




Community Confidence

A Decision Support Tool to
Help Community Leaders
During COVID-19 and Beyond



This project is supported by the North Carolina Policy Collaboratory at the University of North Carolina at Chapel Hill with funding from the North Carolina Coronavirus Relief Fund established and appropriated by the North Carolina General Assembly.

DHIT[™]

Digital Health Institute
for Transformation

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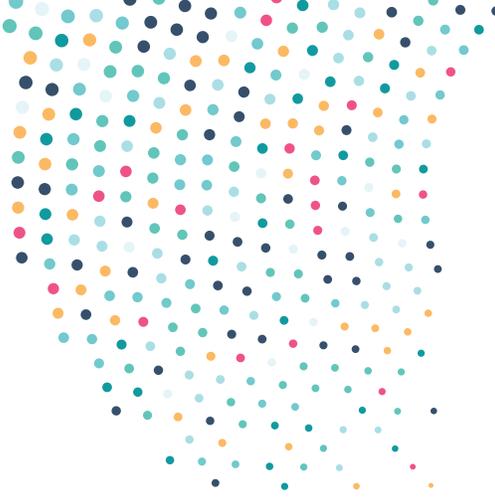
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Background

ABSTRACT

In the spring of 2020, the world went virtual, seemingly overnight. COVID-19 has created a worldwide crisis that has shaken our communities to the core. Beyond the dangers of the virus itself, its impact will ripple through our economy and healthcare system for years. The toll on human life cannot be overstated and should be acknowledged. However, the present crisis created an opportunity for our communities, government leaders, healthcare organizations and technology innovators to come together and create new solutions. Although there were many efforts underway to track and project the prevalence of COVID-19 cases and the respective capacity of the healthcare system to handle said prevalence, there was limited information, insights or tools that evaluate the appropriateness for communities and businesses to reopen with confidence. We have focused on building data sets, projections, and insights in order for our communities to actively “Flatten the Curve” to mitigate the risk of health catastrophe; however, we have very little insight on which communities and businesses should reopen, why they should reopen and how they should reopen. Considering each community and the businesses within are unique and

Communities and businesses could greatly benefit from a tool that could provide guidance on how they can actively mitigate the risk of COVID-19.

idiosyncratic, it was imperative that a “one-size-fits-all” approach not be applied. It was time to build and provide a solution that could aid communities in deploying a confident strategy to reopen without the fear of resurgence and with respect to local commercial nuances.

Pursuant to subdivision (23) of Section 3.3 of Session Law 2020-4 passed by the North Carolina General Assembly, Digital Health Institute for Transformation (DHIT) received \$917,360 in funding from the North Carolina Policy Collaboratory to research, validate, and build a simulation tool and recommendation engine to support community officials, whether private, public or governmental entities, with making the difficult decision to reopen their business and community and how to do so safely and with confidence. With stakeholder input, an agile design process, and advanced statistical methods, DHIT successfully built an application and statistical model to provide these recommendations and much-needed insights to 7 pilot counties.

DHIT thanks the North Carolina General Assembly and the North Carolina Policy Collaboratory for their vision and foresight in funding this initiative. DHIT also thanks the many stakeholders, both county-level, statewide and nationwide, who provided guidance and feedback to build this impactful application with confidence.

DHIT OVERVIEW

Digital Health Institute for Transformation (DHIT) is a North Carolina-based 501(c)(3) non-profit education and research institute supporting communities through the process of digital health transformation. We collaborate with leading academic institutions, associations, and industry to cultivate talent and ecosystems with our immersive learning

application, harnessing real-world experiences that drive the adoption of next-generation skills, capabilities and mindsets needed to foster the digital health leaders and innovators of the future, today.

Since its inception in 2017, DHIT has convened thought leaders and game-changers to further the digital health ecosystem by cultivating relationships, ideating and educating on the opportunities within digital health, and helping communities adopt the Smart Community Health model. The subject of this white paper, Community Confidence, is just **one** component of the infrastructure DHIT is helping communities to build. At DHIT, we define

the Smart Community Health System as the next generation of health and care which is open access, interoperable, and powered by secure data sharing and advanced analytics. Smart Community Health leverages a new generation of information technologies, such as the Internet of Things, big data, cloud computing, advanced biotech and artificial intelligence, as well as a new generation of community health workers called Health Architects to radically transform the traditional medical system and make healthcare more efficient, more convenient, more effective and more personalized. To learn more about this model, please visit our website at dhitglobal.org.



Market + Customer Research

MARKET SCAN OF SIMILAR TOOLS

As part of its landscape analysis, DHIT did a thorough market scan of similar COVID-19 dashboards. When conducting our scan, we analyzed the mission, similarities, differences and data sources for each dashboard.

This led us to identify our unique selling points (USPs) which helped us differentiate our application from the others:

- Our application takes into the account the sentiment/ opinions of those in the community
- Being able to roll up sub-indicator scores into an overall confidence score is unique to our application
- Specific recommendations are given for each county, rather than the whole state, region, or country
- Our scores are comprised of indicators from multiple indices, including behavioral, environmental, economic, community health, and capacity of care.

We also turned our market scan into a blog post on the Top 10 COVID-19 Dashboards which [can be viewed here](#).

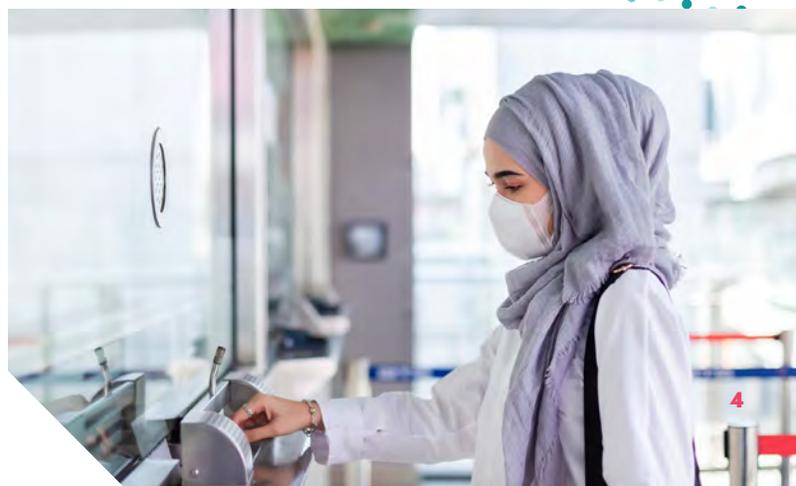
STAKEHOLDER RESEARCH

Immediately after the project began, DHIT sought relationships with key stakeholders at the state level— organizations and programs such as:

- NC Chamber (and NC Chamber Foundation)
- NC Commerce

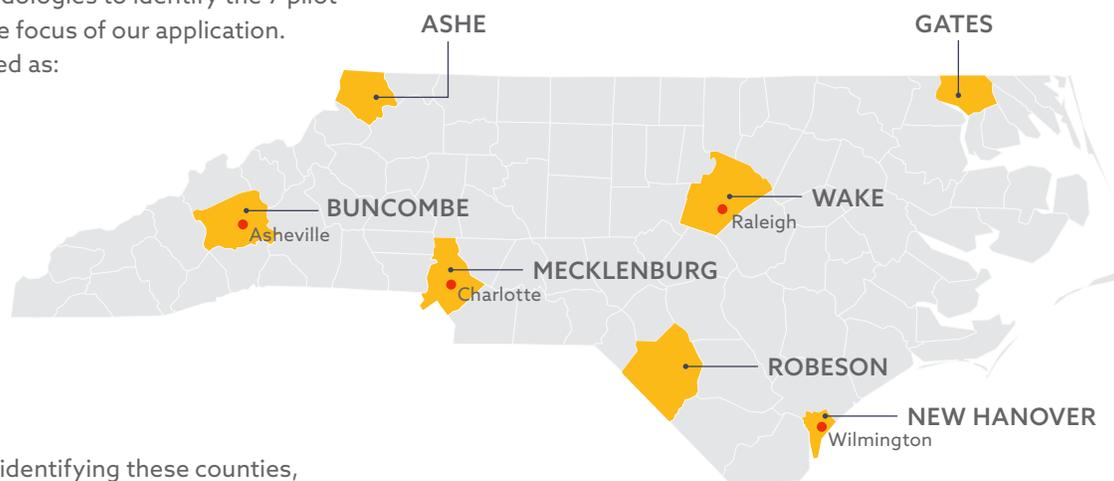
- NC Department of Health and Human Services
- NC Department of Information Technology
- NC Restaurant and Lodging Association
- ncIMPACT
- NCGrowth
- Kenan Institute of Private Enterprise
- Innovate Carolina
- UNC Department of City + Regional Planning
- UNC Institute for Convergent Science
- UNC Gillings School of Global Public Health
- Renaissance Computing Institute (RENCI)

We conducted discussions with these stakeholders to discover pain points, problem areas, gaps, and important county-level stakeholders to engage.



Next, the team explored methodologies to identify the 7 pilot counties that would become the focus of our application. The pilot counties were identified as:

- Ashe
- Buncombe
- Gates
- Mecklenburg
- New Hanover
- Robeson
- Wake



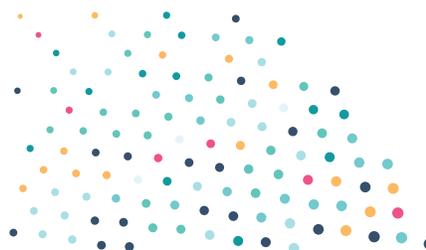
We considered many factors in identifying these counties, including:

- **Overall Health Outcomes:** When ranking all 100 counties, Wake County is #1 while Robeson is #100.
- **Geography:** Two counties in the West, three counties in the Piedmont, and two in the East.
- **Rurality:** Of the two Western counties, one is metropolitan and the other is rural. Of the two Eastern counties, one is metropolitan and the other is rural. Of the three Piedmont counties, two are metropolitan and one is rural.
- **Economic Distress:** One county is designated Tier 1. Two counties are designated Tier 2. Three counties are designated Tier 3.
- **Prosperity Zones:** Each county is taken from a separate Prosperity Zone.
- **Population Density:** Ranging from 63 per sq. mile to 2,013 per sq. mile.
- **Racial Diversity:** Gates County has a higher African American population than average (33.7%, compared to state average of 21.4%). Robeson County has a higher American Indian population than average (39.4%, compared to state average of 1.2%).

- **Age:** Ashe County has a higher than average population over age 65 (24%, compared to state average of 16.3%).
- **Education Level:** Wake County has a higher than average population who have completed college (51.8%, compared to state average of 30.5%). Robeson County has a lower than average population who have completed college (13.2%, compared to state average of 30.5%).
- **COVID-19 Cases:** By June 2020, Mecklenburg County had the highest number of confirmed COVID-19 cases (5,606) and recoveries (3,644).

To gather county-level feedback, the team conducted discovery of county-level stakeholders across the 7 pilot counties and deployed a survey to over 100 of those county-level stakeholders in North Carolina—county administrators, legislators, public health directors, mayors, and more—to identify their challenges regarding COVID-19 and the types of information that would be helpful to make decisions for their communities to mitigate the disease’s spread while still operating businesses, schools, etc. Of the 24 responses, all 7 pilot counties were represented and in addition to anticipated health challenges (such as capacity of care and PPE shortages), respondents identified a need to respond to behavioral and economic challenges—enforcement of mask-wearing, social distancing, handwashing, school reopening models, travel/tourism interruption, business closures, and lack of transportation for essential workers. Data sources for many of these indicators were identified and put into the data model for the application, as described in sections below.

The 7 pilot counties were carefully selected to represent the challenges that counties across North Carolina face.



UX/UI DESIGN PROCESS

The DHIT team took an iterative, agile, human-centered design approach to developing the Community Confidence application’s user interface to ensure it was easy to use, intuitive to navigate, and delivered value with each interaction.

Using Design Thinking methodology, we embedded the user at the center of the design process using tools such as:

- **Empathy Mapping:** a visual representation of what the end user says, feels, and does
- **Persona Development:** used to identify common user archetypes and needs
- **Analogous Thinking:** process of adapting a new system using known design elements
- **User Journey Mapping:** a visual representation of the user’s experience, from problem to solution and beyond

Our user experience design process is an iterative, agile methodology that involves key stakeholders and end users throughout the process which helps us continuously improve and refine designs in accordance with user feedback. This involves going through different stages repeatedly while evaluating designs with key stakeholders at each stage, which allows us to create designs that are clean, simple, intuitive, flexible, user friendly and engaging.

Our 4D process included the following stages:



DISCOVER

In-depth understanding of project goals and desired outcomes

Deep-dive into unmet needs of the user and “jobs to be done” using ethnographic research techniques (contextual interviews using observation of users in their real environment)

Research into latest UX/UI design trends and principles and competitor analysis



DEFINE

Development of empathy maps and end user personas

Defined use cases/user stories and user journeys (storyboarding and wireframing)

Created a framework of design principles for the project (UX guidelines)

Defined technical requirements and key functionality impacting design and user experience



DESIGN

Designed UI images

Developed brand assets for development team, including fonts/typography, iconography, color palette, imagery

Created rapid prototypes for user testing and iteration

Finalized theme, specs, and guidelines required for implementation



DEVELOP

Provided graphic assets and collaborated with development team through agile development sprints

Performed usability tests, created audit reports, identified improvements

Developed roadmap for future releases, with additional features and functionality

The UX/UI design process fed into development of the prototype in September 2020. After creating the prototype, the team deployed another survey to the same group of county-level stakeholders.

- 66% of respondents indicated that the application was either “easy” or “very easy to understand.”
- 11% of respondents indicated they would use the application daily upon launch (50% weekly, 27.8% monthly, and 11% never).

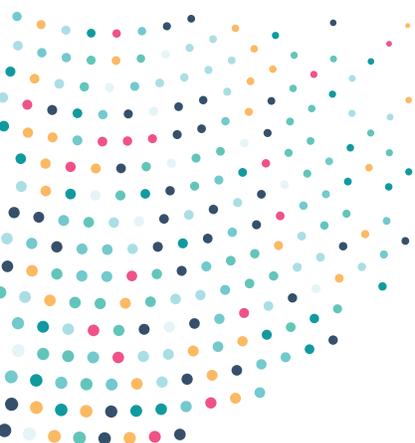
From those who did not complete the survey, anecdotal responses were extremely positive. The team took the insights into consideration as they built the beta for launch in December.

Through a social media campaign to county officials, DHIT enrolled 90 beta testers. The December beta release was sent to this group for feedback beyond the grant period. In 2021, DHIT will continue to refine and improve its application with beta tester, community, and stakeholder input.



Data Science + Application Development

Using the lessons learned from existing COVID-19 dashboards and stakeholder input early in the project, the DHIT Team conducted discovery of multiple data sources across behavioral, environmental, economic, health, and capacity of care. Below is a summary of data sources feeding the application:



DATA SOURCES	WHY?
Wunderground	Wunderground is a comprehensive historic weather data repository that reports on over 250,000+ personal weather stations and commercial weather stations in the USA. We obtain the highest quality temperature, dew point, humidity, and wind gust data by the hour per county
ClimaCell	ClimaCell is one of the most reputable weather APIs, used by Google, Amazon, and Facebook.
Johns Hopkins	Johns Hopkins is the most cited, referenced, and utilized source for COVID case information. The JH API offers a reliable and accessible API to source COVID cases and death data
NC-DHHS	The Department of Health and Human Services is responsible for housing and providing capacity, covid cases, comorbidities, and testing data for all health systems in the USA. DHHS currently is the only source which stores this data other than individual health systems
Keystone Strategy	Data estimates the effectiveness of NPIs as a guide to policymakers, and to aid firms in developing strategic responses, respectively.
RT.live	The most widely used source for calculating growth infection rates
US Census Bureau	The only source which supplies US County demographic data
County Health Rankings	Provides community health data and some socioeconomic data per county (sources from US Census Bureau)
Broadband Now	Provides percentage of people who have access to internet per county
NC State Board of Elections	Voter registration data per county
New York Times Data	Provides COVID-19 Case data and some survey data such as Mask wearing in July per county
NC Commerce	Economic data per county in NC
MIT	Supplies Customer risk when entering establishments per industry. Based on study by MIT in collab with Cyprus University
Visual Capitalist	Sole provider of Employee risk per industry.
NCBI	Repository of Scientific Journals about coronavirus. Used to replicate, validate our methods, and incorporate the rigorous work of other research groups
ChoiceFlows	Investigates community opinion on economic policies, NPIs and coronavirus using the accurate and tried/tested discrete choice experiment approach. The DCE was catered specifically to DHIT's mission using ChoiceFlow's resources along with our qualified staff of data scientists and statisticians
National Center for Education Statistics	Socioeconomic data per county
SafeGraph	Provides the most granular (by county, by industry) and high quality mobility data available, making SafeGraph the most widely used and gold standard data source for social distancing and mobility.



It was imperative to provide suggestions that were agreeable to North Carolinians.

DISCRETE CHOICE EXPERIMENT

A key element of DHIT’s approach to the Community Confidence project has been the inclusion of public opinion, perception and understanding. To accomplish this, DHIT worked closely with the decision science and behavioral economics experts at Choiceflows. The combination of a strategic, customized survey (the Discrete Choice Experiment), data analysis, and appropriate modeling framework has allowed the Community Confidence Application to display both current and projected community reaction. Our impetus and approach to this problem is described below.

Local government agencies are confronted with challenging decisions regarding what actions to take in managing through the pandemic. To inform these decisions, we sought to understand the preferences of North Carolina residents. Using a Discrete Choice Experiment, we examined the tradeoffs that 3,000 North Carolina households were willing to make to change the rate of COVID-19 spread. Discrete Choice Experiments are commonly used tools to understand public opinion and preference, and have a long history of use.¹

¹ Louviere, Hensher and Swait, Stated Choice Methods: Analysis and Applications, Cambridge University Press, 2000

The choices that respondents faced asked them to indicate their most and least preferred scenarios from sets of options that varied from the number of COVID-19 positive cases, deaths, the degree to which schools, restaurants, and houses of worship are allowed to be open, whether non-essential retail business were open and whether factories and office buildings were open, whether bars were open, whether gatherings of over fifty people were allowed and whether facemasks were required. Over the course of the systematic questioning, we were able to understand the drivers that make people feel comfortable/confident in this pandemic.

In particular we found that respondents, as expected, generally dislike policy options that may result in higher levels of positive COVID-19 cases and deaths. Further, respondents:

- Prefer in-person school instruction and dining but at less than fully open levels
- Prefer houses of worship to operate at less than full capacity
- Prefer non-essential retail and factories/office buildings to be open
- Prefer bars to be closed
- Prefer large gatherings be banned
- Prefer face masks to be required

Formalizing these results through data analysis and modeling, we were able to integrate these results in a general manner within our Community Confidence application. The result is that when evaluating a county’s current conditions or a potential future state, we are able to assign a Confidence score based on how well that scenario is perceived by North Carolinians, based on our Discrete Choice Experiment approach.

DATA ANALYSIS + MODELING

In addition to our use of the Discrete Choice Experiment approach, our team conducted a number of analyses and developed several key model components to support the project. Key analyses included the evaluation of multiple disease dynamics and transmission approaches, the analysis of foot traffic data for use in understanding community movement and visitation trends over time, and a broad review of published scientific findings and expert opinions on how various interventions and behaviors impact COVID-19 disease transmission.

The results of our methodological work, including the Discrete Choice Experiment, allow our application to assign a Confidence score to scenarios based on key COVID-19 metrics (e.g. case counts and deaths per 100,000 residents) as well as economic drivers (e.g. amount of activity in restaurants, offices and factories). The Confidence score is essentially a relative ranking of how preferable a particular scenario is when compared to the “ideal” state, which would include zero COVID cases and deaths while bars, restaurants, large gatherings, houses of worship etc. are operating normally (at pre-pandemic levels).

This means that our methodology is able to produce a Confidence score for any such community scenario, either current, past or hypothetical. Therefore, in order to apply a simulation method to produce answers to “what if” questions, we applied the published impact values to understand how a policy change, such as the closure of bars and restaurants, will impact the spread of COVID. In that manner we allow theoretical policy and behavioral changes to impact the spread of COVID.

In addition, to consider future scenarios, we developed a statistical model specifically to predict COVID case counts given the most current data on reported cases. Therefore, simulated scenarios that consider a community four weeks ahead on our application leverage a model flow that works as follows:

- 1 For a given county, use the statistical COVID case count model to predict the number of cases in four weeks under the current disease transmission rate, with no policy or behavior changes. Apply the rate of increase/decrease in case counts to the COVID death rate as well.
- 2 Discount or increase the projected COVID cases and deaths based on our assumed impacts, as described above, which result from published scientific findings and opinion.
- 3 Evaluate the economic and behavioral elements of the potential scenario (e.g. whether bars would be opened or closed or whether citizens would be increasing their use of masks in public).
- 4 The resulting “scenario” (the combination of COVID cases, deaths and the economic and behavioral elements) is then evaluated using the Discrete Choice Experiment model and a resulting Confidence score is produced.



We note that for each update of the CC application with the most up-to-date data, we explore dozens of potential interventions for each county, select those which most improve future Confidence, and present these to the user as Recommendations. We then simulate all possible combinations of the presented Recommendations, which allow the user to consider multiple interventions at a time.

The data sources leveraged include COVID data from the NC Department of Health and Human Services, Johns Hopkins’ COVID data, the NC Department of Labor, publicly available weather data, and human mobility data, which is described below. These data sources are updated within the DHIT database as frequently as the provider enables and our algorithms are flexible enough to update the Community Confidence application and scores when most, but not necessarily all, source data has been provided to DHIT.

A final note regarding the data used to track community activities: DHIT leverages cell-phone mobility data from SafeGraph, who collects and manages comprehensive data of this type. Using this data, for each county we are able to track visitation (activity) at bars, restaurants, office buildings, factories and other entertainment venues in order to evaluate actual community behavior trends. These data have proven extremely valuable in informing a number of elements of the application and our confidence algorithm.

COMMUNITY CONFIDENCE APPLICATION

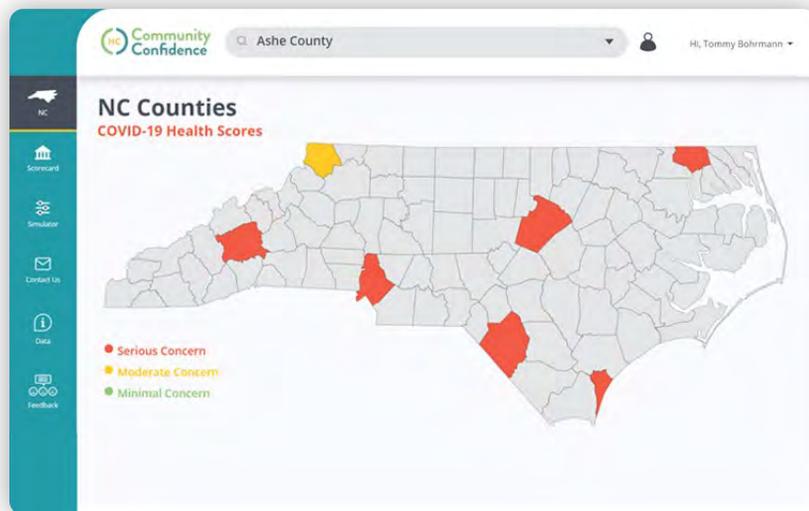
The Community Confidence Application, launched in December 2020 as a result of the activities in the sections above, is a decision support tool for Government and Business leaders to use when making important decisions that will impact their communities during the pandemic or other significant health challenges.

Our application combines actionable scientific data with community preferences to enable informed decision making that will restore confidence.

The application is comprised of a main landing page, a county scorecard, and a simulator.

MAIN LANDING PAGE

The main landing page is accessible by all and provides a map of COVID-19 Health Scores for selected North Carolina counties. The map indicates the level of concern for each county based on key COVID-19 health metrics that include the number of reported cases, the number of hospitalizations, available hospital capacity, and more. In addition to Health Scores, the application also conveys a Confidence Score, which quantifies the priorities and concerns among North Carolinians related to the COVID-19 Pandemic.

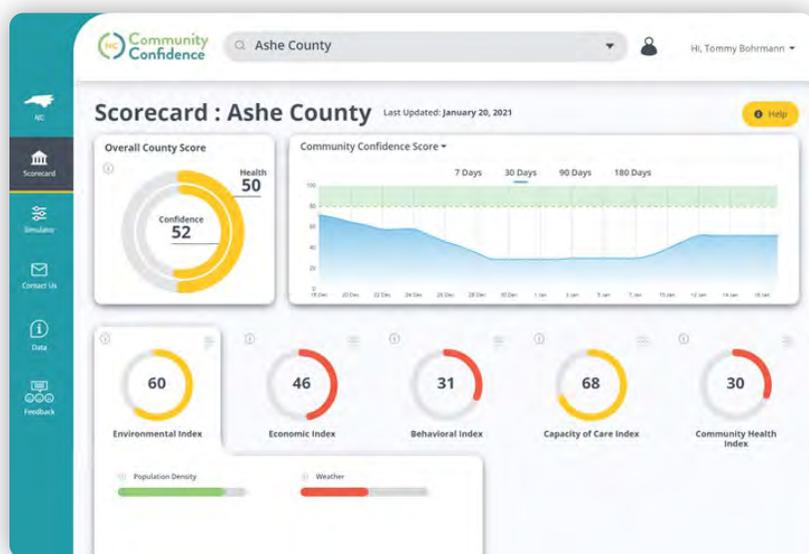


COUNTY SCORECARD

The county-specific scorecard helps users better understand the current health and economic drivers for each included county and consists of both a Health Score and a Confidence Score:

The **Health Score** is an index summarizing a number of key metrics relevant to the COVID-19 Pandemic, from 1-100, with low values indicating concern and high numbers indicating that the Pandemic is relatively well-controlled.

The **Confidence Score** describes how comfortable North Carolinians are of the current Health and Economic situation. For example, when businesses such as restaurants are functioning responsibly and people are productively working in office spaces all while COVID-19 Health indicators suggest the Pandemic is well managed, the Confidence Score will be high. The score is based on surveys of North Carolinians designed specifically to understand and quantify their preferences regarding Pandemic-related tradeoffs.



SIMULATOR

A county-specific Simulator enables the exploration of how various recommended interventions can improve the health and confidence for each county.

The simulator is comprised of a “Do Nothing” score and a “Take Action” score:

The “Do Nothing” score indicates where your Health and Confidence scores are projected to be in 4 weeks’ time given the current economic and county behavior norms and the trajectory of the Pandemic in a given County.

The “Take Action” score contrasts “Doing Nothing” with the potential, simulated impact of various recommendations, which our analytics have already pin-pointed as potentially beneficial to a county’s Confidence score.



Content + Promotion

SOCIAL MEDIA CAMPAIGN

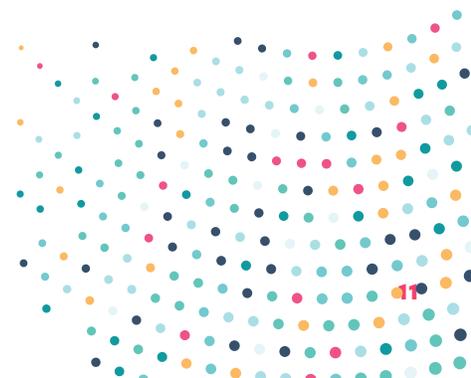
In order to generate awareness about the application among our target audience and build up a database of beta testers for usability and quality assurance testing, we created two digital campaigns:

LinkedIn conversation ads: This channel and approach allowed us to reach potential beta testers and users via LinkedIn messages in a highly targeted and effective way. This ad type facilitated an automated one-to-one conversation that guided each individual through the sign-up process. Using standard AB testing methodology we were able to optimize our campaign messaging, creative and targeting and achieve some outstanding results.

Our government lead generation campaign achieved 43,196 impressions, 3,454 clicks, and a top CTR (click-through rate) of 55.65% (most campaigns of this nature have CTRs in single digits). Overall, the campaign resulted in more than 130 signups.

Facebook ads and boosted posts: Our Facebook campaign goal was to generate website traffic and increase the number of followers on our Facebook page in order to build up an audience profile of interested prospects. Our campaign was a combination of targeted ads and boosted posts, and achieved more than 157,000 impressions, more than 2,000 post engagements, and more than 500 page likes.

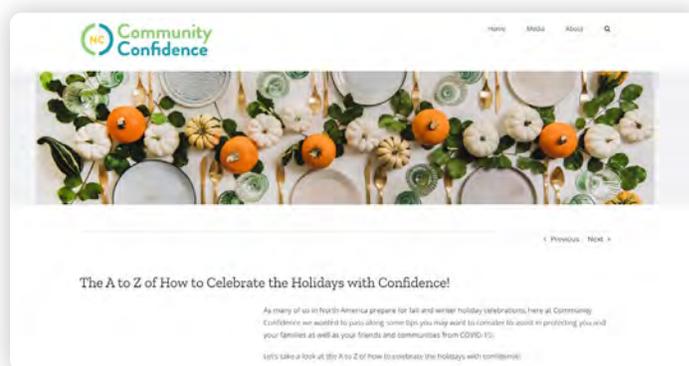
Additionally, our campaign website communityconfidence.org has received more than 1,500 unique visitors since launching in August 2020, with more than 4,500 page views. Of particular note is our Bounce Rate of just 14.12%, compared to the industry average of more than 50% (the lower the number the better), providing further proof that we were highly successful in targeting and engaging our desired audience.



BLOG SERIES

A 10-post blog series was created to educate the community on various pandemic-related topics and then shared on the Community Confidence website and social media:

- 8 Things to Consider When Reopening Your Community
- COVID Mythbusters: Exploring 10 Common Myths
- Reducing Customer Anxiety While Dining Out
- Voting During a Pandemic in North Carolina: 8 Things You Need to Know to Vote with Confidence
- On to Phase 3 in NC – What’s New and What’s the Same?
- Some Do’s and Don’ts When Traveling During the COVID-19 Pandemic
- The A to Z of How to Celebrate the Holidays with Confidence!
- 9 Things You Can Do to Be Safer at the Gym
- 5 Things to Know About the Pfizer-BioNTech Vaccine
- Top 10 COVID-19 Dashboards



PROMOTIONAL VIDEO

In order to engage our key target audience (government and county officials) and raise general awareness about the application, we engaged a local documentary filmmaker to produce a short promotional video that we could use in marketing and outreach. The video included interviews with key stakeholders including:

- Jeff Warren, Executive Director, North Carolina Policy Collaboratory
- Michelle Bolas, Associate Vice Chancellor for Innovation Strategy & Programs at University of North Carolina at Chapel Hill
- Mark Lawson, Vice President, Economic Development at Cary Chamber of Commerce
- Dr. Todd Telemeco, Dean at the College of Health Sciences, UNC Pembroke

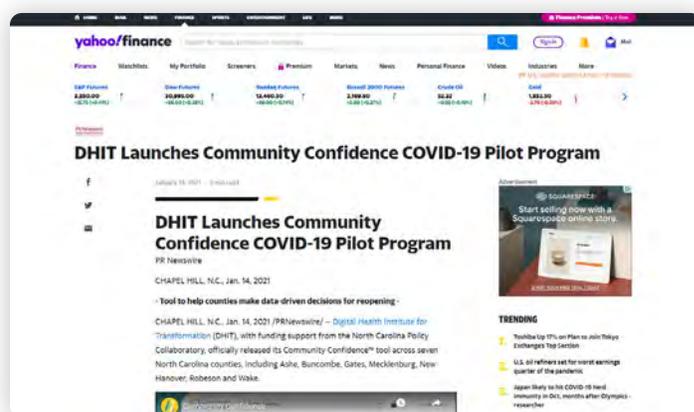
The video is currently being used in our LinkedIn campaign, Community Confidence website, and fundraising activities.



PRESS RELEASES + NEWS COVERAGE

We engaged local PR agency Clairemont Communications to support our media outreach to local, regional and national publications. This resulted in significant news coverage, including interview spots for DHIT CEO Michael Levy on CBS17, WECT News, and articles featured in WRAL Techwire and FedTech Magazine. We also issued press releases, which were picked up by 106 media outlets around the state, country, and world. Global outlets like Yahoo Finance, Cision, and Morningstar picked up the story, as well as media outlets in Canada and Germany. The potential audience was over 96 million people.

Our media relations activity is ongoing and we anticipate doing another burst once we have gathered use cases and testimonials.



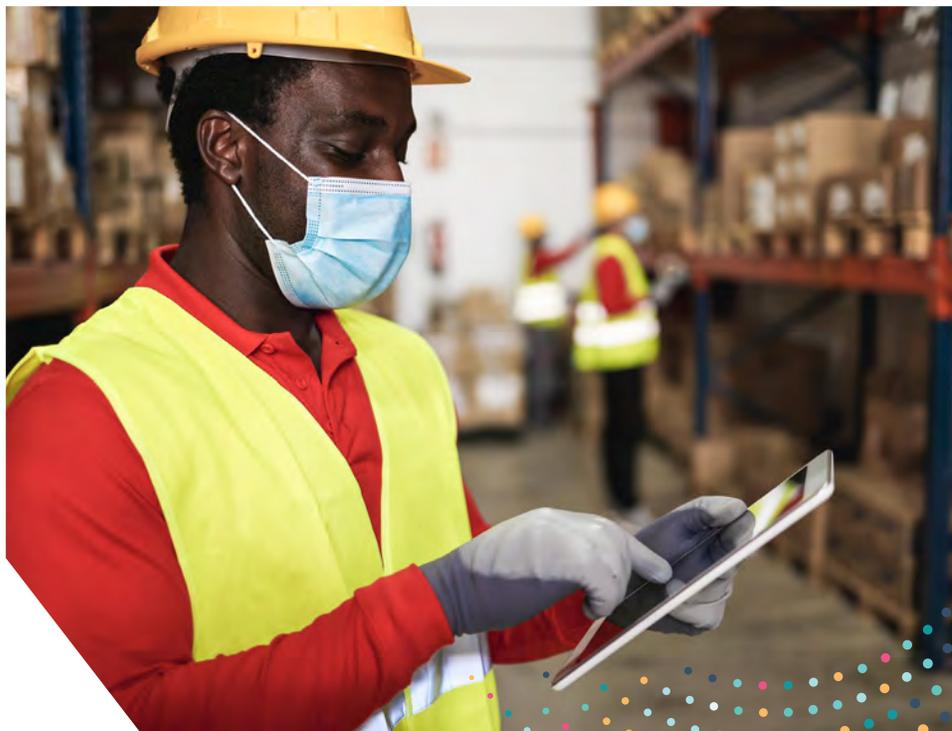
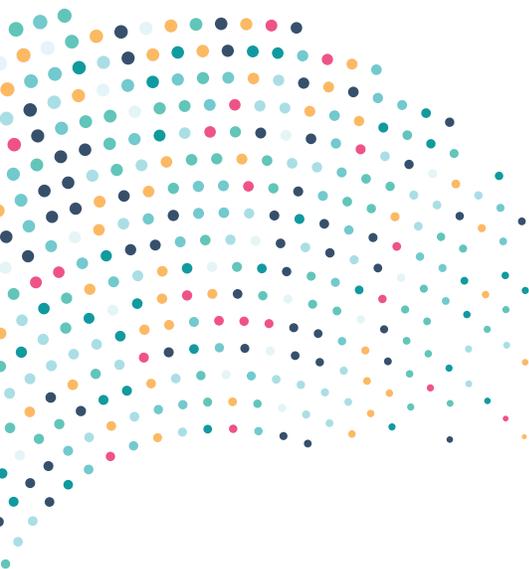
What's Next?

Community Confidence is more than a standalone program—it's a building block for the analytics application of a Smart Health Community and a treasure trove for health research and community insights. DHIT invites all types of organizations to connect with us and partner on different applications of this platform. Some ideas include:

- Predictive modeling and scenario planning
- City and regional planning
- Comparing and contrasting community preferences established through the discrete choice experiment
- Evaluating and stimulating community health needs (access to care, personal protective equipment, transportation, etc)
- Submitting additional data to enhance the model and create new applications

Community Confidence has much to offer beyond county decisionmakers. We see low-hanging fruit for many more stakeholders to take advantage of this rich data application with a few tweaks, including:

- Researchers
- Health systems
- Local and large businesses
- Schools



SUSTAINABILITY

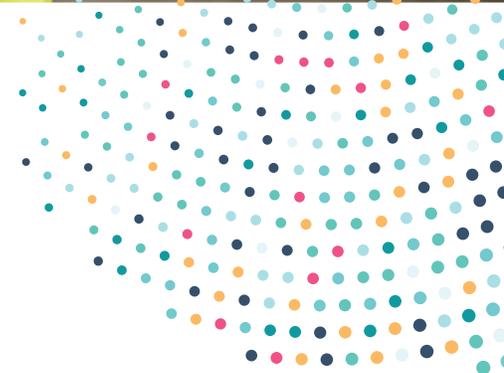
The grant provided through the North Carolina Policy Collaboratory was instrumental in taking this application from ideation to actualization. However, this grant ended on December 30th, 2020 and DHIT requires additional funding to maintain the service and to expand the application beyond the 7 pilot counties. There is tremendous value in adding all 100 counties of North Carolina (and other states) to stratify risk, compare community preferences, and plan for the future. Towards this goal, DHIT is launching a campaign in January 2021 through grants, donations and corporate sponsorships to fund the expansion across the state of North Carolina and beyond.

If sufficient external funding does not materialize through the campaign, DHIT will employ a subscription model to expand the application. On average, expanding to cover an additional state costs approximately \$750,000. A lot of the ground work has already been completed for scaling to the rest of North Carolina, which would cost DHIT \$12,000 per year per county (including expansion and maintenance).

In the absence of any continued funding, the application will continue to be provided free-of-charge in its current state (with only 7 pilot counties) until December 31st, 2021.

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ROADMAP

For many organizations, the COVID-19 pandemic was a wake-up call. For organizations like DHIT, it was validation of the importance of digital health talent, tools and technologies that we have been promoting since our inception in 2017. In the wake of its devastation and impact, the time is NOW to change the way we look at health, provide healthcare, and care for our communities. A recent study found that on average, countries with the best healthcare outcomes spent more than double the money on social infrastructure than healthcare services (2.5:1). On average, this ratio for the United States is 1:1. For Smart Health Communities of the future, we need a next-generation social innovation application. So where do we start? Here are the steps we see to make this a reality:

BUILDING THE INFRASTRUCTURE

10 Steps to Smart Community Health



Community Confidence

A scorecard and decision support tool

Problem – It’s challenging for community leaders and decision makers to acquire the data they need to make informed decisions that will positively impact their community.

Solution – A county-level scorecard that delivers transparent, accurate, timely and actionable insights on the current and future wellbeing of the community across health, economic, environmental, and behavioral factors.

Value – Allows community leaders to make informed, evidence-based decisions for population health management that take into account community health status and sentiment.



3DBioMe

A community and individual simulator of health with 3D avatar

Problem – Patients are often treated by a reactive “sick care” system and lack personalized, actionable information to make proactive, healthy decisions.

Solution – An interactive 3D avatar powered by machine learning that provides a visual representation of current and future health status across communities and individuals and simulates the impact of public and personalized health interventions over time.

Value – Motivates individuals towards healthier behaviors by presenting cause and effect of current vs future health choices and interventions in an engaging format.



Health Architects

Professional resource to engage communities and assess needs

Problem – Although social workers and community health workers have recently been employed in healthcare services, their training does not include the use of digital health tools that take into account the full range of health determinants, beyond social and clinical drivers.

Solution – A new generation of specially trained healthcare professionals who engage individuals in health conversations and collect social, environmental, behavioral and genomic determinants of health data to create a blueprint for better health focused on disease prevention and management.

Value – Unlike conventional health coaches or care navigators, Health Architects represent a new model of personalized health that leverages machine learning to understand unmet needs and generate personalized recommendations while re-humanizing the healthcare experience to engage, motivate and inspire individuals towards better health decision making.



Health Utility Grid

Community infrastructure to support digital transformation

Problem – Data is disparate and not democratized. Users often require specialized training to know which data sources to pull, how to analyze them, and which indicators are most meaningful.

Solution – A Community Cloud “HUG” infrastructure that enables individuals and organizations to leverage the ecosystem of connected data for the community’s best interest, including clinical research and service design and delivery.

Value – Provides critical infrastructure to ensure all parties have the intelligence they need to make informed decisions for public health initiatives, service planning, etc. based on current and future community health needs.



Monitoring + Risk Stratification

Focusing on prevention first

Problem – The World Health Organization estimates that only 10% of an individual’s health status is attributed to health services, but the current system continues to focus on this 10% rather than the 90%, including social, environmental and behavioral factors which would optimize whole life health at an individual and community level.

Solution – Supported by AI-driven digital assistants, Health Architects will be able to track and analyze personal health history across diet, exercise, mind, sleep and other clinical, social, environmental, behavioral and genomic determinants of health to understand individual risk factors and provide support to patients and care providers for a wide variety of conditions and diseases.

Value – Aligning resources and preventative strategies and interventions to the greatest need will deliver immediate public health and economic benefits.



Clinical System Integration

Creating a complete health record

Problem – Regional/statewide Health Information Exchanges (HIEs) are often incomplete due to being regional. And while they do provide community health information to county and state-level decision makers, this data is often not incorporated at the point of care. There is no national HIE in the US.

Solution – Connect the HUG to Electronic Health Records across clinical specialties with two-way data exchange to create longitudinal health records regardless of location or provider.

Value – Transforms the capabilities of healthcare and life sciences enterprises to manage population health and conduct clinical research; empowers a collaborative model of care across community health providers to advance community health, care and well-being.



Data Democratization

Aligning incentives and motivations

Problem – The commercialization of personal data has historically been out of the control of the individuals and communities where the data originates.

Solution – Through the Health Utility Grid and powered by blockchain technology, individuals and communities will have the ability to control, share and sell their data with confidence.

Value – Incentivizes individuals and communities to fuel their Community HUG with more data over time because of the rising value of their data driving both health and economic benefits.



Living Learning Lab

Driving innovation and solution validation

Problem – Digital health innovations are popping up around the world, but we are lacking an efficient mechanism or framework for testing and validating potential solutions in a real-world context.

Solution – Leverage a standardized and facilitated Innovation Framework to test, validate, and evaluate new solutions according to individual and community needs.

Value – Accelerates product/user fit by building solutions against validated need and testing across an extended “Living Learning Lab” to minimize risk and maximize impact.



Global Solutions Marketplace

Matching global supply with local demand

Problem – There are 318,000 digital health apps, making it difficult for any one person to find the best match. There is an absence of concrete outcomes data to show which solutions are effective for which people in which use case.

Solution – Developing a digital health marketplace that sources, validates, and matches a global supply chain of products and solutions to service local health needs.

Value – Ensures accurate matching of supply to demand and provides equal access to global advancements in care.



Individualized Health Benefits

Solving for the person, not the disease

Problem – Health benefits packages are provided through employers and health insurance exchanges. Unlike any other form of insurance in the US, they are “one size fits all” packages that do not take into account individual needs, preferences and behaviors.

Solution – Individuals will be able to access the Smart Community Health Plan to build personalized systems of care and coverage.

Value – Enables individuals and community members to access a global supply of resources and solutions to design their own benefits package based on their individual determinants of health.



Partners, Advisory Panel + Team

PARTNERS

This initiative is a collaboration between the [Digital Health Institute for Transformation \(DHIT\)](#), the [Institute for Convergent Sciences](#) and [Innovate Carolina](#) at the University of North Carolina, Chapel Hill. This project is being funded by the [North Carolina Policy Collaboratory](#) as part of the 2020 COVID-19 Recovery Act.

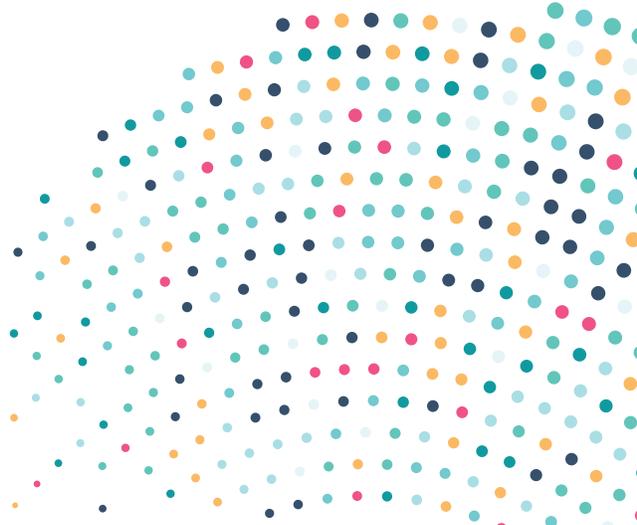


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DHIT Community, we invite you to contact us to change the world together and build the tools, best practices, infrastructure, and standards of excellence for Smart Communities. Contact us at info@dhitglobal.org for more information.



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