Baptism by Fire: How the COVID-19 Pandemic Advanced North Carolina's Health IT Capabilities

Tom Wroth

Faced with the COVID-19 pandemic and the imperative to address health equity, North Carolina strengthened its health information technology capabilities and rapidly evolved in areas such as telehealth. Gains were made in using data to address health disparities and using health IT platforms to address social determinants of health. Policymakers have the opportunity to leverage the learnings of 2020 to build a resilient, coordinated, and more flexible health IT infrastructure.

"The Pandemic Upended the Present, But It Has Given Us a Chance to Remake the Future [1]"

While North Carolina's health information technology (IT) infrastructure has been making strides in the right direction, the COVID-19 pandemic and the imperative to address health equity created significant opportunities for advancements. Prior to the pandemic, North Carolina was on the road to leveraging its systems to strengthen public health reporting and transition much of the health care system to value-based care.

The pandemic exposed a health care system that was not prepared for COVID-19 and a public health infrastructure that suffered from years of underinvestment. Like many states, North Carolina found itself working with disparate health care datasets as it tried to respond to the emerging pandemic. Almost overnight, there was a need to simultaneously monitor personal protective equipment (PPE), hospital capacity, COVID-19 testing, contact tracing, and most recently vaccine distribution.

But as historically marginalized populations accounted for a disproportionate share of COVID-19 cases and deaths, data needed further parsing by race, ethnicity, age, and zip code to even begin to address these disparities. The state's health care leadership responded with breathtaking speed and proficiency to cobble together disparate data sources into a format that allowed for strategic analysis and a data-driven approach to the pandemic. Looking into the future, what can we learn from the events of 2020 and 2021 and how can we leverage North Carolina's health IT assets for a better future?

Pre-pandemic, North Carolina Had Decent Population Health Tools

Over the last two decades, North Carolina has assembled many of the critical building blocks needed to improve population health, as illustrated here:

> A 4-year-old child enters foster care moving from Mecklenburg County to Watauga County. The pediatrician is able to look the child up in the North Carolina Immunization Registry and see that the child is behind on immunizations. The care manager on the team accesses a care management platform that incorporates Medicaid claims and sees that the child is prescribed two psychotropic medications from two prescribing psychiatrists who may not be coordinating care.

> A 42-year-old with diabetes and hypertension presents to the emergency department and the ER physician is able to access electronic health records (EHR) from a nearby competing hospital system and see a pattern of frequent ER visits for poor disease control. From the state-designated health information exchange (HIE)'s NC HealthConnex portal that aggregates clinical data across 6,500 facilities and 120 hospitals, the team further develops a clinical narrative in which the last HbA1c was 11.5%, and the last blood pressure noted was 170/110. The care manager on the team looks at the patient's medication claims profile and sees that he has not been filling his prescription for insulin. The care manager is able to refer the patient for housing and transportation supports through the NCCARE360 platform. The primary care provider receives an admission, discharge, transfer (ADT) alert from NC*Notify event notification service that morning indicating that the patient is back in the hospital.

Both of these patients are complex, and North Carolina's "as-is" health IT system enabled the health care team to defragment care through interoperability, clinical data registries, real time ADT notifications, and analytics that aggregate multiple sources of data to tee up clinical insights.

Electronically published May 3, 2021.

Address correspondence to Tom Wroth, Community Care of North Carolina, 1000 CentreGreen Way, Suite 300, Cary, NC 27513 (twroth@communitycarenc.org).

N C Med J. 2021;82(3):214-217.
0029-2559/2021/82315

During the COVID-19 Pandemic, Telehealth Became Routine Care

In response to rising COVID-19 cases and scarcity of personal protective equipment (PPE) in February of 2020, doctors' offices stopped seeing most patients face to face for routine acute, preventive, and chronic disease care. Elective procedures were put on hold, and the health care system rapidly adopted telehealth. By April of 2020, nearly half of Medicare visits were performed through telehealth, and overall, approximately 70% of visits were performed virtually [2]. There were reports of high satisfaction by both patients and providers [2]. The breadth of telehealth services expanded quickly, including everything from routine preventive care to addiction treatment. Obstetric providers redesigned prenatal care protocols into hybrids of face-to-face, virtual, and nurse visits. Specialty societies and provider support organizations rapidly disseminated information on telehealth implementation, choosing telehealth vendors, and telehealth coding and reimbursement. NC Medicaid swiftly implemented 135 service flexibilities across 482 service codes to increase access to care for Medicaid beneficiaries. The US Department of Health & Human Services Office of Civil Rights offered flexibility to providers and patients during the state of emergency by enabling the use of non-HIPAA-compliant platforms such as FaceTime or Skype, creating greater flexibility for patients and practices. Many practices adopted multiple virtual platforms to meet patients where they were. It was not uncommon to start a visit on one platform and switch to FaceTime or a telephonic visit because of connectivity issues or challenges in using a particular platform.

With this whirlwind of policy change and innovation, a decade's worth of telehealth evolution occurred during the spring of 2020. We must address important questions about telehealth regarding equity, quality, and cost. Telemedicine may exacerbate health care disparities for certain populations. The digital divide (access to technology, digital literacy, and access to broadband internet) disproportionately affects older people, racial/ethnic minorities, those with lower socioeconomic status, populations with limited English proficiency, and rural communities. There is evidence that health care utilization decreased disproportionately in these groups after telehealth implementation [3]. There is the need for updated clinical guidance on which conditions are appropriately treated via telehealth since there are limitations on performing a physical exam and obtaining labs. There is also evidence emerging that the convenience of telehealth leads to an increase in unnecessary visits, potentially offsetting the decreased overhead costs of telehealth [2]. Even with these concerns, telehealth is here to stay and there will be a rich trove of learnings that surface from our experience in 2020.

Population Health Tools are No Longer Just for Innovators

With increasing community spread of COVID-19 and concerns about the safety of clinical environments, there was a marked decrease in health care utilization. Visit rates dropped by 40–60% in some primary care settings and there was even evidence that patients were not accessing the health care system for emergent episodes such as acute myocardial infarction or stroke [4]. There was significant concern regarding decreases in childhood immunization rates, management of chronic disease such as diabetes, and addressing behavioral health issues such as substance use disorder and depression [5]. Once telehealth was implemented and supplies of PPE stabilized, there was a resurgence of practices using population health tools to identify patients with gaps in needed care. In our practice, we ran reports identifying patients with diabetes who were overdue for their HbA1c tests and referred them for chronic care management. The North Carolina Department of Health and Human Services (NCDHHS), North Carolina Area Health Education Centers (AHEC), and Community Care of North Carolina (CCNC) launched the Keeping Kids Well initiative [6]. Practice support staff from CCNC and AHEC worked with large pediatric providers to run lists of their children who were overdue for immunizations from CCNC's practice dashboard. Practices with care management staff queried their EHRs for Medicare patients with chronic conditions and referred them for chronic care management. CCNC and others began developing indicators for patients expected to be especially vulnerable to the risk of COVID-19 infection. Once the COVID-19 vaccine became available in limited supply, practices queried their EHRs for patients aged over 75 years or over 65 years with chronic conditions. While these activities occurred in response to the immediate crisis, it is clear that practices increased their capacity and skill sets in managing populations using the health IT tools at their disposal.

Addressing Social Determinants Became an Essential Component of Quality Care

The COVID-19 pandemic has had the dual impact of disproportionately affecting economically disadvantaged populations (e.g., racial/ethnic minorities, frontline workers) and furthering economic stress through job loss and economic slowdown. North Carolina has gotten in front of these challenges by deploying community health workers to support historically marginalized populations affected by COVID-19. As patients were diagnosed with COVID-19, providers were faced with recommending quarantine or isolation for up to 14 days. For some patients, going into quarantine or isolation led to financial instability, food insecurity, and housing issues. Health care providers responded by screening

patients for social determinants of health and matching them with resources and community-based organizations. The recently implemented NCCARE360 platform had its first large-scale test as part of the health care ecosystem and holds significant promise as a tool to refer and "close the loop" on referrals to community-based organizations. NCCARE360 includes a robust statewide resource directory, a call center with dedicated navigators, and a data team continually cataloging and verifying community resources [7].

Health Care Data Moved Toward Democratization and Stratifying Data by Race/Ethnicity, Age, and Geography Became Standard

North Carolina's health IT infrastructure has been on daily display through the NCDHHS COVID-19 dashboard. The state has led the way in creating visualizations of public health data that can be consumed by stakeholders to make decisions and create strategy. The dashboard has included visualizations of cases, deaths, hospitalizations, testing, and vaccination. Data elements can be stratified by county, zip code, race/ethnicity, age, and gender. With COVID-19 disproportionately affecting Black and Latinx communities, the dashboard displays race and ethnicity for cases and deaths and also displays vaccination rates based on race/ethnicity. State leadership continued to improve the dashboard over time in response to stakeholders' requests. The COVID-19 dashboards may provide a future model for how health care leaders display data in an accessible, transparent, and flexible way as they report health care data to the public and purchasers of health.

North Carolina's Health IT Infrastructure Has the Necessary Components for the Future

Emerging from the pandemic, one of the most promising platforms is NC HealthConnex, sponsored by the North Carolina Health Information Exchange Authority (NC HIEA). NC HealthConnex is now connected to more than 6,500 health care facilities including 120 hospitals, tracking more than 11 million unique patients, and houses more than 120 million continuity of care documents [8]. NC HealthConnex has deployed NC*Notify, which allows flexible push notifications of health care events such as admission to the hospital to connected providers. Through NC HealthConnex's tools, providers can benefit from clinical data not just from other providers in their system, but from all providers who see their patients across the care continuum. Community Care Physicians Network, North Carolina's largest network of independent primary care providers, must contend with 59 different EHRs among practices participating in its clinically integrated network. All value-based programs require data acquisition from EHRs, strategic analytics, and reporting to payers. NC HIEA is well positioned to be a critical partner in value-based care with North Carolina's transition to Medicaid managed care, Blue Cross Blue Shield of North Carolina's Blue Premiere ACO program, the Medicare Shared Savings Program, and the expansion of Medicare Advantage value-based programs. A primary care practice may be participating with five Medicaid prepaid health plans (PHPs) under value-based contracts while simultaneously participating in a Blue Premiere ACO and a Medicare ACO. That practice could potentially use data from NC HealthConnex to ensure the capture and reporting of clinical data for patients from all available providers in North Carolina. With continued development and adoption, NC HealthConnex could be part of the foundation that will sustain us through the next health care crisis.

Conclusion

The COVID-19 pandemic introduced acute awareness of the vulnerabilities in our health care system and inequities in health care. As with other historic events, there is hope that policymakers will seize the opportunity to build an infrastructure better able to withstand the next health care crisis and meet the needs of the most at risk and vulnerable. Instead of a bolus of funds during and after the pandemic, North Carolina needs to support a sustainable and reliable health IT infrastructure that can scale up efficiently during an emergency. Interoperability is not a "nice to have" feature but is rather the minimum necessary architecture for a strong health care system. Interoperability is needed both within the health care system (EHR to EHR) and between the health care system and public health (EHR or lab vendor to public health registry) [9]. Telehealth and other forms of digital health are useful tools that will advance health equity only if there is a narrowing of the digital divide. Platforms like NCCARE360 that enable providers in the trenches to address social determinants of health will be effective if the incremental workflow is sufficiently incentivized. More providers, more patients, and more community organizations are using North Carolina's population health tools. We owe it to thousands of North Carolinians affected by COVID-19 to seize this opportunity for the good of the public's health. NCMJ

Tom Wroth, MD, MPH president and CEO, Community Care of North Carolina, Cary, North Carolina.

Acknowledgments

Potential conflicts of interest. T.W. reports no conflicts of interest.

References

1. Zakaria F. The pandemic upended the present. But it's given us a chance to remake the future. WashingtonPost.com. https://www.washingtonpost.com/opinions/2020/10/06/fareed-zakaria-lessons-post-pandemic-world/. Published October 6, 2020. Accessed April 27, 2021.
2. Agrawal S, Gandhi T. Telehealth Should Be Expanded—If It Can Address Today's Health Care Challenges. Health Affairs Blog. https://www.healthaffairs.org/do/10.1377/hblog20200916.264569/full/. Published September 23, 2020. Accessed April 27, 2021.
3. Nouri S, Khoong EC, Lyles CR, Karliner L. Addressing equity in telemedicine for chronic disease management during the COVID-19 pandemic. NEJM Catal. May 4, 2020. doi: 10.1056/CAT.20.0123
4. Solomon MD, McNulty EJ, Rana JS, et al. The COVID-19 pandemic and the incidence of acute myocardial infarction. N Engl J Med. 2020;383(7):691-693. doi: 10.1056/NEJMc2015630
5. Santoli JM, Lindley MC, DeSilva MB, et al. Effects of the COVID-19

pandemic on routine pediatric vaccine ordering and administration — United States, 2020. MMWR Morb Mortal Wkly Rep. 2020;69(19):591–593. doi: http://dx.doi.org/10.15585/mmwr.mm6919e2
6. Community Care of North Carolina. Keeping Kids Well. CCNC website. https://www.communitycarenc.org/keeping-kids-well. Accessed February 10, 2021.
7. North Carolina Department of Health and Human Services. NC-CARE360. NCDHHS website. https://www.ncdhhs.gov/about/department-initiatives/healthy-opportunities/nccare360. Accessed February 10, 2021.
8. North Carolina Department of Health and Human Services. NC HIEA December 2020 Update. NCDHHS website. https://hiea.nc.gov/blog/2020/12/14/nc-hiea-december-2020-update. Accessed February 10, 2021.
9. Raths D. Pandemic Reveals Public Health Data Infrastructure Shortcomings. Health Care Innovation website. https://www.hcinnovationgroup.com/policy-value-based-care/public-health/article/21147049/pandemic-reveals-public-health-data-infrastructure-shortcomings. Published July 22, 2020. Accessed February 10, 2021.