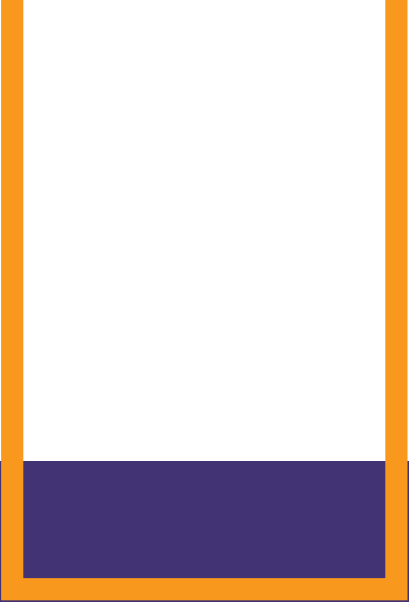




HEALTH EQUITY

DATA ANALYTICS

 Report prepared for the Connecticut
Office of Health Strategy

JUNE 2019



DataHaven
The Twenty Fifth Year

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Executive Summary

Health Equity Solutions was contracted by the Connecticut Office of Health Strategy to conduct this Health Equity Data Analytics Project (HEDA) in order to identify two to four key health equity data elements for incorporation in the data architecture of the forthcoming statewide Health Information Exchange (HIE), an electronic system that gives health care providers from different settings the ability to share health-related information in order to improve the quality of care. The team, comprised of members from Health Equity Solutions, DataHaven and the Yale Equity Research Innovation Center (ERIC), completed a three-phase project over the course of ten months, resulting in the following findings:

- ❑ **Advancing health equity is an emerging issue for most existing HIEs in the country**, and these organizations are still in the early stages of developing and optimizing approaches to exchanging and enhancing social determinants of health (SDoH) data.
- ❑ Many Connecticut health care providers are collecting data related to health equity and SDoH. However, **there is wide variation in what information is being collected and its current level of utilization.**
- ❑ Ensuring that Connecticut's HIE has the ability to exchange, update, and provide analytics associated with **SDoH data is a value-add to many health care providers** in the state as it affords an opportunity to improve health outcomes.
- ❑ Based on research, current and widely available data, and electronic health record (EHR) capabilities, the **HEDA team identified race and ethnicity, geocoded residential address, and insurance status as the key data elements** critical to developing a knowledge infrastructure for improving individual health and well-being.
- ❑ **Health equity data should be a consideration in all future HIE use cases** rather than siloed as a separate use case.
- ❑ Once key health equity data elements are successfully incorporated into the architecture and uses of the HIE, the **system can be expanded to include increasingly more relevant SDoH data from various sources.**



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INTRODUCTION

HEDA Project Background and Role of HIEs in Promoting Health Equity

Health Equity Data Analytics (HEDA) Project Background

Improving health and well-being in Connecticut requires addressing the state's significant health and health care disparities—avoidable differences in both the burden of illness, disability, and mortality, and the population's access to quality, affordable health care—that break down along the lines of age, gender, race/ethnicity, geography, socioeconomic status, and other dimensions.

At the root of these disparities are health inequities and social contexts—the social determinants of health (SDoH) that historically and currently have prevented people of all backgrounds from achieving their full health potential. For example, higher rates of obesity and diabetes among some populations of adults and children have been linked to experiences of hunger and food insecurity. These health inequities overlap with unaffordable housing, poverty, and high health care or medical costs, as well as broader contextual factors such as employment and housing discrimination, and neighborhood disinvestment, leading to food deserts and other forms of environmental stress that prevent access to healthy food. Obesity and diabetes are relatively common conditions in the general population, particularly among older adults, so concerns also lie within the potential differences in quality of care and management of these diseases.

Public and private organizations throughout Connecticut have conducted extensive research and reported on these disparities, and health equity has emerged as a priority within the Connecticut State Innovation Model (including its proposal for Health Enhancement Communities, and other initiatives)¹, the Connecticut Department of Public Health's State Health Improvement Plan,² and other statewide health initiatives. Health equity is also a priority for the state's new health information exchange (HIE).

Project Rationale & Literature Review Findings

Project Rationale

The funders and supporters of this project, notably the Connecticut Office of Health Strategy and the Connecticut Health Foundation, recognize the need for timely, accurate data to drive improvements within the health care system. The goal is for the state's forthcoming HIE to create a system in which health care providers can obtain a comprehensive picture of their patients, potentially leading to better health care and fewer unnecessary tests, while also creating opportunities to improve population health and reduce racial, ethnic, and gender health inequities.

There is widespread agreement among a broad array of stakeholders - from patients, providers, and policymakers - that the state must address health equity concerns within the design of any new health information and HIE infrastructure. While not without its challenges, incorporating high-quality data that relates to health equity and SDoH within the HIE is a crucial first step—one that will require moving beyond the aggregation and use of standard health care data on patient experiences, to considering the integration and use of a much wider variety of contextual factors.

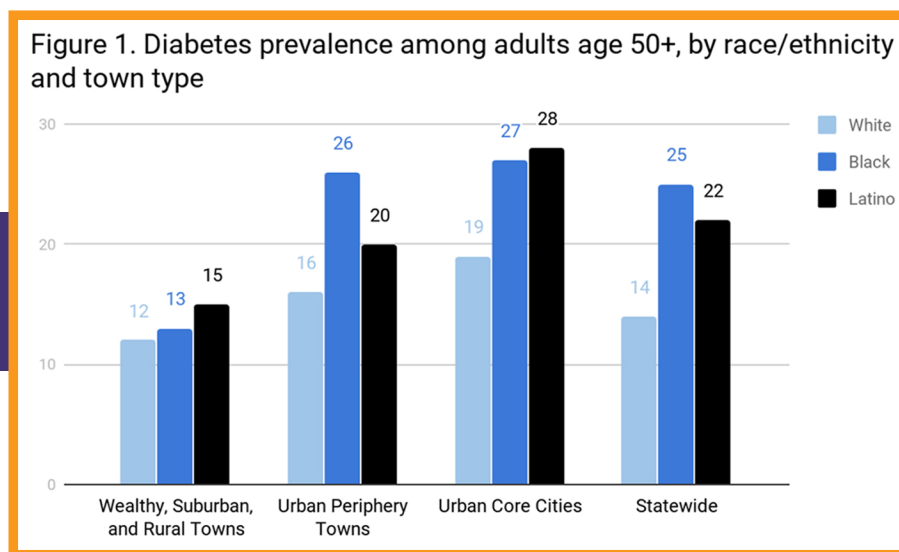
Within Connecticut, disparities by race, ethnicity, and neighborhood are as extreme as those found elsewhere in the United States. As a nation, the United States is already an outlier in the world in the degree to which income and socioeconomic status are drivers of differences in health, so it stands to reason that Connecticut, which has among the highest levels of income inequality in the nation, sees particularly large differences in health outcomes. These differences have been extensively documented in public health surveillance data produced by the Centers for Disease Control and Prevention, the Connecticut Department of Public Health, and in data collected through the DataHaven Community Wellbeing Survey, a live, in-depth survey of over 32,000 randomly-selected adults statewide in 2015 and 2018 that created primary data on health and SDoH. The survey was done with support from nearly all of the state's non-profit hospitals plus its major public health districts, municipalities, and community foundations. As one example, small area life expectancy data analyzed by DataHaven reveal how the 20-year gaps in neighborhood-level life expectancy within Fairfield County, Greater

Hartford, and Greater New Haven align closely with other community-level measures such as preschool experiences, youth connectedness, unemployment, and child poverty rates as well as with self-reported data on well-being, quality of life, and access to community resources.

Similarly large differences are seen by race/ethnicity, often even after controlling for income and geography. Within Fairfield County, Black babies are 3.1 times more likely to die than white babies—a disparity much larger than that

seen nationally, mostly because the white and wealthy towns in that area of Connecticut have relatively low infant mortality rates by U.S. standards, whereas infant mortality rates for Blacks are similar to the U.S. average.⁴

As another example, the prevalence of diabetes among adults age 50 and over is 14 percent among whites, but 25 percent among Blacks and 22 percent among Latinos, and racial/ethnic disparities are apparent even when just looking at the state's suburban communities (see Figure 1).⁵



Source: 2018 DataHaven Community Wellbeing Survey

This data emphasizes the need to consider health reform in Connecticut through a lens that looks at the progression of diseases and opportunities for improved population wellness based on not just broad life course and socioeconomic factors, but also more intentionally at social contexts including neighborhood stressors, race/ethnicity, and other factors related to migration and family social histories.

Literature Review: Background on HIEs

The act of health information exchange involves the bidirectional sharing of information between entities in the health care enterprise, based on national standards.⁶ Since the inception of HIEs in the 1990s, there are now a variety of different organizational structures (e.g. community HIEs or enterprise HIEs) that enable this sharing of information with the goal of improving health care quality, costs, and patient outcomes. Early functionalities of HIE organizations focused on sharing data between two hospitals so that providers in one health care system had access to information about the health care services their

patients received outside the system.⁷ A common method of achieving this is by providing a notification to one health care system that their patients had been admitted to, discharged from, or transferred to another health care system (also known as Admission, Discharge, and Transfer (ADT) message).

Recent literature reviews have assessed the variation in types of HIEs and their relative success in improving quality, cost, and outcomes.⁸ These literature reviews and additional studies demonstrate that: 1) HIEs can improve care coordination, medication reconciliation, and the sharing of imaging reports; and 2) there are significant sustainability challenges for HIEs.^{9,10,11}

The role of HIEs in assessing and addressing health equity and social determinants of health has emerged as a newer focus within the past decade.^{12,13} The literature in this area is limited, indicating an opportunity for further academic, health care, and governmental collaborations to assess and inform future developments.

Landscape Analysis and Provider Outreach

The following section highlights what HIE organizations nationwide are currently doing to address health equity, and to document how Connecticut's health care providers/systems envision leveraging the state's developing HIE organization to address health

Landscape Analysis

■ Methods

The project team conducted 10 in-depth interviews with HIEs and health care data/informatics experts from across the U.S. to learn more about current efforts to utilize SDoH in HIEs. Interviews were conducted from November 2018 to February 2019, were 60-90 minutes in length, and conducted via telephone.

Interviewees were identified as experts in the HIE field via recommendation of the grant program officer, or by the project team through literature searches and professional contacts. Additionally, interviewees were asked to identify individuals at other HIEs who should be contacted. Permission was granted by all interviewees to record the interviews for transcription and analysis.

Respondent HIEs were geographically diverse. The oldest HIEs began in the 1990s and were health care system driven, both by policy/financial incentives and providers' desire to see patient data across health care systems.

The semi-structured interviews included questions about the interviewees' roles, their experiences integrating SDoH data in the HIEs, their current efforts to utilize SDoH data in HIEs, and their advice regarding SDoH data sources and data elements. (See Appendix 1, Landscape Analysis Interview Guide). Interviewees included:

- Phil Beckett, CEO, Healthcare Access San Antonio (HASA)
- Dan Chavez, Executive Director, San Diego Health Connect, Board Member, 211 San Diego
- Brian Dixon, Associate Professor, Indiana University Richard M. Fairbanks School of Public Health at IUPUI, and Research Scientist at the Center for Biomedical Informatics, Regenstrief Institute (partner of Indiana Health Information Exchange)
- Peter Eckart, Director of the Center for Health and Information Technology, Illinois Public Health Institute, and Co-Director, Data Across Sectors for Health (DASH)
- Jill Eisenstein, CEO and President, Rochester Regional Health Information Organization (RHIO), and Co-Chair of SDoH Committee, Strategic Health Information Exchange Collaborative (SHIEC)
- Hadi Kharrazi, Research Director at the Center for Population Health IT, Johns Hopkins Bloomberg School of Public Health
- Ross Martin, Program Director, CRISP Research Initiative, Chesapeake Regional Information System for our Patients (CRISP)
- Waldo Mikels-Carrasco, Senior Director for Regional Population Health Research & Policy, Michiana Health Information Exchange (MHIN), and Co-Chair of SDoH Committee, Strategic Health Information Exchange Collaborative (SHIEC)
- Katie Sendze, Director of Client Operations and Programs, HealthInfoNet, Maine
- Clare Tanner, Director of the Center for Data Management and Translational Research, Michigan Public Health Institute, and Co-Director, Data Across Sectors for Health (DASH)
- Ed Worthington, Former IT Director, Northern Physicians Organization (partner of Michigan Health Information Network - MiHIN), and CEO at Advanced Health Technology Solutions, LLC

HIEs reported that their data comes from many sources, including:

- Health care systems
- Community-based health providers (e.g. physician practices, home health, behavioral health, Emergency Medical Services)
- Public health agencies (e.g. health departments, prescription monitoring programs)
- Public and private insurance providers
- Human service agencies (e.g., Social Services, Housing Authorities, Homeless Services, Disability Services, 2-1-1)
- Publicly available data (e.g. U.S. Census Bureau)
- Other sectors (e.g. Departments of Education, Correction, Environmental Protection)

Findings

Our findings about the current efforts to utilize SDoH include:

- **There are many drivers, opportunities, and challenges associated with collecting and utilizing SDoH data.** The drivers include alignment with reimbursement models (e.g. quality and cost targets that must be met for reimbursement) and alignment with identified health needs.
- **SDoH data can contribute to many aspects of health from individual (e.g. clinical care) to population health (population health analytics and registry, quality measure analysis, observational research).** Interviewees identified opportunities in predictive analytics - using the data to determine who is at risk (e.g. readmissions, adverse outcomes). They also wanted to use the SDoH data to identify health and human service needs and connect patients and communities to available resources. Many of these “use cases”—a methodology used in system analysis to identify, clarify, and organize system requirements—emerged from the HIE interviews, which described how HIEs are leveraged for individual and/or population health, and how HIE data is used to inform patient care or identify individuals or populations at risk for poor health (See Table 1).¹⁴ For example, one participant described the possibility of using HIE data from multiple sources to inform clinicians about patients who are at risk for falls based on the patients’ demographics and health conditions, combined with information about where the patient lives, the specific type of housing, when the structure was built, and how many levels it is.
- **There is variation in how HIEs are currently being used to address SDoH.** The examples in Table 1 describe how end users leverage HIE SDoH data to measure and address multi-level (patient, practice/system, population) health indicators. End users of the HIE organizational data were health systems, providers, community-based organizations, human services organizations, and academia. Though the end goal of the HIEs is to improve patient and population health, few cases specifically identified the end users of HIE platform as patients.
- **There was consensus among interviewees that the collection and use of SDoH data has a foundational role in promoting health equity.** As one interviewee stated:

“Health equity is completely based on our ability to understand and operationalize race, ethnicity, social isolation, and language data in our communities.”

- **There are multiple technical challenges in the collection, storage, and use of SDoH data.** Completeness, accuracy, and access are major data challenges. Concerns regarding SDoH data included, but were not limited to, quality of data coming from different sources, frequency of data collection/updates, the meaning/utility of data that is not longitudinal, and the limited number of data sources with complete, accurate, updated, and longitudinal SDoH data. HIEs specifically identified concerns with EHRs as a source of SDoH data given that staff training and implementation of SDoH screeners and ICD-10 (International Classification of Diseases, 10th Revision) codes are incomplete. HIEs reported being overwhelmed with trying to index patients across multiple systems. As a technical challenge, HIEs reported that SDoH data does not fit well into the health information models that currently exist.
- **There are operational challenges to sharing SDoH data,** including institutional commitment, staff training and turnover, lack of standardized practices (e.g. workflow, incorporation of patient report), and privacy and confidentiality (managing consent is a primary barrier to multi-sector data sharing).
- There were fundamental overarching concerns related to
 - the challenge of engendering continued commitment and engagement around collecting and sharing SDoH data among stakeholders across different sectors;
 - the lack of consensus on how best to impactfully utilize SDoH data; and
 - the overall financial sustainability of these efforts.

While many common challenges were noted by HIE interviewees, there was a strong consensus about the critical importance of a deep understanding of unique local context to ensure success and sustainability.

Table 1: Examples of Current Use Cases of SDoH in the HIE

END USERS	DATA SOURCES	CASE EXAMPLE
Health Systems	Electronic Health Records (EHRs), claims	System receives reports on whether patient participation in disease management clinics resulted in reduction in claims (e.g. care management for population health)
Providers	EHR, tax assessor, claims	Providers receive housing information to inform at-home fall risk for elderly patients (e.g. predictive analytics for patient)
Providers	EHR, environmental health	Providers receive residential lead exposure data to inform testing (e.g. predictive analytics for patient care)
Providers	EHR, DPH, DSS	Providers and public health agency participate in closed-loop referral system (e.g. care coordination for patient care)
Community-based organizations	EHR, CBO	Meals on Wheels receives admission/discharge data so that services are paused while clients are in the hospital (e.g. coordination between patient care and social service management)

END USERS	DATA SOURCES	CASE EXAMPLE
Community-based organizations	EHR, CBO	Use neighborhood-level aggregated clinical data to understand environment for a healthy homes initiative or a community safety initiative. More efforts are needed to link the issues of health and community development/economic investment in neighborhoods (e.g. population health analytics)
Human Service agencies	DOT, census, EHR	Dept of Transportation receives neighborhood-level information on low SES, chronic disease patients to inform where and how often buses should be running (e.g. population health/health systems planning)
Human Service agencies	Environmental health, EHR, census	Dept. of Environmental Health examines lead poisoning and clinical data to understand where hotspots might be so they can direct their city employees to do more code enforcement on lead paint (e.g. population health analytics)
Academic Partners	EHR, academia, vital statistics	Researchers receive infant mortality data to examine disparities (e.g. population level observational research)

Provider Outreach in Connecticut

Methods

The project team conducted 11 semi-structured interviews with provider organizations throughout Connecticut to learn more about the capabilities of EHRs in use; what SDoH data elements are currently being captured and the mechanisms used to collect them within or outside of the EHR; the ability to extract and analyze SDoH elements; and the value the HIE would bring to efforts of incorporating, tracking, and analyzing health equity at the provider level. Interviews were conducted from February to March 2019, ranged in length between 60-90 minutes, and were conducted utilizing ZOOM teleconferencing technology. (See Appendix 2, Provider Interview Guide)

Interviewees were identified based on the following criteria:

- Participation in the State of Connecticut's Community and Clinical Integration Program (CCIP);
- Participation in the State of Connecticut's Person Centered Medical Home Plus (PCMH+) program;
- Participation in the electronic clinical quality measures (eCQMs) project; and
- Providers who could add a unique perspective to the project based on their provider type or coverage population.

The selection of all interviewees was discussed with project staff leads at the Office of Health Strategy and UCONN Analytics and Information Management Solutions (AIMS) to ensure a sufficient cross-section of providers for the project. Permission was granted by all interviewees to record the interviews for transcription and analysis. Interviewees included:

- Charter Oak Health Center
- Community Health Center, Inc.
- Community Health and Wellness Center of Greater Torrington
- Griffin Health
- Hartford Health Care
- Northeast Medical Group
- Pequot Health Care
- UConn Health
- Value Care Alliance
- Yale New Haven Health

Findings

- There is very high interest in SDoH among providers.
- Many providers are currently collecting SDoH data but there is large variation in what is being collected, workflow processes related to collection, and use of the data.
- The most frequently collected data related to SDoH are: race, ethnicity (limited mostly to Hispanic /Non-Hispanic), address, housing security/insecurity, food security/insecurity, and transportation security /insecurity.
- While most providers are collecting SDoH data elements, proactive analysis or use of this data is inconsistent and many lack in-house capability to do analytics.
- Understanding of the clinical utility of SDoH is limited.
- Providers are very interested in the potential of the HIE to provide a more holistic view of what is happening with their patients beyond the medical/clinical setting; they are also motivated by the potential to reduce duplication and increase accuracy and timeliness of data related to patients.

Provider Concerns (about SDoH data and the HIE)

- **Workflow:** How to optimize workflow and learn/implement best practices related to asking questions to secure data from patients;
- **Health equity/SDoH-specific:** Utility of SDoH data at the clinical practice level, i.e. there are questions about how SDoH data can change clinical practice and impact outcomes at the clinical level;
- **Market/HIE viability:** Concurrent HIE and/or information referral service efforts in Connecticut (e.g. Connecticut State Medical Society, Connecticut Hospital Association and others) and the interoperability or competition of these products; and
- **Data utility/data analytics:** How to manage data over load and EHR capabilities/limitations.

Health Equity Data Elements for Prioritization in Connecticut

Recommended Data Elements

Based on our landscape analysis, it is apparent that HIEs throughout the nation are making promising advances to incorporate data elements related to SDoH and health equity. Such work can be time-consuming and requires stakeholder engagement and sustained commitment across public and private sectors.¹⁵ Within Connecticut, the opportunity exists to develop the HIE architecture with a foundational health equity framework.

As part of this project, the HEDA team was tasked with recommending two to four health equity data elements that could enhance the HIE's existing health data architecture, creating a foundational structure that, over the long term, anticipates incremental additions of data related to health equity and SDoH. Many elements relating to social and demographic factors were considered in our analysis. The criteria used to make final recommendations on these data elements were:

- 01 Availability, accessibility, and quality of data at the patient, system, community, and population level;
- 02 How the incorporation of that information has the potential to inform future efforts to embed health equity data and analyze other data within the HIE; and
- 03 Actionability of data, or the likelihood that the information being incorporated would be used to inform the potential array of analytical products or “use cases” related to the HIE. This may include information provided to physicians and providers to inform care delivery, broader health care quality measurements that seek to evaluate the quality of care for a patient population based on access to specialty or routine care and patient outcomes and experiences, as well as public health surveillance to inform population health analysis, planning, and reporting and other uses.

We used these criteria—and lessons learned from the interviews—to propose the following three domains: race/ethnicity, insurance status, and geocoded residential address. It is important to clarify that these recommendations do not require “new” data collection. Rather, we suggest a greater focus be given to where this information is currently available within the HIE and the systems that contribute information to it.

Race and Ethnicity

Race and ethnicity are often confused but are two significant and separate concepts. Race is defined as a social construct that is linked to perceived biological differences, often demarcated along the lines of phenotypical or somatic characteristics, i.e. skin color, hair type, eye shape, etc. Ethnicity is a social construct referring to shared beliefs, culture, ancestry, and language, that are uniquely and closely relevant to an individual, group or population. While vast scientific research has concluded that race has no biological value, it remains a critical point of analysis given the impact race (through racism and discrimination) has on the lived experiences and health and well-being of individuals in society.¹⁶

Race/ethnicity is a data element that was consistently mentioned as the starting point for most HIEs to examine health disparities and develop interventions.¹⁷ Examples included the Diabetes Impact Project in Indiana, which seeks to target communities of racial/ethnic minorities who have a high incidence of diabetes and low life expectancies.¹⁸ Race/ethnicity data are currently collected by many health care providers as mandated by Meaningful Use requirements. While race/ethnicity data are by no means collected in a consistent and fully-inclusive way throughout Connecticut, much of the data is accurate and is usable to analyze disparities. In particular, race/ethnicity data will allow a more consistent understanding of disparities between the state's significant Black population compared to other population groups, especially when combined with geographic information.

Recommendation: Incorporate a race and ethnicity measure into all of the HIE's existing use cases and analytical routes. This will be critical to inform any issue related to health and health care disparities. In addition, the careful analysis of this information, accounting for differences in the quality of such data, can lead to calls to improve how it is collected and used over time. For example, improvements could include procedures that allow data to be analyzed in ways that consider race/ethnicity overall as well as the migration experiences and language backgrounds that frequently relate to it.

Insurance Status

Insurance status serves as a proxy for socioeconomic status. In Connecticut, adults without health insurance tend to be younger, and are disproportionately Latino. While they may be younger, there is a significant burden of chronic disease and health risks (e.g., smoking) in the uninsured population, and many of these adults lack the means or methods to access high-quality health care, behavioral health services, and dental care, in the same ways that insured adults may be able to.

Recommendation: focus on insurance-related information in part because it is widely available through the administrative all payer claims database (APCD) and health system data sources (EHRs).¹⁹ As such, this domain will serve as a case study for the value of having complete information on key health-related social needs. These use cases can be expanded over time as data on other health risks (e.g., food insecurity, incarceration status) become available. When integrated into the HIE and analyzed in the context of other health inequities that impact the population over time, data on health insurance status can complement other analyses that consider health and health care disparities.

Geocoded Residential Address

Residential address is another commonly collected piece of information that relates to the social determinants of health. Through the process of geocoding, addresses can be converted from a simple location description, such as the mailing address of a house or apartment, into a physical location on the Earth's surface (latitude and longitude).

Recommendation: Use geocoding to convert mailing addresses into physical locations and assign them to a consistently-defined set of geographic areas—especially city blocks, census tracts, neighborhoods, municipalities (county subdivisions), and counties. These standard geographic areas may be compared to each other and grouped together for analyses in combination with other data, such as population counts from the U.S. Census Bureau. In this way, geocoded residential addresses can be used to understand individual- and community-level health risks, examine differences in health status by neighborhood, and develop appropriate interventions.²⁰ **Our landscape analysis found that other HIEs were already collecting and using these types of data (longitude and latitude coordinates of a residential address) to inform HIE-based analyses. They intend to use them to help understand the situation within each community and to evaluate the potential benefits of provider or system-level interventions.**

As described above, there are vast disparities in health and well-being by neighborhood within Connecticut. Differences within the state's cities and towns are often larger than differences from one town to another. For example, the DataHaven Community Index has shown how within the City of New Haven, a large, affluent section of the city center experiences socioeconomic conditions and health-related outcomes that are similar to those in the state's wealthiest communities. However, other neighborhoods in New Haven are considered to be among the most economically-distressed areas in the Northeast United States. Similar patterns are observed in all of the state's other cities, as well as in many of its smaller towns.

"Frankly, we know very clearly that most of what affects health care is not what happens in the provider office. It's what happens outside the provider office."²¹

-Victoria Veltri, Executive Director, Connecticut Office of Health Strategy

Neighborhood-level data from a variety of sources is already readily available; the U.S. Census Bureau's American Community Survey, which creates estimates of socioeconomic conditions within small areas based on the averaging of data collected over a five year period, is the most widely used. But there are many others to consider. These local data sources may be compared with geocoded residential addresses, especially when aggregated into larger neighborhood statistical areas and viewed across periods of time to create stable estimates of local-level conditions. Although current sources of data by town enable some level of geographic analysis (e.g., to examine risk of asthma or diabetes progression across different types of towns), we believe that overlaying this information with analyses of smaller geographic areas would create a far more accurate and precise picture of the local landscape of health conditions.

Additionally, geographic information is necessary to develop a more accurate picture of race/ethnicity disparities in Connecticut, given the differences in racial and ethnic populations by geography in the state due to migration patterns and historic and current housing discrimination. For example, Connecticut's Latino population is highly variable, with Latino populations in some towns or zip codes consisting of second-generation migrants from New York City, others consisting heavily of first-generation, some-

times recent immigrants from Brazil or Central America, and many others tracing their roots to the large wave of Puerto Rican immigration in the middle of the 20th Century. Nuanced data on the specific nature of the state's ethnic and racial minority populations may not be fully captured by health records, but an overlay of residential locations could provide additional insight, especially at a regional or town level when combined with local knowledge and community experience.

Given the high degree of variation in conditions even within neighborhoods, the HIE should also explore how data on key health outcomes may be integrated with even more granular, address-level city data, such as information on properties that experience particularly high eviction rates, calls for police service, or particularly adverse health outcomes among mothers and infants. Researchers could use these types of data to uncover underlying factors related to urban stresses, contaminants, or housing conditions that if addressed could lead to significant health improvements within a targeted area or population. These analyses are possible only if the HIE architecture contains a robust system for geocoding residential addresses and storing information on those addresses over time.

Data Elements to Consider for Future Use

In the future, additional SDoH data elements that impact individual and community health and well-being should be considered for inclusion. When thinking of health and health care disparities, communities and providers should have a particular focus on the most vulnerable populations. In some cases, these populations are relatively small and therefore are not captured through general or universal approaches to data collection such as those provided by health care systems or data collected by the U.S. Census Bureau.

In addition, these data are often inaccessible because of how they are collected or maintained. For example, schools may collect some data on homeless students, but they are limited in how that information may be shared and used; similarly, the state Department of Corrections maintains data on individuals in parole or community supervision programs but have limited protocols for sharing that information outside the walls of the agency with, say, health care systems. Where these data exist, elements may not be standardized, nor are there yet standards in place for interoperable electronic exchanges.

With health equity as a foundational goal of the HIE, we believe that important elements to consider in the near future should include:

01

State agency data, such as data on populations whose health status has been impacted by incarceration and community supervision. There are precedents for encouraging interagency collaborations that match DOC data with other state agency data, as evidenced in recent publications that examined how individuals released from incarceration in Connecticut were at a greatly elevated risk of opioid overdose and other causes of mortality soon after release. There are a number of other state agencies that collect and monitor information on populations that may be at a higher risk of experiencing adverse health outcomes.

02

System-wide data, such as data on patients or individuals experiencing food insecurity, which could be accessed through various screening tools (i.e. PRAPARE)²² and projects (i.e. the CMS Accountable Health Communities).^{23,24} At present, this data is in the early stages of collection and its utility is either limited by the ability to share and/or use it, or the data is stored outside of the current data access of the HIE (i.e. currently not stored in the EHR or available in claims data).

03

Community and social service provider data, such as that on populations who have experienced homelessness and/or who are receiving housing-related services (e.g. HUD Homeless Management Information Systems, local housing providers).²⁵ Other HIEs are working to incorporate housing data with community health data as a way to help identify opportunities to improve health for some of the populations at higher risk of morbidity and mortality.

We believe the data based on our primary set of recommended elements (race/ethnicity, insurance status, and geolocation) must be incorporated and used first, before the value of these potential future data sources can be realized.

Conclusion and Next Steps - Potential Future Use Cases to Operationalize Health Equity Data Elements

Health Equity Data Elements

Given the infancy of addressing health equity in the context of health information exchange, Connecticut has an opportunity to become a leader in this space. To ensure this moving forward, it is critical that health equity data is a consideration in all HIE use cases. The Connecticut HIE is developing with strong statewide support, and has already identified at least 29 possible use cases.²⁶ Nearly all of these would benefit from a more robust architecture that allows health care providers, planners, and policy makers to use the lens of health equity and the social determinants of health when reviewing or making decisions based on the information.

All of the state's population health reporting and practice transformation initiatives—including the community and clinical integration program (CCIP), value-based payment grants, and other analyses—are dependent upon having reliable facts that can drive timely and accurate analytics, and dashboards and key performance indicators that can inform relevant clinical decisions, process improvements and care coordination programs. Specifically, the HIE architecture has established measures that allow for an analysis of the quality of care, access to specialty care, and population health for specific groups of individuals.

However, currently, information within the HIE is primarily derived from electronic health records and insurance claims. It is not necessarily set up to examine the health equity data elements (e.g., geocoded addresses) that exist within those data sets, even though those elements can inform health reporting as well as provide information to care delivery teams who are seeking to identify potentially at-risk individuals within their care.

Critical areas of opportunity to improve the state's health using the types of data available in the HIE include, but are not limited to, 1) examining measures of asthma progression and treatment effectiveness among children who are at high risk of serious complications from asthma, 2) creating incentives for reducing the progression of cardiovascular disease among adults, which is considered the leading cause of health care costs and mortality in the state, and 3) preventing issues related to the opioid crisis in which the extreme increase in overdose deaths in recent years indicates how some adults are not being effectively served by policy or health systems. For each of these areas, health equity data can be of great utility. For example, asthma hospitalizations are up to 20 times higher in certain neighborhoods—sometimes those located in close proximity to highways, or with a high amount of distressed housing—than others. In these cases, interventions to improve treatment and health care access based on understanding and targeting these neighborhoods may be more effective than general approaches. In the case of opioid overdoses, rates have dramatically increased for minority racial/ethnic groups in recent years, but the characteristics of those victims may significantly differ by race/ethnicity and may inform provider outreach and culturally competent care approaches.

By incorporating health equity data elements at the outset, the HIE architecture can deliver a broader set of actionable information to support improvements in care. Continued planning and analysis will allow these data elements to be incorporated throughout other use cases in an effective way, and create a platform for the future integration of other data on health inequities and SDoH. In addition, the continued engagement of stakeholders with varying perspectives—from policymakers to patients—will increase the likelihood of achieving HIE sustainability in Connecticut and ensure that the incorporation of SDoH data can and will be used to meaningfully advance equity. The outcomes are likely to include improved cost avoidance, event avoidance, care management, risk mitigation, local and system-wide resource allocation, and public policy-making.

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KEY DEFINITIONS

Ethnicity: a social construct that refers to shared beliefs, culture, ancestry and language, that uniquely and closely relevant to an individual, group or population.

Health Equity: a process, way of being/philosophy, and outcome resulting in all people attaining optimal health without barriers or obstacles.

Social Determinants of Health: economic and social conditions that influence individual and group differences in health status.

Race: a social construct that is linked to perceived biological differences, often demarcated along the lines of phenotypical or somatic characteristics, i.e. skin color, hair type, eye shape, etc. While vast scientific research has concluded that race has no biological value, it remains a critical point of analysis given the impact it has in the lived experiences of individuals in society.

Use Case: a methodology used in system analysis to identify, clarify, and organize system requirements. The use case is made up of a set of possible sequences of interactions between systems and users in a particular environment and related to a particular goal. A use case can be thought of as a collection of possible scenarios related to a particular goal, indeed, the use case and goal are sometimes considered to be synonymous.

ACRONYMS

CCIP: Community and Clinical Integration Program

CDAS: Core Data Analytics Solution

CMS: Centers for Medicare & Medicaid Services

DOC: Connecticut Department of Correction

EHR: Electronic Health Record

ERIC: Yale Equity Research Innovation Center

HIE: Health Information Exchange

HITO: Health Information Technology Office

KPI: Key Performance Indicator

OHS: Connecticut Office of Health Strategy

SDoH: Social Determinants of Health

SIM: State Innovation Model

- Describe your role in the HIE.
- Describe HIE's development, focusing on process of engaging stakeholders, and explaining big picture trajectory.
- Describe current state of HIE:
 - Main contributors of data?
 - Core functions?
 - Key users?
 - Data sources included in HIE?
- Social determinants of health (SDoH) data:
 - Types of SDoH data included in HIE?
 - Source of SDoH data?
 - Barriers to obtaining SDoH data?
 - Specific considerations around integrating SDoH data into HIE?
 - What was initial test case (if any)?
 - How have SDoH data been used or what are plans for how data will be used?
 - Are there existing plans around adding additional data sources to HIE: EHR data, population-based survey data, census data, etc.?
 - What is current governance around use of SDoH data?
- Based on your experience, what is your advice regarding:
 - Approach to transmitting SDoH data into HIE?
 - Type of SDoH data to prioritize?
 - Key stakeholders to engage?
 - Potential early and future test cases?
- Who else would you recommend we interview?

- Current electronic health record (EHR) system?
- How long has EHR been in use?
- Certified EHR ID number?
- Plans to switch EHR systems in near future?
- If so, what EHR system(s) are under consideration?
- Current EHR easily interoperable with other EHRs?
- Ability to collect social determinants of health (SDoH) information embedded in EHR?
- If have SDoH screening capability within EHR, what data is collected and where is it stored?
- SDoH data stored longitudinally? Who can access? Can it be shared?
- Possible to share SDoH data outside system (i.e. can it be transmitted to a cloud-based system, or would it be shared as an excel file)?
- EHR has capability of reading handwriting?
- Provide examples of utilizing SDoH data, such as: improving clinical outcomes, data sharing, analytics, interventions, diagnostic coding (using ICD-10 Z Codes, etc.).
- Current SDoH analytic capabilities as an institution? What additional capabilities would be valuable?
- Obstacles to collecting and using SDoH data?
- Currently using information referral system for identified social needs? Examples include: NowPow, Aunt Bertha, Vision-Link, Tiger, HealthLeads.
- Does information referral system integrate with EHR?
- Where is information referral system data stored?
- How is information referral system data collected (e.g. paper, iPad, laptop, etc.)?
- Is race/ethnicity an input on referral form?
- If so, what are standard options/categories available?
- If not already, considering using/incorporating information referral system into EHR and current workflow?

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