps during the response to COVID-19.
Mar. 27, 2020	Executive Order 121	Issues a statewide Stay at Home Order beginning Monday, March 30, 2020, at 5 p.m. until April 29, 2020, and directs people to stay at home except to visit essential businesses, to exercise outdoors or to help a family member. Specifically, the order bans gatherings of more than 10 people and directs everyone to physically stay at least 6 feet apart from others.
Mar. 23, 2020	Executive Order 120	Closes K-12 public schools statewide through May 15, bans mass gatherings of more than 50 people and closes some businesses.
Mar. 21, 2020	Executive Order 119	Waives restrictions on child care and elder care and provides the N.C. Division of Motor Vehicles with flexibilities.
Mar. 17, 2020	Executive Order 118	Closes restaurants and bars for dine-in service, makes unemployment benefits more widely available.
Mar. 14, 2020	Executive Order 117	Closes K-12 public schools statewide.
Mar. 10, 2020	Executive Order 116	Declares a state of emergency to coordinate response and protective actions to prevent the spread of COVID-19.

Appendix C: Summary of Key Information Technology Infrastructure Development

Examples (not comprehensive) of significant IT and data systems developed and launched over the past 20 months are as follows:

- **NCDHHS Business Intelligence Data Platform (BIDP).** NCDHHS stood up a secure, cloud-based data management and business intelligence tool in 48 hours that enabled the sharing, consumption, and analysis of data from multiple internal and external source systems and included dashboard, reporting and analytics capabilities. This platform has evolved and expanded during the pandemic and now functions as a data hub for the state's pandemic-related data.

  The NCDHHS BIDP is a Health Insurance Portability and Accountability Act- (HIPAA-) compliant, cloud-based business intelligence data platform to integrate data from multiple internal (North Carolina government agencies) and external (hospitals, labs, federal systems, health information exchanges and other) sources, and in different data formats (databases and flat files). It serves as a central repository, including disease surveillance, COVID-19, Medicaid, vaccination, hospital bed availability, PPE, and data from other sources. As such, the platform is being used to analyze and report on COVID-19 vaccine distribution, COVID-19 case trends by race and ethnicity, open hospital beds, clustering and outbreaks, contact tracing, and numerous other areas.

- **North Carolina COVID-19 Surveillance System (NCCOVID)**.[108] Since COVID-19 case reporting was mandated for North Carolina state and local health departments in 2019, laboratory and case data (positive SARS-CoV-2 testing results) have been stored in the NCCOVID application, and data is extracted daily to help develop the COVID-19 dashboards.

  NCCOVID is a statewide, electronic web interface communicable disease database. NCDHHS invested significant resources to automate manual reporting and incorporate reporting from new types of facilities. For example, at the start of the pandemic, many laboratories that shared testing data, including public health laboratories in local health departments, reported results on paper, a time-consuming process that could introduce errors.

- **OpenBeds Critical Resource Tracker (OpenBeds CRT).** In spring 2020, NCDHHS implemented an automated acute care hospital capacity monitoring system to provide a complete, near real-time view of available ICU beds, ventilators, PPE, and other resources across North Carolina's hospitals.

  Data is updated as often as every hour, reassuring state users of its timeliness. Real-time, unique views are provided at the hospital, regional, and state levels, meaning hospital and state administrators each see different displays that fit their data analysis needs.

  Visibility of available critical COVID-19 resources helps NCDHHS identify surpluses, shortages, and gaps to better manage patients' needs, assess resources and allocate funding. One hundred twenty acute care hospitals usetracker, with 80 hospitals automating their reporting to the state and federal governments.

- **COVID-19 Community Team Outreach (CCTO) Tool.**[109] From October 3, 2020 to January 9, 2021, North Carolina experienced a 400% increase in daily reported COVID-19 cases. NCDHHS implemented an automated digital notification system on December 24, 2020, to reach persons with diagnosed COVID-19 in a timely manner and support contact tracing efforts.

  Notification of a positive COVID-19 test result and rapid isolation are critical tools in mitigating the spread of the virus. As testing capacity increased and as the state experienced surges in cases, the need for contact tracing and case investigation overwhelmed the limited available staff.

  Before December 24, 2020, patients were notified through telephone calls by North Carolina case investigation staff members. To handle the increased number of cases and rapidly notify patients receiving a positive SARS-CoV-2 test result, NCDHHS and local health departments moved from telephone notification only to telephone calls plus automated text and email (digital notification), which helped get information to individuals faster. After implementation of the CCTO tool, approximately one-half of patients were notified within 24 hours of the report of the positive test result to North Carolina state and local health departments, compared with approximately one in six reached within 24 hours prior to implementation.[110]

  The CCTO tool allows individuals to receive a text or email directing them to click a link unique to that person and test result. If the individual has a positive test result, the tool lists the date of their positive test and requires them to enter their symptom-onset date or to select an option indicating that they have not had any symptoms. The page automatically uses this information to generate a unique isolation end date. It gives them the next steps – to isolate from others, to notify their close contacts, to consider treatment and to get the COVID-19 vaccine – and information on resources. The CCTO tool streamlines case investigation workflows and can help prioritize telephone or field-based communication in cases where electronic communication is not delivered. By supporting more timely notification of test results, the CCTO tool aims to facilitate more rapid patient isolation and increase the efficiency of case investigation.

  In July 2021, NCDHHS implemented a patient portal to supplement the notification system. The portal allows patients to enter their close contacts online and have those contacts immediately made aware of their exposure by digital notification.

- **SlowCOVIDNC Application Programming Interface (API).** In September 2020, NCDHHS created a COVID-19 exposure notification smartphone app. The voluntary and free app was developed to support contact tracing and isolation efforts. The app detects when two users are in close contact, then sends a notification if one of them later tests positive for COVID-19.

  NCDHHS developed the app quickly after Google and Apple made their Exposure Notification System (ENS) available to state and local public health authorities. The app can provide automated notification of exposure to known and unknown contacts who may have been exposed to an individual who has tested positive. The app is anonymous and does not collect data on a user's location or with whom they've been in contact. The app also does not have access to test data; if a user tests positive, the app relies on the user to anonymously submit their results to notify others.

  SLOWCOVIDNC may be downloaded for free on the Apple App Store and the Google Play Store; by October 2021, it had been downloaded almost a million times. While the app's impact on

isolation and COVID-19 spread mitigation at this point is unclear, the technology is promising, and the fairly high response rate indicates a receptivity from the public to engage with government agencies using mobile devices during an emergency. Exposure notification apps could play an important role in limiting outbreaks of endemic infectious diseases or be used during future pandemics.

- **COVID-19 Vaccination Management System (CVMS):** Manages vaccine inventory and tracks vaccine administration. CVMS is a secure, cloud-based vaccine management solution for COVID-19 that enables vaccine management and data sharing across providers, hospitals, agencies, and local, state, and federal governments on one common platform.

  After an approximately six-week build, CVMS launched initial functionality on December 10, 2020. Its rollout schedule reflected the Centers for Disease Control and Prevention (CDC) requirements for data entry, and also the reality that supply limitations would require a phased allocation of vaccine doses. The system was developed to allow health care providers to enroll as vaccine providers, manage vaccine inventory and track overall vaccine administration data as well as patient-specific information, including dose administration and frequency and timing of additional doses.

  Providers use CVMS to manage vaccine recipients, record administrations and grant immediate access to new users at their location. In addition to vaccine administration, providers use CVMS to manage vaccine inventory and facilitate vaccine transfers across the state, helping to prevent wastage. NCDHHS program managers also use the system to manage vaccine inventory shipments and usage and analyze real-time data reports across the state. Providers seeking additional inventory can request transfers using a Vaccine Marketplace function. CVMS also provides recipients access to their vaccine information through a unique portal.

  The CVMS system is COVID-19-specific and was rapidly developed to support vaccine administration specifically. This has led to some unintended data challenges. For example, staff could not link COVID-19 test data to vaccination data, due to the lack of any easy patient-matching feature, to automate answering the important question of whether infections are breakthroughs.

Appendix D: Timeline of Key Federal and State Vaccine Guidance and Communications in Early Months

North Carolina's COVID-19 vaccine roll-out was a monumental effort – and one that was highly complex and linked to a federal effort that was unprecedented in size and scale. COVID-19 vaccines were also groundbreaking, leveraging new technology that had never been broadly available before and came with special storage and handling requirements.

NCDHHS committed to equitable vaccine distribution for all North Carolinians from the very beginning of its vaccine planning efforts. The state established five guiding principles for vaccine distribution and planning:

- Everyone has access. All North Carolinians have equitable access to vaccines.
- Inclusion and respect. Vaccine planning and distribution are inclusive and draw on the experience and expertise of leaders from historically marginalized populations.
- Keeping you informed. Transparent, accurate and frequent public communications are essential to building trust.
- Informed decision-making. Data is used to promote equity, track progress and guide decision-making.
- Continuous improvement. Appropriate stewardship of resources and continuous evaluation and improvement drive successful implementation.

Translating policy and highly complicated logistics into operations was challenging, particularly in the very early days of the roll out. A few factors drove much of the early vaccine roll-out process:

- mRNA vaccines used a technology that had special storage requirements.
- Originally, vaccine doses came in large quantities, with each vial containing multiple doses that had to be used within a very short time.
- There would not be enough doses for everyone in the country on day one.
- Equitable distribution was a priority, particularly considering the disproportionate impact of COVID-19 on some population groups.
- It was unclear how many doses would be available to states and at what intervals once the vaccine was approved. (And it was unclear which vaccines would be approved, meaning NCDHHS had to plan for multiple scenarios.) However, the vaccine would eventually become widely available.

Many interviewees felt that the initial vaccine roll out in the state was "clunky," while acknowledging that it dramatically improved over time. Several stakeholders pointed to what they perceived as the state changing its vaccine prioritization policies and changing communications related to the initial vaccine distribution as the single biggest frustration of the COVID-19 response effort in North Carolina. Interviewees also indicated they wanted more transparency on in-state vaccine allocation earlier in the process, though noted that the state did start publishing information on overall allocation on the state's COVID-19 dashboard fairly early in the process. Interviewees had varying levels of awareness of the changing processes between the federal government and states that drove vaccine allocation and changed on a weekly basis.

Key Events in Early Vaccine Guidance

June 2020

June 2020: Centers for Disease Control and Prevention (CDC) Advisory Committee on Immunization Practices (ACIP) begins public meetings to review evidence-based information pertaining to COVID-19 vaccines, including initial allocation of COVID-19 vaccine supplies

July 2020

July 2020: National Academies of Sciences, Engineering, and Medicine and the National Academy of Medicine (NAM) formed committee to develop an overarching framework to assist planning for equitable allocation of vaccines against COVID-19, at request of CDC and the National Institutes of Health (NIH)

July 2020: New messenger RNA (mRNA) vaccines from both Modena and Pfizer begin Phase 3 clinical trials

August 2020

August 2020: Initial information begins to filter out about the promising prospects for the new vaccines

- While mRNA technology had been studied for decades, the COVID-19 vaccines would become the first approved for widespread use. New manufacturing processes would also be needed to support large scale production. There would be a ramp up time to develop the billions of doses needed if approved.
- The vaccines initially had very stringent storage requirements (both needed to be frozen, the Pfizer candidate required "ultra cold" storage)
- Both vaccine would likely require more than one dose for an individual to receive full benefit

September 2020

September 2020: The North Carolina Institute of Medicine forms a NC COVID-19 Vaccine Advisory Committee to provide feedback to DHHS on its CDC required COVID-19 Vaccination Plan. The Committee continued to meet regularly across 2020 and the first half of 2021 as the federal and state vaccine landscape evolved.

October 2020

October 2, 2020: The NAM Committee releases its Framework for Equitable Allocation of COVID-19 Vaccine

October 16, 2020: **NCDHHS submits its initial vaccine plan,** closely aligning with the NAM guidance and input from the Vaccine Advisory Committee, with a multi-phased rollout approach, with specific groups eligible for each phase. Vaccine scarcity was expected initially and NCDHHS placed high value on health equity and risk categories.

October 29, 2020: CDC releases COVID-19 Vaccination Program Interim Playbook for Jurisdiction Operations, 2.0

November 2020

November 12, 2020: The U.S. Department of Health and Human Services (HHS) announces it will be partnering with national chain and independent pharmacies and will also be distributing vaccine doses directly to them.

November 23, 2020: The CDC ACIP releases an Interim Report saying any plan for distributing coronavirus vaccine should take into account fair and equitable access for everyone—especially groups that are disproportionately affected by the pandemic.

November 25, 2020: HHS Secretary Alex Azar says in press briefing that the first batches of vaccines will be allotted to states based on total population over age 18, not by risk group population

December 2020

December 1, 2020: The CDC ACIP holds vote to recommend that the first vaccine doses be administered to health care personnel and residents of long-term care facilities. The CDC director adopts recommendation.

December 11, 2020: The Food and Drug Administration (FDA) issues an Emergency Use Authorization (EUA) for the Pfizer-BioNTech COVID-19 vaccine

December 14, 2020: **North Carolina receives its first doses of Pfizer vaccine,** begins Phase 1a, vaccination of health care workers fighting COVID-19

December 18, 2020: FDA issues an EUA for the use of the Moderna COVID-19 vaccine

NCDHHS reports the state's highest one-day number of COVID-19 cases to date, indicating a coming surge that would further tax health care providers across the state as vaccine distribution begins

December 21, 2020: **North Carolina receives its first doses of Moderna vaccine**

December 22, 2020: The CDC releases "Updated Interim Recommendation for Allocation of COVID-19 Vaccine"

NC DHHS adds data on vaccinations to the NC COVID-19 dashboard

December 28, 2020: North Carolina begins vaccinating nursing home residents

December 29, 2020: NCDHHS launches new partnership to ensure COVID-19 information is effective in reaching underserved communities and to research vaccine hesitancy

January 2021

January 5, 2021: Governor Cooper announces National Guard mobilization to help with vaccine efforts.

January 11, 2021: North Carolina opens enrollment for all additional types of vaccine providers. Initial vaccine providers (from Dec. 18 - Jan. 10) were local health departments and hospitals plus pharmacy chains as part of the federal program for long term care. NC broadly expands vaccine providers eligibility.

January 12, 2021: HHS Secretary Azar announces in a press briefing that vaccine allocations to states would be changing within two weeks. Vaccine allotments would now be based on the population of adults 65 and older in each state instead of allocated based on total state population.

January 14, 2021: NCDHHS updates its vaccination plan to expand age-based access, in line with new federal guidance

January 26, 2021: NCDHHS updates its vaccine dashboard to include information on doses promised to and received by the state as well as the percentage of doses administered.

January 29, 2021: North Carolina surpassed the 1 million mark of COVID-19 vaccine doses administered across the state

February 2021

February 2, 2021: President Biden announces retail pharmacies will begin giving vaccinations on February 11

February 9, 2021: President Biden announces federally qualified health centers (FQHCs) would become authorized vaccine distribution sites and begin receiving federal allocations of vaccine

February 18, 2021: Vaccine shipments nationwide are delayed due to severe weather

February 26, 2021: North Carolina Governor Cooper announces plans for a FEMA-supported COVID-19 Community Vaccination Center in Greensboro

February 27, 2021: FDA issues EUA for Johnson & Johnson single dose vaccine

March 2021

March 11, 2021: President Biden announces vaccine production has ramped up; directs states to adult eligible for vaccination by May 1, 2020

March 11, 2021: North Carolina announces expedited access for high-risk individuals as vaccine supply increases

March 25, 2021: Governor Cooper announces an accelerated timeline for vaccine eligibility and the launch of a new public private partnership, Healthier Together: Health Equity Action Network, to enhance the state's work to deliver equitable access to vaccines

Appendix E: Interviews Conducted as Part of This Review

Chip Baggett, Executive Vice President and Chief Executive Officer, North Carolina Medical Society

Mark Benton, Assistant Secretary for Public Health, NCDHHS

Amy Braun, Director of Creative and Digital Services, NCDHHS

Patrick Brown, Senior Program Manager, NCDHHS

Cardra Burns, Deputy Secretary, Operational Excellence, NCDHHS

Shelley Carraway, Local Health Department Director, Jackson County, North Carolina

Charles Carter, Chief Operating Officer for Technology & Operations, NCDHHS

Chris Chung, Chief Executive Officer, Economic Development Partnership of North Carolina

Kimberly Clement, Program Manager, North Carolina Office of Emergency Medical Services, NCDHHS

Mandy Cohen, Secretary of HHS, NCDHHS

Kathleen Colville, President and Chief Executive Officer, North Carolina Institute of Medicine (NC IOM)

Brian Combs, Director and Branch Head, Public Health Emergency Preparedness, NCDHHS

Iris Cooper, Assistant Secretary for Procurement, Contracts and Grants, NCDHHS

Eric Davis, Chair, North Carolina Board of Education

Chris DeRienzo, Senior Vice President and System Chief Medical Officer, WakeMed

Dena Diorio, County Manager, Mecklenburg County

Shannon Dowler, Chief Medical Officer, NCDHHS

Terri Duncan, Local Health Department Director, Bladen County, North Carolina

Andy Ellen, President and General Counsel, North Carolina Retail Merchants Association

David Ellis, County Manager, Wake County, North Carolina

Debra Farrington, North Carolina Medicaid Chief of Staff, NCDHHS

Evelyn Foust, Head, Communicable Disease Branch, NCDHHS

Steve Garrison, County Manager, Rutherford County, North Carolina

Jen Greene, Local Health Department Director, Appalachian District, North Carolina

Cody Hand, Senior Vice President, Advocacy & Policy; Deputy General Counsel, North Carolina Hospital Association

Scott Harrelson, Local Health Department Director, Craven County, North Carolina

Kevin High, President, Wake Forest Baptist Health

Danielle Hollowell, Administrator, Clapps Nursing Center

Norma Houston, Chief of Staff, UNC System Office

Ryan Jury, COVID-19 Vaccine Program Director, NCDHHS

Susan Kansagra, Chronic Disease and Injury Section Chief, DPH, NCDHHS

Tatyana Kelly, Vice President of Planning/Strategy & Member Services, North Carolina Hospital Association

Kody Kinsley, Chief Deputy Secretary for Health, NCDHHS

Steve Lawler, President, North Carolina Hospital Association

Michelle Laws, Assistant Director for the Division of Mental Health, NCDHHS

Aditi Mallick, (former) Director, COVID-19 Response Command Center, NCDHHS

Viviana Martinez-Bianchi, Family Medicine Doctor, Primary Care Doctor, Duke University School of Medicine; Latinx Advocacy Team & Interdisciplinary Network for COVID-19

Johnny McLean, Interim Deputy Director Division of Human Resources, NCDHHS

Lynn Minges, President and Chief Executive Officer, North Carolina Restaurant and Lodging Association

Amanda Fuller Moore, Pharmacist, Division of Public Health, NCDHHS

Zack Moore, Section Chief, Epidemiology Section, NCDHHS

Will Ray, Director, North Carolina Department of Public Safety, Department of Emergency Management

Dave Richard, Deputy Secretary, North Carolina Medicaid, NCDHHS

Michelle Ries, Associate Director, North Carolina Institute of Medicine (NC IOM)

Jennifer Robinson, President, SanStone Health and Rehabilitation

Todd Roper, Administrator, Conover Nursing & Rehabilitation Center

Gary Salamido, President and Chief Executive Officer, North Carolina Chamber of Commerce

Erika Samhoff, Surveillance Manager, NCDHHS

Adam Sholar, President and Chief Executive Officer, North Carolina Health Care Facilities Association

Scott Shone, Director, State Laboratory of Public Health, NCDHHS

Janet Sullivan, Senior Director, Diversity and Inclusion, NCDHHS

Colleen Tapen, Funding Lead, NCDHHS

Larkin Taylor-Parker, Staff Attorney, Disability Rights North Carolina

Jessie Tenenbaum, Chief Data Officer, NCDHHS

Betsey Tilson, State Health Director and the Chief Medical Officer, NCDHHS

Stacie Turpin Saunders, Local Health Director, Buncombe County, North Carolina

Michael Waldrum, Chief Executive Officer, Vidant Health

Roxie Wells, President, Cape Fear Valley Health

Melinda Wiggins, Executive Director, Student Action with Farmworkers, Duke Human Right's Center

Hope Williams, President, NC Independent Colleges and Universities

Walker Wilson, Assistant Secretary for Policy, NCDHHS

Charlene Wong, Chief Health Policy Officer, NCDHHS

Cornell Wright, Executive Director, Office of Minority Health, NCDHHS

Hayley Young, Data Office Director, NCDHHS

Tracy Zimmerman, Deputy Secretary for Policy and Communications, NCDHHS

Appendix F: End Notes

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