Public Health Disparities Assessment and Identification for Action

For the CONNECT Our Future Region

CONNECT
Our Future

Vibrant Communities–Robust Region

Iredell

Rowan

Lincoln

Cabarrus

Cleveland   Gaston

Stanly

Mecklenburg

York

Union

Anson

Union   Chester   Lancaster

The 14-county bi-state region includes: Anson, Cabarrus, Cleveland, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Stanly and Union Counties in North Carolina, and Chester, Lancaster, Union and York Counties in South Carolina.

Executive Summary

The purpose of this report is to provide the CONNECT Our Future Public Health Work Group with critical information about the overall health and well-being throughout the 14-county CONNECT region. This information relates health issues and disparities to the overall CONNECT planning process and demonstrates how region-wide health concerns may be integral to addressing region-wide planning issues. In addition, this report will help planners and policymakers focus on the most important issues that determine how the CONNECT region can continue to be a healthy place to live, work, and raise a family.

Findings

Demographic, Social, and Economic Characteristics

Population growth, population diversity, an aging population, variation in the social and economic characteristics of the population, and its distribution among urban, suburban, and exurban areas within the region all contribute to the diverse health needs and health disparities within the CONNECT Our Future region. The CONNECT region has experienced 60 percent population growth (1.2 million residents) since 1990, and much of this has been concentrated close to Charlotte, North Carolina. Growth has been accompanied by increasing population diversity. The region's Latino population has grown by more than 1,000 percent since 1990, and there has been extensive growth in the region's Asian population as well. Also, more than 500,000 African Americans live in this region, and comprise 21 percent of the region's total population. Despite the somewhat younger profile of the area's growing racial and ethnic populations, the CONNECT region has been growing older as members of the baby-

boom generation age. Population growth and population aging are both expected in the CONNECT region in the future. These trends will require more attention to population health, additional health care services, and more culturally sensitive health care services.

Communities closer to the commercial and employment center of the region (e.g., Charlotte) exhibit greater financial well-being than other areas in the region. The inner counties (Mecklenburg, Cabarrus, and Union counties in North Carolina, and York County in South Carolina) are characterized by higher median income levels, lower poverty levels, higher college education levels, and lower unemployment rates than other, nonadjacent counties. Associated with their more positive social and economic circumstances, the four inner counties exhibit higher overall health status than most of the 10 surrounding counties. This is one of the most important health disparities evident in the CONNECT Our Future region.

Health Risk Behaviors

The most significant disparities with regard to health risk behaviors concern teenage pregnancy and births to teenage mothers and, in particular, the experiences of African American young women.

- Pregnancy rates for teenage African American women are higher than for white teenagers in every county in the region.
- Births to teenage girls regardless of race are above average in half of the region's counties.
- Births rates for African American teenagers are higher than for white teenagers in the region.
- Births to teenagers are more common in the region's smaller and more rural counties than in the larger urban and suburban areas.

The most common health risk behaviors throughout the region are binge drinking and marijuana use. Both are above average in five CONNECT counties, and the use of marijuana among middle school students is above average in nine of the region's 14 counties.

Higher levels of health risk behaviors are concentrated in two of the region's poorest outer counties (Gaston and Rowan counties). Health risk behaviors are lower than average mainly in suburban areas surrounding Mecklenburg County, and the remaining counties fall in between these levels and are not greatly different from statewide averages.

While the presence of health risk behaviors represent the potential for poor health, illness, and premature death in the future, the disparities between African Americans and others in terms of teenage pregnancy and births represent continuing barriers to young women of color and the unwelcome conclusion that some African American children in the CONNECT region continue to face systemic disadvantages from the time of their birth.

Health Outcomes: Child and Maternal Health

The health of newborns, children, and their mothers are sentinel indicators of the overall health of a community as they represent both the legacy health issues in that community as well as the health potential of an entire future generation. Infant mortality and poor birth outcomes often indicate systemic deficits in community health and the entire health care system.

Infant mortality rates were greater than average in only four counties in the CONNECT region (Chester, Cleveland, Gaston, and Lancaster), and they are better than average in seven other counties. As with several other health indicators, higher infant mortality rates are most commonly found among outer counties with lower than average household income, higher than average poverty rates, and lower than average college education attainment rates.

Despite these relatively positive findings, infant mortality and poor birth outcomes are widespread problems. Births to African American mothers throughout the CONNECT region consistently exhibited poorer outcomes than births for the rest of the population.

- The rates for low birth weight and very low birth weight babies are at least 20 percent higher among African American mother than the rates for other mothers in each of the 14 CONNECT counties.
- Infant mortality experienced by African American mothers is similarly at least 20 percent greater than for the rest of the population in 11 of the 14 CONNECT counties. In most of these counties, the rate was about twice that of the state average, and in Lincoln County, North Carolina, infant mortality among African American babies was reported to be four times the statewide average.

Other childhood health issues such as asthma and lead poisoning, while present in the region do not appear to be as prominent or serious as infant mortality and birth outcomes.

While there are some immediate actions that can be taken to address these striking disparities, they are among the most visible results of pernicious social and economic impacts on child and maternal health. As infant mortality and poor birth outcomes are extensively widespread within the population at large, child and maternal health may nonetheless be one of the most important "stealth" issues that need to be considered in a region-wide context of economic development, housing, community planning, and transportation planning in additional to health planning.

Health Outcomes: Hospital Discharges (Morbidity)

Illness and death (morbidity and mortality) often reflect cultural norms and individual decisions earlier in life. Hospitalization and the most common hospital discharge diagnoses were chosen to represent the extent of chronic illness and other serious health problems in the CONNECT region. The most common conditions for which individuals were hospitalized (and later discharged) throughout the region are the chronic diseases and conditions commonly associated with old age. These include heart disease, stroke, pneumonia, COPD (chronic obstructive pulmonary disease), and the complications of diabetes. Discharge rates for these diagnoses are also higher for the 65 and older population than for any other age groups.

Lower than average discharge rates for the most common causes of hospitalization are mainly found in the higher income, higher employment, and higher education core counties around Charlotte. Residents of counties with notably lower (e.g., better) discharge rates are closer to primary care services that are more concentrated in the region's core area, and they have easier access to secondary and tertiary care services to treat these conditions and thus prevent hospitalization. In contrast, higher than average discharge rates are mainly found in the region's smaller, outer counties. These are characterized by lower income levels, higher poverty rates, and lower educational attainment. These areas contain relatively fewer health resources (providers and facilities) than is warranted based on population size.

The prevalence of chronic conditions in the region's outer counties will require, at minimum, the interaction of health, transportation, and technology planning in order to provide greater transportation options for outer area residents to reach the care they need, to provide mobile health services that will bring preventive and primary care services to them, and to provide the technology that can make telemedicine and remote patient monitoring feasible.

Health Outcomes: Mortality

Age-adjusted data on the leading causes of death and death rates were obtained for each county from the North Carolina and South Carolina state departments of health. Where available, data were obtained for race (white non-Hispanic and African American non-Hispanic), ethnicity (Hispanic), and gender. The most common causes of death in the CONNECT Our Future region are:

- Diseases of the heart
- Cancer
- Stroke
- Pneumonia and influenza
- Chronic lower respiratory diseases
- Diabetes mellitus
- Kidney disease
- Alzheimer's disease
- Motor vehicle accidents
- Septicemia (infection)
- Other unintentional injuries

In nine of the CONNECT region's counties, average mortality rates exceed corresponding statewide mortality rates; in four counties the mortality rates are lower (e.g., better) than average.

Mecklenburg, Cabarrus, Lancaster, and York counties—which together comprise 58 percent of the region's current population—all exhibit below average mortality rates. These are core counties where the rates may reflect greater access to tertiary care services in and around Charlotte. These rates may also be attributed to the more favorable social and economic characteristics of these counties as compared to the incomes levels, poverty rates, and educational attainment found in most of the counties with above average mortality rates. These findings imply that higher socioeconomic status and relatively close access to a broad spectrum of health care services, including tertiary care services, may produce lower mortality rates and be closely associated with greater population health within the CONNECT region.

The most important finding, however, is that there are great disparities between the mortality rates reported for African Americans and those reported for others. Wherever data by race were available:

- The mortality rates for African American populations were consistently higher than the statewide mortality rates throughout the CONNECT region.
- Even among those counties that are "healthier" as indicated by lower than average population mortality rates, African American were more likely to die—often much more likely—than their counterparts in the rest of the population.

The most critical implication of these findings is that the factors contributing to high mortality rates among the region's African American population need to be addressed through the region-wide planning process. This will not only improve the health of the region's African Americans but it will also improve the region's overall health status and its desirability as a place for continued growth and development. Moreover, the health disparities in the African Americans community should be addressed as one of the region's highest priorities and should be explicitly integrated into all other planning efforts. Specific analysis should be conducted to determine the extent to which transportation, primary care shortages, poverty, and/or other factors are contributing to these disparities so that planning to eliminate these barriers may be launched.

Health Resources

Health care providers, health care facilities, and availability of a wide spectrum of health services wherever there are people who require these services are critically important components for maintaining and improving the health status of the community. The main source of data on health resources in the CONNECT region is the Area Health Resources File (AHRF)—a data base maintained by the Department of Health and Human Resources, Health Resources and Services Administration (HRSA). This dataset includes reasonably up to date information about licensed health providers, licensed health care facilities, and health insurance.

While the CONNECT region contains an extensive supply of health care provider and facilities, these resources are not well distributed throughout the region. Medically Underserved Areas are located in each of the 14 CONNECT Our Future counties, and almost all of the counties have some provider deficits. Only Mecklenburg County, with its high concentration of health care

resources and facilities, has a higher than average concentration of physicians in the region. All other counties exhibit a deficit, and the region as a whole has 38 fewer physicians than would be expected given statewide averages across both states. As a result, access to care—particularly primary care services—is seriously compromised in several of the region's counties. Shortages like these typically result in difficulties in finding a medical home, getting access to a physician when needed, or excessively long wait times to see a care provider. Similarly, hospital beds are distributed unevenly across the region.

The maldistribution of physicians and hospital facilities reported in the CONNECT region is a common problem throughout the United States, especially in more rural and thinly populated areas. This is particularly reflected in shortages of or difficulties in getting access to primary care services. Education and recruitment of more physician extenders (including nurse practitioners and physician assistants) is called for, and advocacy to allow these practitioners to work at the "top of their license" should be considered. Short-term solutions require getting patients to primary care resources or bringing those resources to the patients where they live. Transportation and technology planning for the entire CONNECT region is needed to address these issues. Planning for the installation and availability of broadband services throughout the CONNECT region in order to make telemedicine and remote patient monitoring feasible may ultimately be as important to the health of the region as is transportation planning.

Environmental Impacts on Health

Environmental health factors that may affect the most vulnerable members of the population in the CONNECT Our Future region were limited to air and water quality indicators. Air quality data were obtained from the Centers for Disease Control and Prevention, and they were limited to reporting the average level of fine particulate matter in the air (micrograms per cubic meter). Water quality data were tabulations of the percentage of the local population served by drinking water utilities that have recorded any drinking water quality violation. These data were acquired from the Environmental

Protection Agency's Safe Drinking Water Information System.

Five counties reported some environment concern based on drinking water violations in their localities, but only one county reported a worrisome situation. Union County, South Carolina reported that more than one fourth of its population (28 percent) was potentially exposed to water resources in excess of standard water quality pollution limits. In contrast, fine particulate matter in the air varied only slightly from the statewide particulate matter averages reported for North Carolina and South Carolina. All of the counties did report slightly higher than average rates of fine particulate matter in the air.

Based on these data, the CONNECT region does not appear to have more than minor concerns regarding air and water quality, and these do not appear to have had a major influence on the health of the region's population. The environmental data available at the county level to assess possible environmental impacts on the region's health, however, are very limited. As a result, lack of detailed air and water quality findings for the CONNECT region's counties should not be interpreted as indicating there are few air and water quality issues—or other environmental concerns—that may be having an impact on the health of the region's population. These concerns cannot be addressed at this time given the limited local information available.

Health Status and Disparities

Data collected and analyzed through this project reveal two key sets of health disparities within the CONNECT Our Future region: health disparities by race and health disparities by a combination of socioeconomic status and geographic location.

Wherever health data by race was available at the county level, disparities between the white non-Hispanic and African American non-Hispanic populations were striking. These disparities were most evident in terms of women and children's health and the causes of death throughout the region.

- Teenage African American women experienced higher pregnancy and higher birth rates than their peers throughout the region.

- The pregnancy rates for African American teenagers were higher than average in all 14 CONNECT Our Future counties.
- Births to African American mothers of all ages had poorer outcomes than births for the rest of the population.
- Low birth weight babies more commonly born to African American mothers throughout the CONNECT region.
- Mortality among babies born to African American mothers was similarly at least 20 percent greater than for the rest of the population in 11 of the 14 CONNECT counties.
- African American mortality rates were higher than for the rest of the population in almost every county in the CONNECT region.
- African American mortality rates were higher than the rest of the population even in counties where overall mortality statistics indicate that these are "healthier" counties when compared with other counties in the region.

Notable health disparities in terms of health risk behaviors and health outcomes are also evident within the CONNECT Our Future region in relation to county location and the socioeconomic status of the residents of those counties. With only one exception (Stanly County), counties that are characterized mainly by behavioral risk factor indicators that are better than average when compared to their respective statewide averages are the most prosperous counties.

- Counties with relatively low health risk behavior rates have lower than average unemployment and poverty levels and higher than average education and household income levels.
- CONNECT counties with prevalence of behavioral risk factors that are average or worse than average typically exhibit less favorable socioeconomic characteristics, including average or below average income levels, average or higher than average poverty levels, and college education attainment levels below 20 percent.
- Most of these counties that exhibit worse than average behavioral risk factors are located greatest distance from the region's urban core (Mecklenburg County and the City of Charlotte).

County morbidity and mortality indicators in the region exhibit many of the same patterns.

- Counties with the lowest discharge rates for congestive heart failure (CHF) have the highest median incomes in the region.
- Three of the four counties that reported CHF discharge rates at least 20 percent greater than the statewide average also have higher unemployment rates, relatively low educational attainment levels, low household income, and higher poverty levels.
- The four counties that reported CHF discharge rates at least 20 percent greater than the statewide average are not adjacent to the urban core, and they are the four least populated counties in the CONNECT region.
- Most of the other more rural counties within the region also exhibit higher than average levels of chronic disease among their respective populations as indicated by hospital discharge diagnoses.
- Four of the more prosperous counties all exhibit lower than average mortality rates. Many of the other counties exhibit higher than average mortality rates.

The relationships between health disparities, socioeconomic status, and geographic location relative to the core urban area around Charlotte are not statistically perfect, yet most of the counties in the CONNECT region are easily categorized as either (1) sharing more favorable health outcomes (e.g., "healthier" counties) and more favorable socioeconomic indicators, or (2) sharing less favorable health outcomes and less desirable social and economic conditions—poverty, unemployment, fewer college-educated residents. The first category consists mainly of inner core counties—Cabarrus, Mecklenburg, Union (North Carolina), and York—while the second category includes suburban and rural counties that are farther away.

Concept Mapping

A formal concept mapping (CM) process was included in this project in order to provide a level of scientific rigor to the identification of what stakeholders within the CONNECT Our Future region perceive as the most important health issues for the region as well as their perceptions of the most critical health disparities within the region. In addition, the conceptual maps point to avenues for dealing with important underlying health disparities that are not captured elsewhere in the regional planning process; specifically, the themes of comprehensive health education and affordable, accessible health care for all. While these clusters are not tied directly to the top 10 regional planning priorities, they were deemed to be most relevant to health disparity remediation across the region. Efforts to enact the following changes are supported by the CM exercise:

- Ensure the availability of more transportation options that help people get to medical facilities; this is an important component of affordable and accessible healthcare for all, without which health disparities could grow more common and more severe.
- Fill gaps in health care access for all, including dental and mental health services. The ideas developed by the stakeholders were thoroughly infused with the notion of access for all, i.e., affordable and equitable access.
- Retain and strengthen public health education and campaigns focused on disease prevention and self-care/self-management; the emphasis on Comprehensive health education (e.g., health literacy) suggests that public health concerns need to be integrated directly into the planning process.

Stakeholder suggestions for addressing these high priority concerns included the following specific ideas:

- Better and more public transportation options.
- More walkable and bikeable communities, where sidewalks, paths, and greenways are both safe and connected.
- Efforts to decrease food deserts, increase community and school gardens, farmers' markets, and food entrepreneurship.
- Promote sensible urban and rural zoning to encouraging farming.
- Develop and enhance the region's recreational infrastructure and resources.
- Promote the region's recreational resources in order to encourage more physical activity among all populations and, consequently, improve the overall health of the population.
- Work towards improving air quality and reducing fossil fuel pollution throughout the CONNECT region in order to provide CONNECT region residents with a cleaner and healthier physical environment.

Conclusion

While health status and health disparity issues have been identified as important components for integration within the planning endeavor, the disparities identified here have significant implications for where region-wide resources should be directed. CONNECT Our Future region-wide planning efforts should increasingly incorporate health considerations, and these efforts should address the health disparities among African Americans in the region, regardless of location, along with a focus on the six or seven "least healthy" counties in the region as the highest priorities.

Recommendations

Community health assessment and remediation efforts, and the CONNECT Our Future regional planning effort have numerous interests in common, and these interests may be addressed through common solutions. Amelioration of the most serious racial, economic, and geographic health disparities within the CONNECT region—as well as planning for improving the health status of the entire region—will require greater explicit integration of these concerns within the CONNECT Our Future planning process now and subsequent regional planning efforts.

- Regional and local planning initiatives should recognize the impact that planning decisions, strategies, and tactics may have as benefits or detriments to the health of local populations. To that end, it is suggested that health impact assessment be routinely incorporated within planning analysis.
- Local and regional health officials (e.g., local health departments, health planners, health analysts) should be consulted regularly, and they should be invited to participate actively in the planning process wherever possible.
- More complete population health data need to be developed and made available so county health

indicators may be more closely examined, and so that the relationship of these indicators to social, economic, and demographic indicators may be assessed; state and local agencies, therefore, need to expand local behavioral risk factor surveys; youth risk behavior surveys, and other locally-focused data collection efforts to capture more small area data especially for minorities and other groups within the population.

- Planning efforts also need to identify how they may affect the health and well-being of racial and ethnic minorities—especially African Americans—who are subject to poorer health status and have poorer health outcomes than the rest of the population in the CONNECT region. Other racial and ethnic minorities—Latinos and Asians in particular—deserve similar attention, but specific data concerning their health status and disparities at the local level are, for the most part, not available.
- The study results also suggest that all public health campaigns designed to address health status and health disparities within the region be routinely examined to assess the level of cultural competency embedded within the campaign. To be most effective today, every health planning effort and every public health campaign should provide culturally competent messaging for all populations, and these messages should be delivered in culturally competent ways so that target populations understand, and welcome and support these planning efforts.

Public Policy ASSOCIATES INCORPORATED

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Introduction

The fourteen-county region of North and South Carolina around Charlotte, North Carolina, is one of the fastest growing and economically dynamic regions in the United States. In 2008, a majority of the region's local governments adopted a regional approach to "improving the economy, managing growth, protecting the environment, and enhancing education, social equity and collaboration among jurisdictions."[1] The CONNECT Our Future initiative was established in 2011 as a three-year process to build a "regional growth framework to grow jobs and the economy, improve the quality of life and control the cost of government."[2] This initiative has been supported by a $4.9 million grant from the U.S. Department of Housing and Urban Development Sustainable Communities program along with additional funding from local public and private sources. The basic purpose of the CONNECT Our Future initiative is to "coordinate long-term solutions to the interdependent challenges of economic development; social equity; energy use and climate change; and *health* and environmental impacts [emphasis added]."[3]

Over the past three years, nine program and process areas were identified as critical to this work moving forward, and work groups were established for each to provide "technical support and guidance to the process of developing a regional growth framework."[4] The Public Health Work Group (PHWG) is responsible for addressing the issue of health as a planning consideration and how the health status of the population and health disparities within the region relate to the growth and development of the region. PHWG is tasked with collecting standardized, baseline data on health and health disparities within the CONNECT region that are

"potentially useful in developing targeted interventions aimed at reducing disparities and improving the overall health of the region."[5][6]

Public Policy Associates, Incorporated (PPA), was engaged in February, 2014, to fulfill the data collection and analysis tasks defined by PHWG, specifically: (1) collect and report on a broad set of health indicators for each of the region's 14 counties; (2) to identify health disparities within and among the region's 14 counties; and (3) to solicit and compile recommendations from the region's residents regarding their concerns with and solutions for these disparities and other regional health issues. Since March 2014, PPA has been collecting baseline data for this report, including tabulations of adverse health behaviors (smoking, drinking, and illegal drug use), selected health outcomes (teen pregnancy and low birth weights), mortality (leading causes of death), morbidity (the most prevalent reasons for hospitalization), and the availability of health resources (health care providers and health care facilities) within the region. In addition, PPA implemented a concept mapping exercise with a cross-section of stakeholders and residents from the region in April, May, and June 2014. This structured approach to soliciting input from diverse participants was used to identify clusters of participants' greatest health concerns for the region and their recommendations for addressing these issues as part of the region-wide planning process.

Purpose of This Report

The purpose of this report is to analyze, document, and illustrate the importance of population health and well-being to the success of the broader CONNECT planning process—directly through the recognition that health concerns and solutions are often related to other planning issues and/or are addressed by other planning solutions, and indirectly by demonstrating how the CONNECT

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[1] University of North Carolina Charlotte, UNC Charlotte Urban Institute, PlanCharlotte, "CONNECT-ing to a regional vision of growth." http://plancharlotte.org/display/connect-regional-plan-public-engagement-economic-development-growth-mecklenburg-hud

[2] Ibid.

[3] Ibid.

[4] Centralina Council of Governments, CONNECT Our Future, "CONNECT OUR FUTURE PROCESS MAP," (No date).

[5] Centralina Council of Governments, CONNECT Our Future, "Public Health Work Group," (2014), http://connectourfuture.org/public-health/

[6] Centralina Council of Governments, *CONNECT Our Future, Request for Qualifications for Assessment of Public Health Disparities and Identification of Action Plan to Improve Conditions for the CONNECT Our Future Region*, (December 2013).

region can be a healthy place to live, work, and raise a family. Related purposes include the opportunity to illustrate how health issues and disparities are associated with the region's socioeconomic environment and to describe how the health concerns and recommendations identified through the concept-mapping process are similarly intertwined with other regional concerns and planning priorities, including parks and open space, air and water quality, preserving farmland, supporting local communities, and reducing the impact of commuting to work. Ultimately, this report is intended to demonstrate how these data and suggestions for improving the region's overall health status should be incorporated into a long-term, region-wide growth framework.

Data Collection and Analysis

Data presented in this report were obtained from publicly available state and county data repositories, including the South Carolina Department of Health and Environmental Control, North Carolina Department of Health and Human Services. Additional data were compiled from non-governmental sources such as the Annie E. Casey Foundation Kids Count database and County Health Rankings and Roadmaps (University of Wisconsin and the Robert Wood Johnson Foundation), as well as governmental sources such as the Centers for Disease Control and Prevention (CDC), Health Resources and Services Administration (HRSA), the Health Care Utilization Program (HCUP), and the Bureau of the Census. These data were subsequently compiled, analyzed, and presented in tables designed to illustrate health indicators and the health status of individual counties and, where available, by presenting these data by race, ethnicity, and/or gender within the counties.

Health Disparities

A main purpose of this exercise was to identify health disparities among the counties and populations within the fourteen-county region. Variations in the data from county or state-wide averages that met certain thresholds were identified as health disparities and were documented within the tables. Specifically:

- Differences of at least 10 percent in either direction between an indicator for a county and the same indicator for the respective state in which the county is located was identified as a health disparity, regardless of whether the state-wide indicator was at a desirable level or not. For example, in a state with a relatively high binge-drinking rate among adults (e.g., a "bad" or negative indicator), a county that reports a binge-drinking rate at least 10 percent higher or lower than the statewide rate would nonetheless be identified as a exhibiting a recognized disparity from the statewide rate.
- Differences between a health indicator for a population subgroup (e.g., women or African Americans) of at least 20 percent in either direction from the same indicator for the entire countywide population was also identified as a health disparity.

Concept Mapping

Concept mapping is a multi-step process by which ideas about an issue (such as health status or disparities) are clustered with other like ideas to illuminate the collective perceptions of the participants. A formal concept mapping exercise was subsequently conducted with the participation of CONNECT region stakeholders and residents in order to compile a set of the most important regional health issues and proposed suggestions for addressing these issues. A set of concept "maps" and "go zone" documents based on these results were subsequently prepared to illustrate the statistically-derived outcomes of this exercise and to identify some promising opportunities for addressing these issues.

Detailed description of the methods employed, data sources, and the concept-mapping process are presented in Appendix A.

Findings

Demographic, Social, and Economic Characteristics of the CONNECT Region

Data

Key demographic and socioeconomic data that were compiled for assessing the health status and health disparities within the CONNECT region include the following:

- County population size (1990 – 2020)
- Population composition: race, ethnicity, and gender
- Socioeconomic characteristics commonly associated with health status, including:
  - o Educational attainment
  - o Health insurance status
  - o Labor force participation and employment
  - o Household Income
  - o Poverty status

In addition to illustrating the size and location of the population that require health care services from birth to death, the dynamics of population change and the socioeconomic characteristics of the population provide insight into some of the factors that are associated with county-by-county variation in health status. In addition, these data illustrate how health status and health needs may vary within the region's counties.

Key Findings

- The CONNECT Our Future region is a fast growing area which has experienced 60 percent increase in population (1.2 million residents) since 1990 as Charlotte, North Carolina, became the second largest financial center in the United States.

Region-Wide Population Growth, 1990-2020
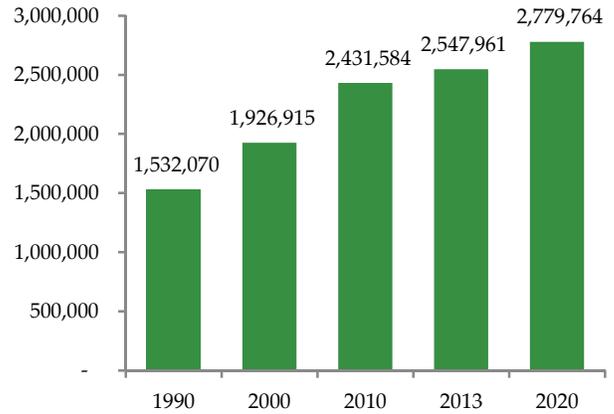
- The current population is approaching 3 million residents; almost one million of them reside in Mecklenburg County.
- Additional growth has been concentrated mainly in suburban Charlotte counties, including Cabarrus, Iredell, and Union counties in North Carolina and York County in South Carolina.
- The region is also growing more diverse as indicated by the growth of the Latino population by more than 1,000 percent since 1990.
- The population of the CONNECT region has been aging over the past several decades,[7] and this change is expected to continue, leading to greater demand for health care resources and services particularly as the baby-boom population grows older.

Region-Wide Population Growth by Race and Ethnicity, 1990 to 2012

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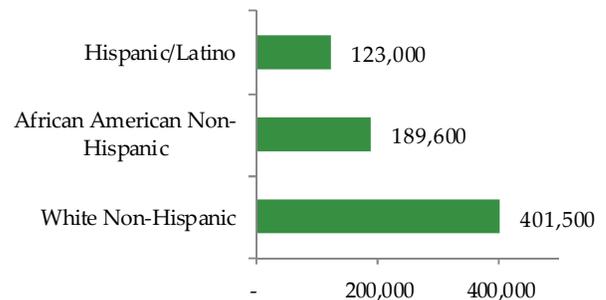
[7] North Carolina Office of State Management and Budget, LINC (Log into NC), LINC Report: Median Age, (August 5, 2014), http://data.osbm.state.nc.us/pls/linc/dyn_linc_main.show; Centralina Council of Governments, "Request for Qualifications," (Charlotte: December, 2013).

- Diversity is also evidenced by the growth of the Asian population, mainly in Mecklenburg County.
- Counties that are not contiguous with Mecklenburg County—Chester and Union counties in South Carolina and Anson and Stanly counties in North Carolina—have experienced considerably less growth or population stagnation.
- Counties that are not contiguous with Mecklenburg County are also characterized by relatively low educational levels, high levels of unemployment, and high levels of poverty (see the figure below).
- These non-contiguous counties are also commonly associated with overall poorer health status and health outcomes than their more prosperous neighbors, potentially requiring greater attention to preventive care, risky health behaviors, health access, and health care costs in these locations.

Percentage of Households in Poverty by County in the CONNECT Our Future Region, 2012

Implications

Demographic and socioeconomic data compiled for this report reflect several important issues that relate to comprehensive planning for the CONNECT Our Future region.

- The size of the population and its rate of growth indicate that the overall health and well-being of the CONNECT region and its ability to comprehensively plan for continuing growth should explicitly include access to care throughout the region as a planning priority, even for those areas where population and access to health care resources have grown in tandem over the past few decades.
- Poor health status and limited access to health care services should be at or near the top of the list of planning issues in the outer reaches of the CONNECT region where there has been considerably less population growth and where low employment and high levels of poverty are common.
- Aging population throughout the CONNECT region will generate increased demand for health care services in the future. Transportation options to access to care throughout the region may help to ameliorate some of the region's health disparities.
- Growing population diversity implies growing cultural and language challenges to deliver health care and the potential for new health disparities which should be addressed through several of the CONNECT planning priorities.

Health Risk Behaviors

There are a number of widely recognized individual behaviors that are commonly recognized as being a direct risk to one's health or are likely to lead to poor health outcomes or death sometime later in life.[8] These data are typically collected through the Behavioral Risk Factor Surveillance System (BRFSS) or the Youth Risk Behavior Survey (YRBS), both of which are conducted by the Centers for Disease Control and Prevention (CDC)

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[8] Centers for Disease Control and Prevention, Behavioral Risk Factor Surveillance System, "About the Behavioral Risk Factor Surveillance System (BRFSS)," http://www.cdc.gov/brfss/about/about_brfss.htm

in collaboration with state and local health departments. Other data are collected by state health departments.

Data

Twelve risky behaviors were identified by the PHWG for inclusion in this report. These included risky or unhealthy behaviors such as:

- Drinking, smoking, and drug use
- Teenage pregnancy
- Obesity and sedentary lifestyle
- Lack of health insurance

These data describe how the lifestyles of residents of the CONNECT region can potentially lead to poorer health status (morbidity) or death (mortality), and in either case require increased utilization of health care services. These behaviors are typically associated with higher than normal expenditures on health care in both the immediate and long-term. Understanding these data can help develop target informational campaigns and early intervention programs in order to help the population understand how these behaviors affect their health. While low levels of behavioral risk typically indicate a relatively healthy population and are desirable, rates and percentages for this study were compared with statewide rates to identify the counties that stand out prominently from the average.

Data on behavioral risks was obtained through various sources including state departments of health and the Annie E. Casey Foundation's Kids Count Data Base. Wherever possible, these data were collected at the county level. Some of these data, however, are only available at a regional level with some limited data for select counties—typically larger counties where an adequate sample for county-level findings were surveyed.

Drinking, Smoking, and Drug Use

The undesirable health behaviors that are most commonly found in CONNECT counties include binge drinking and adolescent marijuana use. Both are above average in five CONNECT counties, and the use of marijuana—particularly among middle school students—is above average in nine of the region's 14 counties. In North Carolina middle schools, 6.4% of students in the

Central/Piedmont Region[9] reported marijuana use in the past 30 days. Males and Hispanics reported higher rates of marijuana use. In Region 2 North Carolina high schools, marijuana use was reported by 20% of students, again with a higher rate for males, but with a lower rate for Hispanics. In South Carolina, 24% of students reported using marijuana in the past 30 days, with males reporting higher usage and females reporting lower usage.

For the CONNECT region as a whole, smoking rates are lower than the state average. While much of these data are only available at the regional level, some county data are available. Notably, smoking rates are higher than the state average in Rowan and Gaston counties. Smoking rates are lower than the statewide average in Mecklenburg, Lincoln, and Iredell counties. Lower smoking rates are generally reported by Hispanics/Latinos In North Carolina. South Carolina reports higher smoking rates among males than among females.

Data gathered on alcohol use (i.e., binge drinking) was available mainly at the regional level. For counties in the CONNECT region in North Carolina, alcohol use was similar to the state average. However, in Mecklenburg County, the only county where county-level data were obtained, binge drinking is significantly higher than the state average. In North Carolina, lower rates of alcohol use were reported among African Americans, while higher rates were reported by Hispanics and males. South Carolina CONNECT counties collectively reported slightly higher alcohol use rates than the state average. In South Carolina, lower rates were seen among the white and female populations.

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[9] The Charlotte AHEC region includes Anson, Cabarrus, Cleveland, Gaston, Iredell, Lincoln, Mecklenburg, Stanly, and Union counties. The Central/Piedmont Region (Region 2) Emergency Medical Services Region includes Alamance, Anson, Cabarrus, Caswell, Chatham, Cumberland, Davidson, Davie, Durham, Forsyth, Franklin, Gaston, Granville, Guilford, Harnett, Hoke, Iredell, Lee, Lincoln, Mecklenburg, Montgomery, Moore, Orange, Person, Randolph, Richmond, Robeson, Rockingham, Rowan, Scotland, Stanly, Stokes, Surry, Union, Vance, Wake, and Yadkin counties.

Teenage Pregnancy

The most important disparity among health outcome findings in the CONNECT region is that young African American women typically experience higher teenage pregnancy and teenage birth rates than their peers. Even in counties where teenage pregnancy and/or teenage births are close to the statewide average, rates of pregnancy and births among young African American women are noticeably higher than for other women of the same age. This is a critical disparity.

Teen Birth Rate, Ages 15-19, per 1000
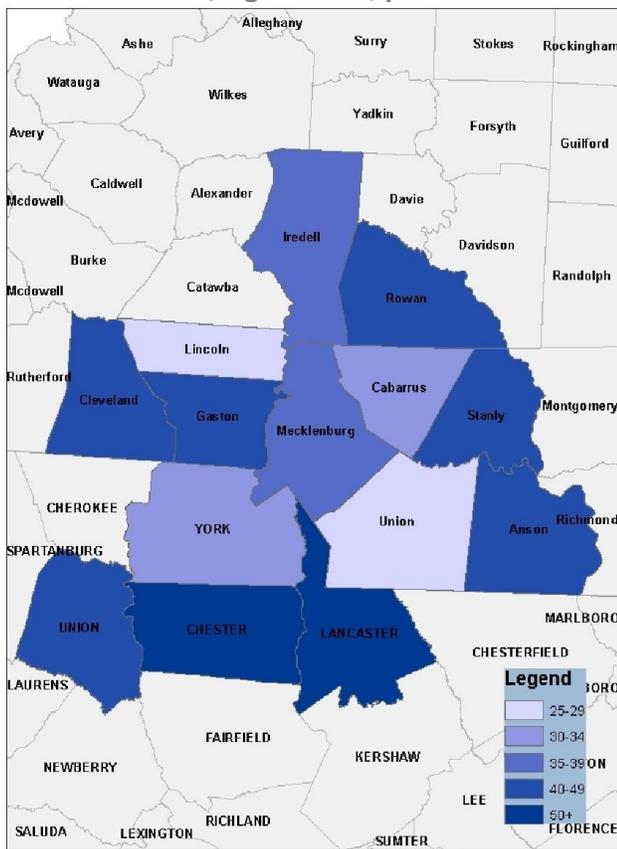
The figure displays the birth rate by county in the region.

Births to teenage girls are above average in half of the region's counties, and these births are more common in the CONNECT region's more rural and less populous counties than in the larger urban and suburban areas. One exception is the relatively low teenage birth rate in Lincoln County, North Carolina, which is a predominantly rural area within the Charlotte-Concord-Gastonia, NC-SC Metropolitan Statistical Area. Teenage birth rates are highest in Chester and Lancaster counties

in South Carolina. Teenage pregnancy rates are higher than the statewide average in eight of the region's counties. As with teenage births, teenage pregnancy rates for African Americans are higher than the statewide average in every county in the CONNECT Our Future region.

Obesity and Sedentary Lifestyle

In all four South Carolina CONNECT counties, obesity rates are slightly higher than the state average. Despite this, residents of these counties do not report having overly sedentary lifestyles. In North Carolina, obesity rates are generally lower than the state average. Similarly, the number of people reporting no physical activity is slightly lower than the state average.   In contrast, Rowan County residents reported much higher rates of sedentary lifestyles compared to the North Carolina statewide rate as well as any other CONNECT county. Union County, NC, and Iredell County, NC, on the other hand, both reported much lower rates of sedentary lifestyle than both of the states and the rest of the CONNECT counties.

Overall, higher rates of obesity for African Americans, Hispanics, and males were reported. Obesity data for children are limited to state-level data, with 31% of North Carolina children reporting being obese, while 39% of South Carolina children report being obese.

Lack of Health Insurance

The population without health care coverage in 2012 varied from a low of 9% in Union County, South Carolina, to a high of 19% in Rowan County, North Carolina.

In nearly every case, white populations report higher rates of coverage while African Americans and Hispanics have much lower rates of health care coverage.
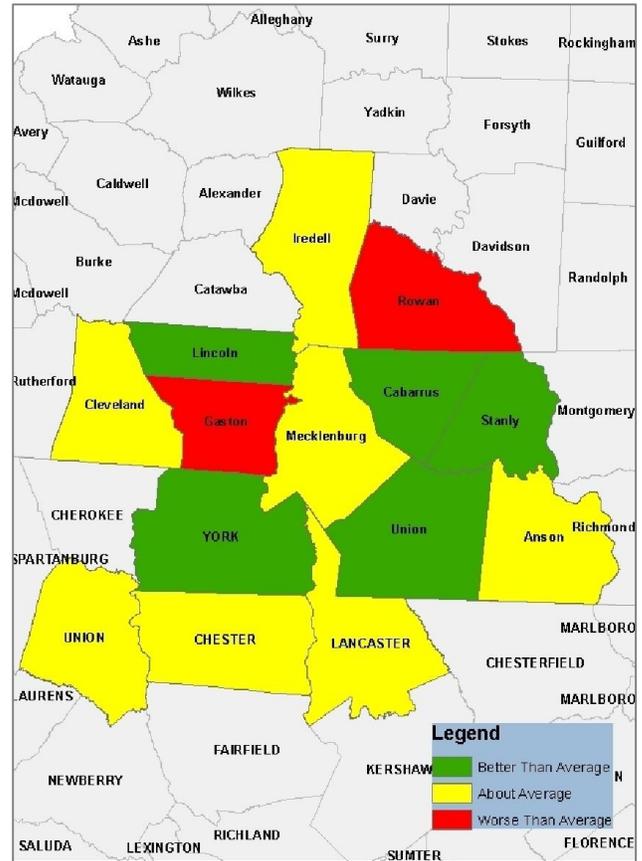
Summary

Table 1, below, displays how counties performed on behavioral health factors when compared to their respective states. This aggregation shows how counties are addressing overall behavioral risks.

Table 1. Number of Behavioral Risk Factors by County and How They Compare to Statewide Averages[10] [11]

County	Worse than Average	About Average	Better than Average
Anson	4	3	3
Cabarrus	1	2	8
Chester	4	3	3
Cleveland	3	5	3
Gaston	5	5	1
Iredell	2	4	4
Lancaster	2	6	2
Lincoln	1	6	4
Mecklenburg	3	3	5
Rowan	7	3	1
Stanly	3	2	6
Union NC	1	5	5
Union SC	1	6	3
York	2	2	6

The figure displays a map of the region highlighting areas that are usually better than the states, worse than the state, or essentially the same as the state with regard to health risk behavior.

[10] The number of behavioral risk factors identified for each county are not equivalent as data were not available for all behavioral risk categories for each county.

[11] South Carolina Department of Health and Environmental Control; North Carolina State Center for Health Statistics; Annie E. Casey Foundation Kids Count Data Base; County Health Rankings. Tabulations prepared by Public Policy Associates, Inc., 2014.

County-Level Behavioral Risk Factors Compared to State Averages

Half of the 14 CONNECT counties do not vary substantially from the average statewide rates or percentages for most of the behavioral risk categories. Five of the remaining counties appear to be "more healthy" than average, and two of the CONNECT counties exhibit several above-average health behaviors that may have long-term implications for the health of their residents. Cabarrus, Lincoln, Stanly, Union NC, and York counties are "healthier" than average, as indicated by their smoking, binge drinking, exercise, obesity, and teenage pregnancies and births indicators. In contrast, Gaston and Rowan counties, report a relatively large number of poor health behavior choices among their residents.

Implications

Risky health behaviors are preventable behaviors, and while the CONNECT region as a whole does not exhibit uniformly high levels of these behaviors, there are some findings that imply a need to address some health behaviors that are likely to have long-term deleterious implications.

Most prominent among them are the higher rates for teenage pregnancies and births than for the population at large. While these rates may be related to some of the social determinants of health such as poverty and lack of education, the fact that teenage birth rates have declined nationally for all racial and ethnic groups indicate that there are effective techniques available to address this issue.

It is widely recognized that teenage pregnancies and births can result in risky outcomes and perinatal health problems for the children who are born, and these outcomes may exacerbate the poverty and limited opportunities for the mothers of these children. For the long-term social and economic health of the CONNECT region—as well as to the overall physical and mental health of all of its residents—there is a clear need for CONNECT region planning efforts to address this issue for youth who may be at particular risk in this region.

The most serious implication of this finding is that region-wide growth and development in a region that promotes the health and well-being of all of its residents may be hampered or diminished over time if this health issue is not addressed and if the health outcomes of young African American women and men are not more fully brought into the mainstream of the region's long-term plans.

While it appears that some counties are addressing behavioral health better than others, every county has some data elements that are below the state average. Additionally, in many of these categories it is apparent that special efforts should be made to reach out to African Americans, Hispanics, and males in order to affect positive changes in lifestyles in order to improve the health of the CONNECT region.

According to the Centers for Disease Control and Prevention (CDC) "An ideal population health outcome metric should reflect a population's dynamic state of physical, mental, and social well-being. Positive health outcomes include being alive; functioning well mentally, physically, and socially; and having a sense of well-being. Negative outcomes include death, loss of function, and lack of well-being. . . . Diseases and injuries are intermediate factors that influence the likelihood of achieving a state of health."[12]

For purposes of this report, three aspects of health outcomes are employed as distinct but related approaches to identifying the health status of the CONNECT Our Future region. The following sections identify diseases and lack of well-being (morbidity) and death (mortality) within the region. This section focuses more directly on health outcomes related to pregnancy, birth, and two of the more problematical health issues that are most closely associated with disadvantaged families and children: lead poisoning and childhood asthma.

Child and Maternal Health

The health of newborns, children, and their mothers are sentinel indicators of the overall health of a community, as they represent both the legacy health issues in the community as well as the health potential of an entire future generation.[13] Infant mortality and poor birth outcomes (such as low birth weight) more often than not represent institutional or endemic deficits in the health care system or, at the very least, barriers or limitations to comprehensive health care for the mothers and, possibly, the rest of the community. These indicators also may reflect social and economic determinants of health, especially indicators of children's chronic health problems that can be prevented. In addition, maternal and children's health issues are typically associated with higher than normal expenditures for health care in both the immediate and long-term.

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[12] R.G. Parrish, "Measuring population health outcomes." Prev Chronic Dis 2010;7(4):A71. http://www.cdc.gov/pcd/issues/2010/jul/10_0005.htm.

[13] D. Reidpath, and P. Allotey, "Infant Mortality as an Indicator of Population Health," *Journal of Epidemiology and Community Health* 57 (2003): 344-345.

Understanding these data can help identify where intervention is needed to improve birth outcomes, mothers' health, and healthy children.

Data

Two of the most common indicators of unhealthy births were chosen for this analysis as were two chronic children's health issues that have the potential to restrict full social and intellectual development among children as they grow.

- Low birth weight (e.g., birth weight of less than 2,500 grams)
- Infant mortality (infants who die at birth for every 1,000 live births)
- Asthma (as indicated by hospitalization for this disease)
- Lead Poisoning (as indicated by the lead levels in the bloodstream that may lead to physical and intellectual deficits)

Findings

Birth Outcomes

Births to African American mothers throughout the CONNECT region resulted in poorer outcomes than births for the rest of the population. Low birth weight and very low birth weight[14] births to African American mothers are at least 20 percent higher in each of the 14 CONNECT counties than for other mothers.[15] As shown in the accompanying figure, infant mortality among African American mothers is similarly at least 20 percent greater than for the rest of the population in 11 of the 14 CONNECT counties.[16]

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[14] Low birth weight babies are less than 2,500 grams at birth; very low birth weight babies are less than 1,500 grams at birth.
  [15] The rate of very low birth weights among African American mothers is suppressed in Union County, South Carolina, due to the small size of the African American population.
  [16] Annie E. Casey Foundation Kids Count Data Base, "Infant Mortality Rate by Race," 2010, accessed April 2014, http://www.datacenter.kidscount.org/; tabulations by PPA.

Disparities in African American Infant Death Rates

In most of these counties, the rate is about twice that of the state average, and in Lincoln County it is four times the state average. Overall, infant death rates are below average in 4 counties (Chester, Cleveland, Gaston, Lancaster) and better than average in 7 counties (Cabarrus, Iredell, Mecklenburg, Rowan, and Union Counties in North Carolina, and Union and York counties in South Carolina).

Other Indicators

Other childhood health indictors in the CONNECT region are less clear. Childhood asthma does not appear to be a major problem in the region as only two of 14 counties report higher than average hospitalizations for children with asthma, but one of these is Mecklenburg County with almost one million residents. Given that Mecklenburg County contains approximately 40 percent of the entire region's residents, the volume of childhood asthma cases in Mecklenburg County is worthy of further attention.

There is very limited information about lead poisoning among children in the region, but the data that are available do not point to this being a significant problem.

In contrast, despite the lack of county-level childhood obesity data, the statewide rates of 31 percent for North Carolina and 39 percent for South Carolina[17] are consistent with the relatively high levels of childhood obesity across the nation. These rates serve as region-wide markers for children's health now, and the potential for adult health problems in the future because of childhood obesity. Childhood obesity is a serious problem and should be addressed throughout the CONNECT region now and the very near future.

Implications

The most important finding on child and maternal health is the striking disparity in infant death rates and low/very low birth weights for children of African American mothers. While South Carolina and North Carolina both rank in the top one-third of all states for infant mortality,[18] the findings presented here imply that a significant reduction in statewide infant mortality might be addressed by focusing more attention on providing African American women with more and better prenatal care. Data from the federal Office of Minority Health report that African American women are less likely to participate in prenatal care than other mothers-to-be.[19] An important implication of this is that more outreach efforts and assistance are needed to help improve African American mothers' health and to identify potential infant issues well before birth.

As with any risky behaviors that may lead to unanticipated pregnancy and birth, these issues need to be viewed in the context of larger, region-wide issues of economic development and planning. Child and maternal health may be among the most important "stealth" issues that need to be considered in the context of economic development, housing and community planning, transportation planning, and environmental planning in additional to health planning itself. Unplanned births and unhealthy infants often limit economic opportunities for mothers. This may limit their housing choices, limit their employment and educational opportunities, and may require greater transportation options to meet their needs. In contrast, although health issues such as childhood asthma and lead poisoning do not appear to be endemic in the CONNECT region, it should also be noted that data reporting on these two issues are limited in both states. Asthma discharge data are available at the county level, but demographic breakdowns of these data were not available, thus limiting the ability to determine which, if any, population groups are most seriously affected. Data on lead poisoning was limited to regions only with no additional demographic details. Determination of the current and potential impact of air and water pollution as well as environmental issues such as lead poisoning requires expanded and improved collection of these data elements at the county level.

Morbidity

As noted in preceding chapters, risky behaviors and the experiences of mothers and newborns set the stage for health and wellness—as well as illness and death—for both individuals and for entire communities in future years.

Illness and death (morbidity and mortality) largely reflect the long-term outcomes of decisions and experiences that occur earlier in life. Individuals who choose to smoke cigarettes when they are young (health risk behavior), for example, are likely to be hospitalized for chronic obstructive pulmonary disease (COPD) or other lung condition (e.g., morbidity) when they get older. The individual may even die from COPD, pneumonia, or lung cancer (mortality) as a result of the health behaviors that often occur relatively early in life.

In order to provide an overview of the CONNECT region's morbidity profile, PHWG requested that the most common reasons for hospitalization (excluding delivery and birth) within the CONNECT region be

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[17] Annie E. Casey Foundation Kids Count Data Base, "Children and teens overweight or obese by gender," 2011-2012, accessed April 2014, http://www.datacenter.kidscount.org/.

[18] Centers for Disease Control and Prevention. *Infant Deaths per 1,000 Live Births, By State: 2010,* http://www.cdc.gov/nchs/pressroom/states/INFANT_MORTALITY_RATES_STATE_2010.pdf

[19] U.S. Department of Health and Human Services, The Office of Minority Health, *Infant Mortality and African Americans,* http://minorityhealth.hhs.gov/templates/content.aspx?ID=3021

identified for each of the region's 14 counties. These data typically represent the chronic diseases and diseases of the older population within the region, and these data are particularly important as the baby-boom generation ages and begins to put increasing demand for services onto the entire health care system—from physicians to hospitals to long-term care—across the region.

Data

The leading reasons for hospitalizations are indicative of the chronic illnesses and long-term effects of poor health choices that are most common within a given population. Data on the diagnosis of patients at discharge was collected to identify the ten most commonly occurring reasons for hospitalization for the residents of each county regardless of the hospital or location in which they were cared for. These data were obtained from HCUP[20]—a consortium of states that contribute statewide sets of hospital patient records that may be used to analyze patterns and trends in illness and treatment in hospitals across the United States. Patient discharges were chosen as they typically reflect the highest acuity illnesses and/or treatments patients have experienced during their hospital stay. Diagnoses in the patient records were standard ICD-9-CM categories[21] further aggregated in a smaller number of Clinical Classifications categories which were developed by the Agency for Healthcare Research and Quality. Discharges presented in this report are rates per 100,000 state population adjusted by age to reflect state baseline population data in 2000. Data are also provided for hospital discharges for age groups 0 to 17, 18 to 44, 45 to 64, and 65 and older.

Findings

Patients in the CONNECT region were most commonly discharged with one of the eleven diagnosis categories listed in Table 2. Discharges were based on the residence of the patient, not the location of the hospital. The rankings of the discharge categories vary from county to county.

Table 2. Most Common Hospital Discharge Categories in North and South Carolina[22]

Discharge Category*	Description
Acute cerebrovascular disease (stroke)	Diseases of the blood vessels and arteries that supply blood to the brain; often results in a stroke
Acute myocardial infarction	Heart attack
Cardiac dysrhythmias	Irregular heart beat
Chronic Obstructive Pulmonary Disease	Progressive disease of the lungs or airways that makes it difficult to breathe
Congestive heart failure	Diminished heart capacity, inefficient delivery of oxygen and nutrients to the body, resulting in fluid build-up in the heart, the kidneys, and other organs
Diabetes with complications	Lack of insulin production or limited insulin production that damages the nerves and small blood vessels of the eyes, kidneys, and heart, leading to heart attack, and stroke
Mood disorders	Psychiatric and psychological problems including bipolar disorder, depression, anxiety, and drug addiction
Osteoarthritis	Breakdown of cartilage in the joints, particularly weight-bearing joints of the hips, knees, and spine
Pneumonia (except caused by tuberculosis or sexually transmitted diseases)	Infections of the lung that may be caused by bacterial infection, viral infection, or the introduction of foreign objects into the lungs, such as food
Renal failure	Kidneys stop working as a result of infection, medications, an injury, or a blockage such as kidney stones
Septicemia (except in labor)	An extreme immune system response to an infection that has spread throughout the blood and tissues

*It should be noted that although diabetes is not identified as one of the most common discharge categories, diabetes is an underlying condition for several of the chronic disease listed in the Table 2. Diabetes is similarly an underlying factor in the most common causes of death that are identified in a later section of this report.

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[20] HCUP, State Inpatient Databases, 2011, based on data collected by individual states and provided to AHRQ by State Partners. Weighted national estimates from HCUP Nationwide Inpatient Sample (NIS), 2011, AHRQ, are based on data collected by individual states and provided to AHRQ by the States. Community-level statistics represent measures created at the county-level or county equivalent-level.

[21] International Classification of Diseases, Ninth Revision, Clinical Modification

[22] Definitions: WebMD.com and other sources.

Most of the most common discharges reflect the prevalence of chronic diseases within each county and, not surprisingly, discharge rates in most cases are highest for the population aged 65 and older. Hospitalization for heart problems, stroke, and pneumonia are typically associated with the oldest members of the community. Others, such as diabetes and COPD are also diseases of older people and are often the result of behavioral choices earlier in life. Important differences, however, may be seen in the discharge rates for people with these conditions among the CONNECT region's counties, indicating several possible differences among the counties such as access to care, poverty, employment, or other lifestyle and cultural factors.

The most common chronic disease-related discharge diagnosis across the 14-county region is congestive heart failure (CHF).

Disparities in Congestive Heart Failure Discharge Rates
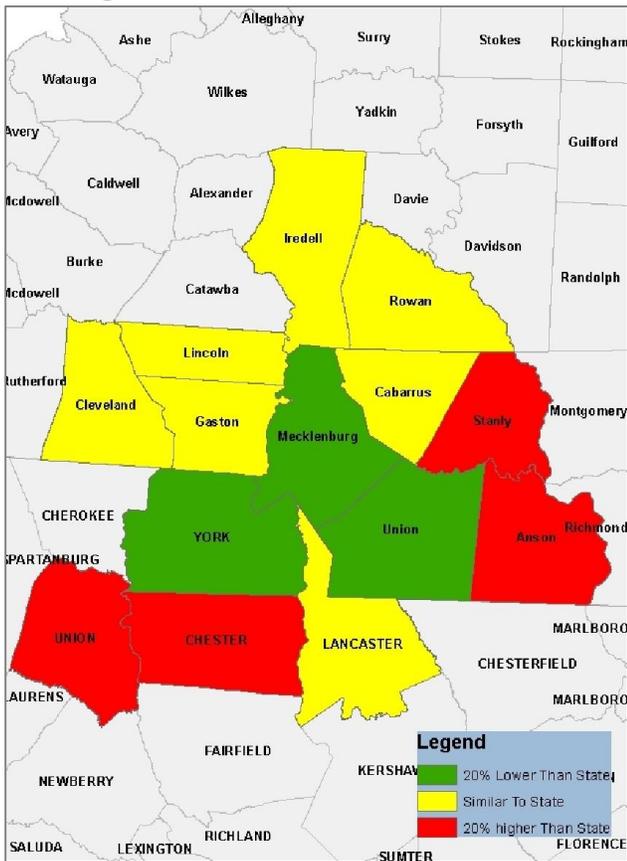
As seen in the figure, there are some important differences among the counties in terms of their individual comparisons. The three counties with the lowest discharge rates (at least 20 percent lower than the statewide average) for CHF are those with the highest median household incomes in the region. In contrast, three of the four counties that reported CHF discharge rates at least 20 percent higher than the statewide average have higher unemployment rates, relatively low educational levels, low household incomes, higher poverty levels. These four counties (Anson and Stanly in North Carolina; Chester and Union in South Carolina) are not adjacent to Charlotte (Mecklenburg County) and are the four least populated counties in the CONNECT region. In addition, most of the less populated and more remote counties within the region have a preponderance of their discharges above the statewide rate, indicating higher than average levels of chronic disease among their respective populations.

In contrast, three of the more prosperous counties (Mecklenburg, York, and Union North Carolina) have a preponderance of most common discharges that are below the respective statewide levels in North and South Carolina. Two explanations may be offered for this pattern. First, much of the region's health care infrastructure is located in Mecklenburg County and is relatively accessible and reachable by residents of Charlotte and some of its major suburbs. Beyond that, however, the populations of these three counties are wealthier, more educated, likelier to be employed, and more likely to have health insurance. Although Cabarrus County does not exhibit overwhelming lower discharge rates than the State of North Carolina, it nonetheless has enough lower than average discharge rates to appear in the "Below Average" column in Table 3, below. This table provides another illustration of the variation of the 14 CONNECT region counties from a chronic disease/morbidity perspective.

Table 3. Disparities Between CONNECT County Discharge Rates and Statewide Rates for the 10 Most Common Discharge Categories (2011)

County	Above Average	About Average	Below Average
Anson	8	2	0
Cabarrus	1	2	7
Chester	9	1	0
Cleveland	7	3	0
Gaston	6	4	0
Iredell	3	6	1
Lancaster	6	4	0
Lincoln	5	5	0
Mecklenburg	0	2	8
Rowan	5	5	0
Stanly	6	4	0
Union NC	0	4	6
Union SC	10	0	0
York	1	1	8

Here, the four counties with notably better discharge rates (e.g., lower rates per 100,000 population) are the large urban and suburban counties surrounding Charlotte (Cabarrus, Mecklenburg, and Union counties in North Carolina; York County in South Carolina) that have relatively easy access to tertiary care services and extensive medical networks. These are also counties with the highest levels of educational achievement and among the lowest poverty levels in the region.

Implications

It is likely that the counties with relatively high discharge rates on a large number of chronic conditions have less access to primary health care providers, as is common in more rural settings and among economically disadvantaged populations. Hospital treatment for chronic conditions such as these may be reduced through better access to and adherence to preventive care, and this can be facilitated through transportation and technology planning. Typical approaches include mobile health care services, telemedicine, policy decisions that expand the types of practitioners that can provide preventive care services in locations where physicians may be in short supply, and public transportation to provide older, rural, and economically disadvantaged populations the opportunity to meet with providers. For younger generations, prevention is critical, and prevention requires

knowledge and education. Planning for parks and recreation, opportunities for active transportation, support for local fruit and vegetable production, and access to fresh produce through farmers markets and the development of new, local, and innovative food production and distribution programs all have the potential to improve health and reduce the incidence of several chronic conditions.

Mortality

As stated in the preceding section on morbidity, the rates and causes of illness and death within a population or community provide a revealing backward look at both individual health decisions as well as the social and economic characteristics of a community. As with most illness and hospitalization in the U.S., death is often the culmination of the long-term presence of a chronic disease or the sudden result of a chronic condition that may have been untreated over a period of time.

In order to provide a greater perspective on the health status of the CONNECT region and to identify health disparities that might be revealed through examination of leading causes of death, PHWG requested an analysis of the most common causes of death in each of the region's 14 counties. As with hospital discharge data,[23] chronic diseases and diseases of the older population within the region—that are often the same—are particularly important as the population ages and the demand for health care services grows.

Data

Data on the leading causes of death and death rates were obtained for each by county from the North Carolina and South Carolina state departments of health. Mortality rates for each county are age adjusted so that they may be directly compared. Data were also obtained for death rates by race (white non-Hispanic and African American non-Hispanic), ethnicity (Hispanic), and gender, where available. The demographic breakdowns of these data in particular are useful in identifying health disparities within the populations and should be publicized and addressed through the CONNECT planning process.

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[23] There is some overlap between morbidity and mortality data as a death that occurs within a hospital is coded as a discharge.

Findings

Mortality rates among the 14 CONNECT Our Future counties are divided among two groups—nine counties in which the average mortality rates exceed the counties' respective statewide mortality rates, and four counties in which the mortality rates are lower (e.g., better) than the statewide rates. One additional county had an overall mortality rate very close to the statewide rate. The countywide rates and their relationship to their respective statewide mortality rates are illustrated in Table 4. Table cells highlighted in red are counties that have mortality rates in excess of the statewide rate and cells highlighted in green have mortality rates that fall below the statewide rate.

Table 4. Age Adjusted Mortality Rates, 2012
(Death per 100,000 Residents)[24]

County	All Residents	African American	Statewide
Anson	915	971	901
Cabarrus	847	RSU[25]	901
Chester	762	775	678
Cleveland	991	RSU	801
Gaston	976	RSU	801
Iredell	878	RSU	801
Lancaster	607	904	678
Lincoln	906	RSU	801
Mecklenburg	707	911	801
Rowan	924	RSU	801
Stanly	885	RSU	801
Union NC	767	RSU	801
Union SC	806	781	678
York	674	728	678

The four counties shaded green in Table 4, above (Mecklenburg, Cabarrus, Lancaster, and York counties)—which together comprise 58 percent of the region's current population—all exhibit below average mortality rates. Cabarrus, York, and Lancaster counties are all adjacent to Mecklenburg County, and these rates may again reflect greater access to tertiary care services in

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[24] North Carolina State Center for Health Statistics 2014; South Carolina Department of Health and Environmental Control, 2014.
[25] Results statistically unreliable.

and around Charlotte. These differences may also be attributed to the social and economic characteristics of Mecklenburg, Cabarrus, and York counties. These three counties have higher incomes, lower poverty rates, and are better educated than most of the counties with higher than average mortality rates. As with other findings presented in this report, these findings imply that higher socioeconomic status and relatively close access to a broad spectrum of health care services, including tertiary care, are both associated with below average mortality rates, and these rates may serve as a broad surrogate for identifying healthier versus less healthy locations within the CONNECT region.

Mortality by Race and Ethnicity

The most important finding here is that wherever data by race were available, African American populations consistently suffered higher than average mortality rates. Even among those counties that are "healthier" than others as indicated by lower than average mortality rates, the African American populations exhibited higher—often considerably higher—rates of mortality than were found for the rest of the population. Only Union County, South Carolina, is an exception to this pattern.

Mecklenburg County is the largest county in the region with more than 900,000 residents, of which thirty percent (277,000) are African American. Disparities in mortality by race are available for Mecklenburg County while they cannot be determined for other counties in the region. Overall mortality is one-third higher among African Americans in Mecklenburg County than for the white, non-Hispanic population. Similarly, African American death from cancer in Mecklenburg County are 39 percent higher than for the population at large. The cardiac death rate is 34 percent higher, the death rate from stroke is 50 percent higher, the diabetes death rate is 130 percent higher, and the mortality rate for kidney disease is approximately 300 percent higher among African Americans. Although fewer data points are available, this pattern of higher African American mortality rates by cause of death is also evident in some of the other CONNECT counties.

For counties where data are available, mortality rates for the Hispanic population tend to be lower than either the overall countywide mortality rate or the statewide

mortality rate. For most counties, however, the only mortality data available for the Hispanic population were countywide rates. No additional, condition-specific conclusions can be reached with regard to the region's growing number of Hispanic residents.

Leading Causes of Death

The most common causes of death in the CONNECT region are identified in Table 5.

Table 5. Most Common Causes of Death in the CONNECT Our Future Region (2012)

Rank Order	Cause of Death
1	Diseases of the heart
2	Cancer
3	Cerebrovascular disease
4	Pneumonia and influenza
5	Chronic lower respiratory diseases
6	Diabetes mellitus
7	Nephritis, etc.
8	Alzheimer's disease
9	Motor vehicle accidents
10	Septicemia
11	Other unintentional injuries

Mortality rates for the most common diseases vary from low rates in Mecklenburg and adjacent counties to much higher rates in the outer counties of the region.

The figure immediately below illustrates the distribution of cancer mortality rates among the 14 CONNECT region counties.

Mortality Rate per 100,000 (Cancer)

Mecklenburg, York, Union (North Carolina), Lancaster counties have the lowest cancer mortality rates in the region. Chester County, South Carolina, has the highest rate.

As can be seen by the next figure, below, mortality rates for heart disease exhibit a similar pattern to the rates for cancer.

Mortality Rate per 100,000 (Diseases of the Heart)
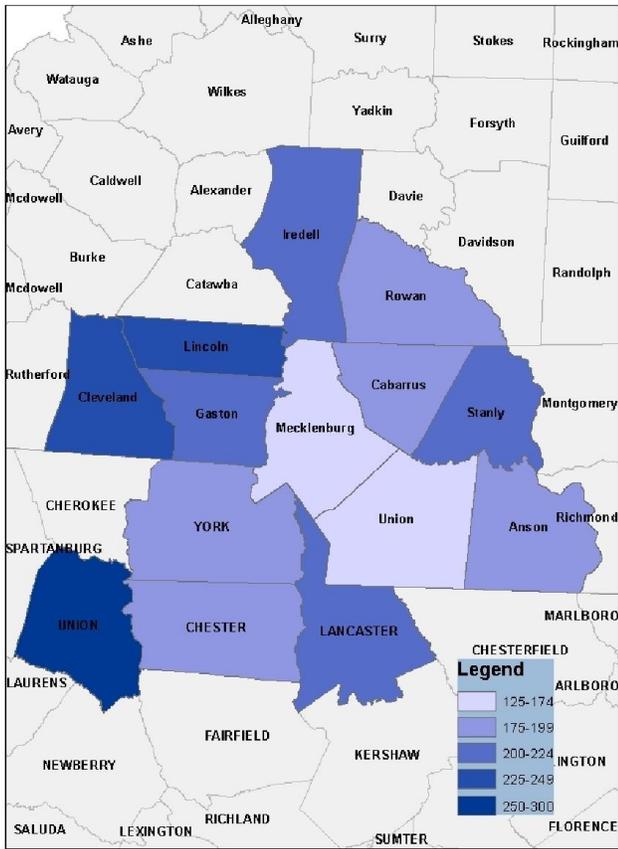
The lowest mortality rates for heart disease in the region are concentrated in Mecklenburg and adjacent Union County, North Carolina. Higher heart disease mortality rates are reported as distance from the region's urban core in Charlotte increases.

Disparities in mortality by gender are also evident across the CONNECT region. Women in the region exhibit higher mortality than men for five of the leading causes of death in the region: diseases of the heart; cancer; chronic lower respiratory diseases; diabetes; and injuries other than car accidents.

Implications

The most critical implication of these findings is that disparities in mortality among the region's population—particularly among African Americans—need to be addressed in order to improve the life chances of African Americans in the CONNECT region, as well to improve the region's overall health status and its desirability as a

place for continued economic growth for all people. The causes of death that disproportionately affect the CONNECT region's African American population are preventable. Interventions that promote earlier diagnosis of chronic or pre-chronic conditions through greater access to primary care, as well as greater efforts to encourage healthier lifestyles among populations at risk, can positively affect diseases of the heart, cancer, diabetes, and lung disease. Planning efforts therefore should not only recognize these disparities, but should be more explicitly addressed as part of the comprehensive approach to planning for all racial and ethnic groups for the CONNECT region's future growth and prosperity.

Expanded and ongoing participation by health planners, health providers, public health officials, academics, health insurers, and health care consumers within the overall planning process would help to address these issues. Furthermore, as African Americans in the CONNECT region commonly exhibit higher mortality rates for many chronic conditions, special efforts should be made to engage more minority community residents and leaders in health and related planning efforts to affect long-term changes. Planning for healthy lifestyles, parks and recreation, and access to healthy foods should similarly involve African Americans, Latinos, South and East Asians, African immigrants, other population groups.

Health Resources

Health resources in the form of health care facilities (hospitals, clinics, and long-term care facilities) and health care providers (physicians, nurse practitioners, dentists, physician assistants, and allied health care technicians and technologists) are important components of the health status of a community or region. The availability or lack of availability of any of these components, the level of services available (e.g., primary, secondary, tertiary care services), and the geographic distribution of these resources all have a significant impact on access to care, utilization, and, ultimately, the health of the community at large.

Data

The main source of data for the CONNECT region is the Area Health Resources File (AHRF), a data base maintained by the Department of Health and Human Resources, Health Resources and Services Administration (HRSA). This dataset includes reasonably accurate and comprehensive information about licensed medical practitioners, licensed health care facilities (hospitals, clinics, and long-term care facilities), and health insurance.

Findings

Extensive health resources are available to the population within the CONNECT Our Future region, including more than 5,900 acute care hospital beds, almost 5,500 physicians, 3,100 advanced and specialized nurses, and more than 800 nurse practitioners.

Table 6. Health Resources in the CONNECT Our Future Region[26]

Health Resources	North Carolina Portion	South Carolina Portion	Total CONNECT Region
Total Number Hospitals (2010)	24	5	29
Total Hospital Licensed Beds (2010)	4,911	1,011	5,922
Total Nursing Home Licensed Beds (2010)	369	227	596
DO, Non-Federal and Federal, Active (2011)	197	25	222
MD's, Non-Federal and Federal, Total Active (2011)	4,687	440	5,127
Dentists, Total Professionally Active (2009)	930	129	1,059
Physician Assistants w/NPI (2012)	761	43	804

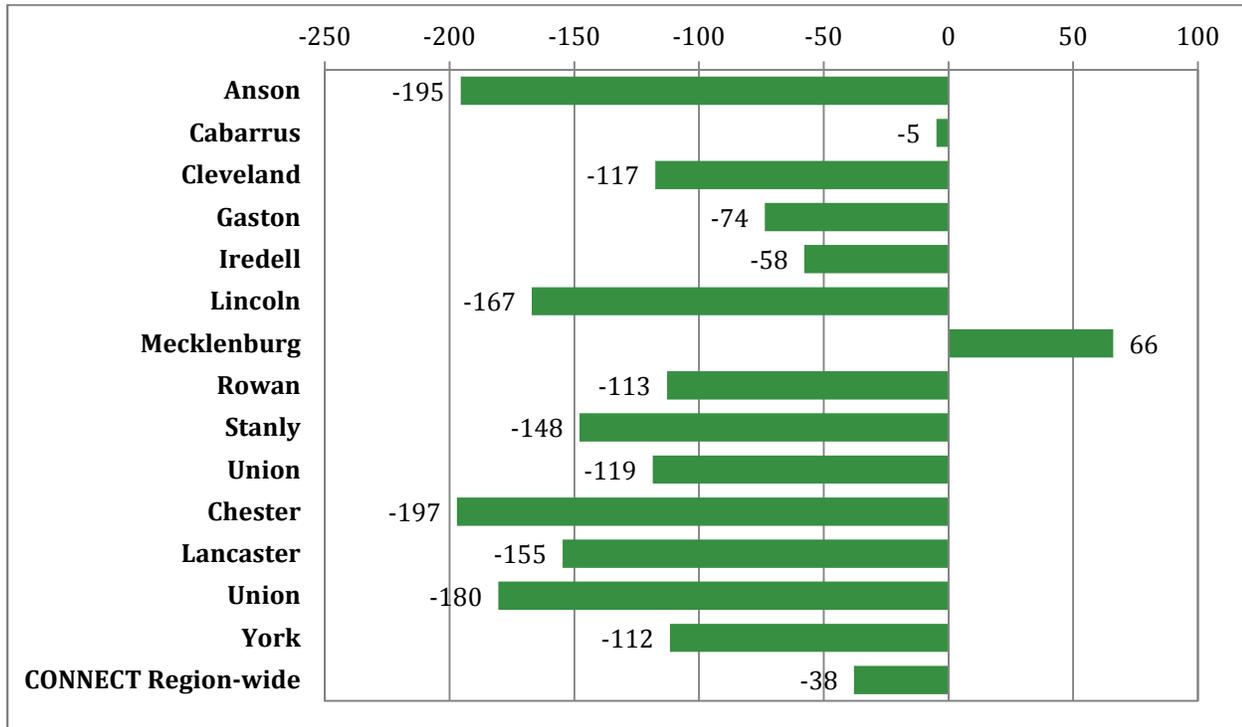| Health Resources	North Carolina Portion	South Carolina Portion	Total CONNECT Region
Advanced Practice Registered Nurses w/NPI (APRN) (2012)	1,437	112	1,549
Nurse Practitioners w/NPI (2012)	809	76	885
Clinical Nurse Specialists w/NPI (2012)	11	4	15
Cert Registered Nurse Anesthetists w/NPI (CRNA) (2012)	581	30	611
Advanced Practice Nurse Midwives w/NPI (2012)	36	2	38
Federally-Qualified Health Clinics (FQHCs)	24	8	32

Despite the large number of facilities and health care practitioners in the CONNECT region, neither facilities nor practitioners are evenly distributed in terms of population distribution or health care needs across the region. According to the Health Resources and Services Administration (HRSA), Medically Underserved Areas[27] are found in each of the 14 CONNECT Our Future counties, and almost all of the fourteen counties have some primary care provider deficits. Only Mecklenburg County, with its high concentration of health care resources and facilities, has a higher than average concentration of physicians in the region. All other counties exhibit a deficit, and the region as a whole has 38 fewer physicians (based on physicians per 100,000 residents) than would be expected given statewide averages across both states. As a result, access to care—

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[26] U.S. Department of Health and Human Services, Health Resources and Services Administration, "Area Health Resources File (AHRF)," accessed June 9. 2014, http://ahrf.hrsa.gov/download.htm

[27] Health Professional Shortage Areas (HPSAs) commonly have fewer than one primary care physician for every 3,500 residents although some other factors may be relevant; medically underserved areas (MUAs) are designated by a combination of persons below the federal poverty level, population aged 65 and older, and persons who may face cultural or linguistic barriers to health care. U.S. Department of Health and Human Services, Health Resources and Services Administration, accessed June 9, 2014, http://www.hrsa.gov/shortage/

particularly primary care services—is seriously compromised in several of the region's counties. Shortages like these typically result in difficulties in finding a medical home, getting access to a physician when needed, or excessively long wait times to see a care provider. As noted in the figure below, physician shortages are greatest in some of the least prosperous counties on both sides of the state line.

Surplus/Deficit of Physicians[28] (MDs and DOs) per 100,000 Residents in the CONNECT Region, 2012[29]

County	Value
Anson	-195
Cabarrus	-5
Cleveland	-117
Gaston	-74
Iredell	-58
Lincoln	-167
Mecklenburg	66
Rowan	-113
Stanly	-148
Union	-119
Chester	-197
Lancaster	-155
Union	-180
York	-112
CONNECT Region-wide	-38

Similarly, although the CONNECT region has close to an adequate number of acute care hospital beds as determined by statewide figures for North Carolina and South Carolina, the figure below illustrates the uneven distribution of acute care hospital beds among the 14 CONNECT counties.[30]

Several counties in both the North and South Carolina portions of the region have lower than average hospital beds than warranted by their population.

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[28] Physician surpluses and deficits are based on the statewide average number of physicians per 100,000 residents, compared with the number of physicians per 100,000 residents for each county. U.S. Department of Commerce, Bureau of the Census, *American Community Survey*, 2012.

[29] U.S. Department of Health and Human Resources, Health Resources and Services Administration, "Area Health Resources File, 2012," http://ahrf.hrsa.gov/download.htm. (Calculations prepared by Public Policy Associates, Inc., 2014).

[30] U.S. Department of Health and Human Resources, Health Resources and Services Administration, "Area Health Resources File, 2012," http://ahrf.hrsa.gov/download.htm; U.S. Department of Commerce, Bureau of the Census, *American Community Survey,* 2012 (Calculations provided by Public Policy Associates, Inc., 2014).

Hospital Beds per 100,000 Residents in the CONNECT Our Future Region
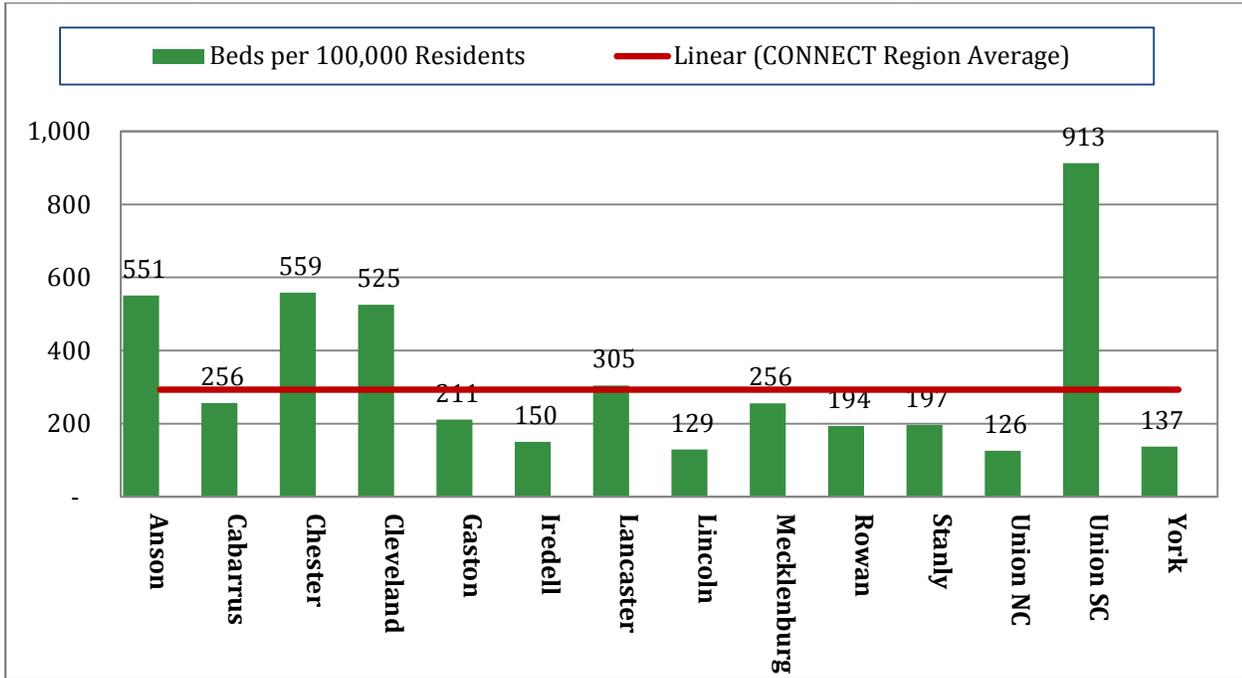
Implications

The maldistribution of physicians and hospital facilities in the CONNECT Our Future region is not a unique problem. This is a component of the health care access issue that is evident throughout the nation, especially in more rural and thinly populated areas.

Attracting physicians to rural areas is a common problem beyond the CONNECT region. There have been a number of different means that have successfully addressed this issue in various locations. These include the use of telemedicine, Foreign Medical Graduates (who are required to practice in a medically underserved area as part of their J-1 Visa waiver), and satellite physician offices or practices in rural areas to which physicians and other providers travel periodically. Additional options include increasing utilization of nurse practitioners, physician assistants, and clinical nurse specialists to reduce the patient load on physicians and to expand opportunities for patients to independently receive primary care services. Allowing physician extenders to work at the "top of their license"—that is, allowing expanded responsibilities to nurse practitioners and physician assistants, may help to alleviate some shortages and should be considered for the CONNECT region.

Federally-qualified health clinics, in particular, have expanded access to health care through the use of several of these approaches in numerous locations—both rural and inner city—for more than two decades.

Fewer physicians and fewer hospital beds in some counties indicate that patients often must travel to larger regional medical centers. This is not only a driver for transportation planning that will facilitate access to care, this may also result in economic stresses for rural and small town residents who may need to take time off from work in order to access care services. The importance of telemedicine and related technologies such as home health monitoring to address access issues also needs to be accounted for in communications planning throughout the CONNECT region. Planning for the installation and availability of broadband services throughout the CONNECT region in order to make telemedicine and remote monitoring feasible may ultimately be as important to the health of the region as is transportation planning.

Environmental

A healthy environment is important for maintaining and improving individual and community health throughout

the CONNECT Our Future region, and it is equally important to prevent illness and premature death that may be caused by non-infectious, non-occupational environmental factors. It is particularly essential to identify and understand environmental hazards that may affect the most vulnerable segments of the population, including newborns and children, people with disabilities, and the elderly.[31]

Environmental factors that affect the health and well-being of people include air pollution, exposure to toxic chemicals, clean water, radiation exposure, carbon monoxide exposure, and extreme weather (heat, cold, and drought). The built environment can also have an important effect on health and well-being. Policies, plans, and projects to create healthy and safe environments—or to eliminate unhealthy and unsafe environments—are now widely recognized as contributing to individual and population health.[32] The built environment may include buildings, facilities, roads, other transportation, parks, and many other factors.

This overview of the health status and health disparities within the CONNECT Our Future region includes limited analysis of air and water resources within the 14-county region.

Data

The specific external factors that affect the health of the population and that were examined for this report are the most central features of environmental health: air quality and drinking-water safety.

Air quality was reported as the average level of fine particulate matter in the air (micrograms per cubic meter). These data were obtained from the Centers for Disease Control and Prevention WONDER Environmental database.[33] Additional air quality measures included the levels of carbon monoxide, lead, nitrogen, and ozone in the air. Data were limited almost exclusively to

measurements in Mecklenburg County.

In contrast, water quality data were tabulations of the percentage of the local population served by drinking water utilities that have recorded any drinking water quality violation during the reporting period. These data are one-time samplings of water sources in treatment or storage facilities. The entire population served by these utilities is therefore considered to be potentially exposed to poor quality water. These data were acquired from the Environmental Protection Agency, Safe Drinking Water Information System.[34] While water quality violations are not a direct indicator of water quality, this metric is commonly used as a surrogate measure for water quality. Some additional water quality data were obtained from the largest water utility in each county on a number of different contaminants such as excessive levels of:

- Barium
- Fluoride
- Manganese
- Mercury
- Sodium
- Sulfates
- Nitrates

Findings

Water quality violations data reported here indicate that nine of the 14 counties had no violations at all. Five counties reported higher rates, and only one county reported a worrisome situation; Union County, South Carolina reported that more than one fourth of its population (28 percent) was potentially exposed to water resources in excess of standard water quality pollution limits.

In contrast, air quality, as measured by fine particulate matter, is little different in each of the 14 counties from the statewide particulate matter averages reported for North Carolina and South Carolina. All of the counties did have slightly higher rates of fine particulate matter in the air than the state. The North Carolina average was 12.4, while the CONNECT counties ranged from 12.52 to

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[31] Centers for Disease Control and Prevention, "National Center for Environmental Health," accessed on August 8, 2014, http://www.cdc.gov/nceh/

[32] Centers for Disease Control and Prevention, "Healthy Places. Health Impact Analysis," accessed on January 3, 2014, http://www.cdc.gov/healthyplaces/hia.htm

[33] "CDC Wonder," accessed on August 13, 2014, http://wonder.cdc.gov/controller/datarequest/D73a

[34] "South Carolina, 2014," County Health Rankings & Roadmaps, accessed on August 13, 2014, http://www.countyhealthrankings.org/app/south-carolina/2014/measure/factors/124/map

12.79. The South Carolina average was 12.49, with CONNECT counties ranging from 12.61 to 12.75.

Additional data collected on specific pollutants in the air and water, respectively, indicated no clear instances of pollution levels exceeding federal standards on a county-by-county basis. Unfortunately, no data for specific pollutants in the air (carbon monoxide, lead, ozone, and others) are reported for most of the counties in this region. In contrast, data on the concentration levels for 15 common chemicals potentially found in water resources were available for each North Carolina county in the region, but all of the concentration levels are either below the federal limits or were too small to report at all. The value of the water quality data are further limited as water pollutants are reported by utility companies for only the largest municipality in each county. Water pollution in rural areas, therefore, cannot be determined from readily available sources.

Implications

From the data obtained, the CONNECT region does not appear to have more than a few minor environmental concerns in terms of air and drinking water quality, and these do not appear to have major influence on the health of the region's population. However, the lack of detailed air and water quality data for most of the CONNECT region's counties does not mean that air and water quality issues—or other environmental concerns—are not having an impact on the health of the region's population. This issue cannot be resolved given the limited information available for the region at this time.

The most important implications of these findings (or lack of findings) are that (1) additional reporting mechanisms and aggregations for data collected by local environmental agencies need to be established to make these data more accessible, and (2) environmental health professionals need to identify all potential environmental issues in the region and devise or adopt metrics to report on these issues to the public.

Health Status and Disparities

Compilation of extant data from reputable and readily available health data sources in North Carolina, South Carolina, federal agencies, and well-known private sources such as the Annie E. Casey Foundation, and

County Health Rankings paint a picture of a region that exhibits many of the same health patterns and trends that are found throughout the United States. Childhood and adult obesity is common, risky health behaviors such as smoking cigarettes, binge drinking, and using illegal drugs is common, and the chronic diseases associated most strongly with older people are evident in the hospital discharge and mortality data presented. Health data combined for the entire region point neither towards a population that is significantly healthier or significantly less healthy than comparable metropolitan areas elsewhere. This very "average" health status, however, masks some important health disparities within the CONNECT region that are closely related to the diversity of the population, the population's geographic distribution, and the social and economic characteristics of the population.

Population growth in the region has been fueled mainly by the growth of the City of Charlotte and its adjacent suburbs. That growth has spilled over into surrounding counties and those along major transportation routes in both North and South Carolina. These areas are typically more prosperous areas characterized by relatively high household income levels and low poverty levels, higher levels of education, and lower unemployment rates. Surrounding this inner core, however, are some additional parts of the region that are less well integrated with the economic drivers in Charlotte and Mecklenburg County, and are characterized by less well-educated populations with lower income levels, higher unemployment, and more poverty.

The population of this region will continue growing in the foreseeable future, and it is likely that it will continue to become more diverse. The region will continue to grow older, although some of the newer and faster growing components of the population—Latinos, Asians, and other immigrants, in particular--are typically younger on average than the rest of the population. Like much of the rest of the nation, as the region's population has grown, it has also become considerably more diverse. The Latino population has grown ten-fold over the past two decades and now totals approximately 140,000. The CONNECT Region's Asian population has similarly expanded. The Asian population of Mecklenburg County alone is close

to 50,000. Approximately one of every five CONNECT region residents are African American. Between 1990 and 2012, the region's African American population grew from 316,000 to 525,000 and remains the largest component of the region's diversity.

These characteristics and trends provide an important backdrop for understanding the most important health disparities within the CONNECT Our Future region.

Race

Wherever health data by race is available at the county level, disparities between the white non-Hispanic and African American non-Hispanic populations are striking. These disparities are most evident in terms of women and children's health and the causes of death throughout the region.

Births to African American mothers throughout the CONNECT region exhibited poorer outcomes than births for the rest of the population. Low birth weights (less than 2,500 grams) and very low birth weights (less than 1,500 grams) are usually indicators of prenatal health problems for the mothers and/or lack of access to prenatal care. Low birth weight and very low birth weight babies are often pre-term babies who may have health problems that may have restricted their growth or fostered early delivery. Regardless, these babies require extensive care, often in a neonatal intensive care unit (NICU). In all 14 CONNECT Our Future counties, the proportion of low birth weight babies born to African American mothers are at least 20 percent higher than for other mothers. The implication of this unfortunate pattern is that African American children born in the CONNECT region are more likely to begin life with a significant health-based disadvantage.

Mortality among babies born to African American mothers is similarly at least 20 percent greater than for the rest of the population in 11 of the 14 CONNECT counties. In most of these counties, the infant mortality rate is about twice that of the white population as well as approximately twice the statewide average infant mortality rate regardless of race. In Lincoln County, North Carolina, African American mothers experienced four times the infant mortality rate that was experienced among white mothers.

Related to both of these undesirable outcomes is the finding that young African American women experience higher teenage pregnancy and birth rates than their peers who are not African American in all 14 counties of the CONNECT Our Future region.

In terms of those chronic diseases and adverse events to which the deaths of individuals may be directly attributed, African Americans consistently suffered higher mortality rates than the population at large in the same county. This pattern was evident even within those CONNECT region counties (Cabarrus County, Lancaster County, Mecklenburg County, and Union County, North Carolina) that are "healthier" based on their better than average (e.g., lower) age-adjusted death rates for all residents. Death rates among the African Americans in three of these four counties[35] were also higher—often considerably higher—than for the rest of the population.

Geography and Socioeconomic Status

Health disparities in CONNECT Our Future region related to risky health behaviors and health outcomes are mainly associated with county location and the socioeconomic status of the residents of those counties.[36]

For the most part, counties that exhibit better than average behavioral risk factor indicators when compared to their respective statewide averages are also the most prosperous counties. These counties are characterized by lower than average unemployment and poverty levels, and higher than average education and household income levels. CONNECT counties with behavioral risk factors that are average or worse than average typically exhibit less favorable socioeconomic characteristics, including average or below average income levels, average or higher than average poverty levels, and college education attainment levels below 20 percent. Most of these counties are not adjacent to Mecklenburg County.

Morbidity and mortality indicators exhibit the same patterns. As an example, counties with the lowest

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[35] Mortality data for the African American non-Hispanic population in Cabarrus County were statistically unreliable and, thus, not reported.

[36] It is also very likely that there are racial and ethnic components of these disparities, but this level of analysis was beyond the scope of this project.

discharge rates for CHF have the highest median incomes in the region. Three of the four counties that reported CHF discharge rates at least 20 percent higher than the statewide average also exhibit higher unemployment rates, relatively low educational attainment levels, low household income, and higher poverty levels. In contrast, three of the four counties that reported CHF discharge rates at least 20 percent higher than the statewide average have relatively high unemployment rates, low educational attainment levels, low household incomes, and higher poverty levels. These four counties (Anson and Stanly in North Carolina; Chester and Union in South Carolina) are not adjacent to Charlotte (Mecklenburg County), and they are the four least populated counties in the CONNECT region. Most of the other smaller and more remote counties within the region also exhibit higher than average levels of chronic disease among their respective populations as indicated by hospital discharge diagnoses.

The four more prosperous "inner" counties (Mecklenburg, Cabarrus, Lancaster, and York)—which together comprise 58 percent of the region's current population—all are healthier than average as indicated by lower than average mortality rates. Cabarrus, York, and Lancaster counties are all adjacent to Mecklenburg

County, and these rates may again reflect greater access to tertiary care services in and around Charlotte. As with patient discharge data and health risk behavior indicators, these differences may also be attributed to the social and economic characteristics of those four counties. Mecklenburg, Cabarrus, and York counties have populations with higher median incomes, lower poverty rates, and their residents are better educated than most of the counties with higher than average mortality rates.

These findings imply that higher socioeconomic status and relatively close access to a broad spectrum of health care services, including tertiary care, are both associated with below average mortality rates, and these rates may serve as a broad surrogate for identifying healthier versus less healthy locations within the CONNECT region. Table 7 summarizes the geographic/socioeconomic disparities among the counties along with the mortality disparities that are available for the region's African American population. As indicated in Table 7, each indicator for each county is identified as either "worse" or "lower" than average, "better" or "higher" than average, or "n.a." where comparative data are not available. The aggregate status of each CONNECT county may be determined by looking across the rows.

Table 7. CONNECT Our Future County Rankings for Selected Health and Socioeconomic Indicators

County	Child & Maternal Health	Health Risk Behavior	Population Mortality Rates	African American Mortality	Hospital Discharges	Median Income	College Education	Family Poverty
Anson	Worse	Worse	Worse	Worse	Worse	Lower	Lower	Higher
Cabarrus	Average	Better	Better	n.a.	Better	Higher	Average	Lower
Chester	Worse	Worse	Worse	Worse	Worse	Lower	Lower	Higher
Cleveland	Worse	Average	Worse	n.a.	Worse	Lower	Lower	Higher
Gaston	Worse	Worse	Worse	n.a.	Worse	Average	Lower	Average
Iredell	Worse	Better	Worse	n.a.	Average	Higher	Average	Lower
Lancaster	Worse	Average	Better	Worse	Worse	Average	Lower	Higher
Lincoln	Worse	Average	Worse	n.a.	Average	Higher	Lower	Lower
Mecklenburg	Worse	Better	Better	Worse	Better	Higher	Higher	Lower
Rowan	Worse	Worse	Worse	n.a.	Average	Lower	Lower	Higher
Stanly	Worse	Better	Worse	n.a.	Worse	Average	Lower	Lower
Union NC	Worse	Better	Better	n.a.	RSU	Higher	Higher	Lower
Union SC	Better	Average	Worse	Worse	Worse	Lower	Lower	Higher
York	Average	Better	Average	Worse	Better	Higher	Higher	Lower

While relationship between disparities, socioeconomic status, and geographic location relative to the core urban area around Charlotte is not perfect, most of the counties in Table 7 are easily identified as falling within one or another set of counties: (1) those sharing more favorable health outcomes with more favorable socioeconomic indicators; and (2) those sharing less favorable outcomes with less desirable social and economic conditions. The inner core counties—Cabarrus, Mecklenburg, Union (North Carolina), and York—plus Iredell County fall within the first category. Anson, Chester, Cleveland, Gaston, Rowan, Stanly, and Union counties (South Carolina) represent the second category. The other two counties (Lancaster and Lincoln counties) fall somewhere between the two main categories. While the health issues and disparities identified throughout this report should, ideally, be addressed through the CONNECT region's comprehensive planning process in order to improve the entire region's health and well-being, socioeconomic, racial, and intra-regional variations may call for more targeted attention. Health status, disparities, and the factors associated with them are not evenly distributed throughout the region. Many of the conclusions reached in the preceding paragraphs as well as many of the suggestions drawn from the CM exercise may be more urgently applied to some locations than to others, to some populations than others. Thus, despite the general recommendation that health status and health disparity be integrated into the overall regional planning endeavor, immediate efforts to improve the health and well-being of the entire CONNECT Our Future region may be best served by addressing the health status and health resources available to the residents of the seven "less healthy" counties identified in Table 7, above.

Concept Mapping

A formal concept-mapping process was included in this project in order to provide a level of scientific rigor to the identification of what stakeholders within the CONNECT Our Future region perceive as the most important health issues and disparities within the region. Concept mapping is a multi-step process by which ideas about an issue (such as health status or disparities) are clustered with other like ideas to illuminate the collective perceptions of the participants. Clusters may be assessed in terms of their importance across stakeholders, and they may be further analyzed to determine how they relate to sub-sets of stakeholders. This exercise has been particularly helpful in gaining critical insight into several of the stakeholders' underlying regional health concerns and how they relate to broad CONNECT planning effort.

The Concept-Mapping Process

Concept mapping is any practice in which diagrams or "maps"[37] are used to represent ideas. In this study, CM refers to a particular structured methodology for consolidating the ideas of a group or organization.[38] This participant-driven research process produces qualitative and quantitative information that brings together the ideas contributed by individual participants into clusters of themes or concepts which are displayed as a series of maps and other visual tools. The results are used to help stakeholders develop a common framework for planning or evaluation purposes. In this study, CM was undertaken to identify actions that ought to be taken to reduce health disparities and improve the health status of the CONNECT region.

Participants in the CM process were identified using a database of diverse individuals who had previously participated in various activities of the CONNECT Our Future initiative. Individuals were invited to indicate their interest in the CM process, and from this interest list, the project team invited participation in one or more

stages of the CM process. The project team attempted to ensure diverse demographic and geographic representation. The group of invitees also included members from PHWG and CONNECT Program/Policy Forum members.

The steps that relied on public input were:

1. Generate creative ideas about health status and health disparities
2. Sort and rate these ideas
3. Interpret the results

The CM process began with the each participant generating ideas in response to this prompt: "One thing that would help make people healthier in this region is…" The ideas that completed this phrase became the data that described opportunities to improve health in the region overall.[39]

The second step was for each participant to sort the statements, i.e., "creative ideas," into thematic groups, according to any scheme that made sense to them personally. At this stage, however, statements were not assessed any greater value or importance than any other statement, but the individual thematic sortings were used as the foundation of the statistical analysis. Sortings were transformed into an aggregate map that displayed clusters of themes or concepts all of which are presented as being equivalent in value. The distance between statements on the maps indicate the relative similarity of ideas; those that are close together on the map were more often grouped together into piles, and statements that are farther apart were less likely to be grouped together, by each stakeholder. Accordingly, thematic clusters that appear near each other on the map are more similar to each other than clusters than are not nearby.

Each statement was rated by the participants on two separate 5-point value scales:

• "Rate how much you, your family and friends, would support each statement."
• "Rate each statement in terms of its ability to address major health inequalities in the region."

In the third and final step in the process, stakeholders

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[37] Diagrams typically used in concept mapping are called "maps" as they resemble symbolic representations of physical landscapes or spaces.

[38] W. Trochim and M. Kane, *Concept Mapping for Planning and Evaluation* (Sage Publications, 2007).

[39] Details about the methodology are in the appendix.

Health Disparities

were gathered to interpret the findings. Stakeholders participated in a facilitated meeting where they were charged with determining how many clusters were meaningful to them in terms of addressing potential solutions to health inequities within the region. The evaluation team presented to the group the ten-cluster solution map as a reference point, along with maps with fewer and with greater numbers of clusters, for comparison. Each map held a potential conceptual framework from which to consider potential solutions to health inequities. The ten-cluster solution map was finally selected, because it was conceptually cohesive, and offered a level of detail that was neither too fine nor too broad to be useful. Based entirely on the stakeholder statements, groupings, and labeling, the final named cluster map constitutes the conceptual framework and the basic results of the CM process.

It is important to understand that despite the statistical process of grouping together the ideas of numerous stakeholders into clusters, the understanding of what each cluster represents is subjective. Determining the number of clusters that stakeholders believe represent a reasonable set of potential solutions for the CONNECT region's health disparities is also subjective. Therefore, there is no one most correct way to address these issues, and therefore there is no one most correct cluster map.

Findings

A complete set of CM results, including the 97 concepts identified by participants in response to the prompt question ("One thing that would help make people healthier in this region is…") along with concept maps and tables may be found in Appendix B.

The following paragraphs present:

- A description of the stakeholder participants in the exercise
- A summary of the conceptual clusters, i.e., their labels, examples of their ideas, and descriptions
- Importance ratings of items and clusters
- Ratings of clusters, according to subgroup differences;
- Areas of high agreement in ratings, also known as " go-zone" areas
- Crosswalk between CM results and previously generated regional priorities
- Recommendations.

Participants

Of the participants in the sorting and rating step, 30% were people of color or of Hispanic ethnicity, and 70% were white, non-Hispanic. There was representation from 10 of the 14 counties in the region, but participants were otherwise fairly homogenous in terms of other characteristics:

- All had some college education
- The majority were over age 44
- Two-thirds were female
- Most were at or above median household income

Conceptual Clusters

The final named cluster map is shown in the following figure below.

Cluster Map: 10 Cluster Solution
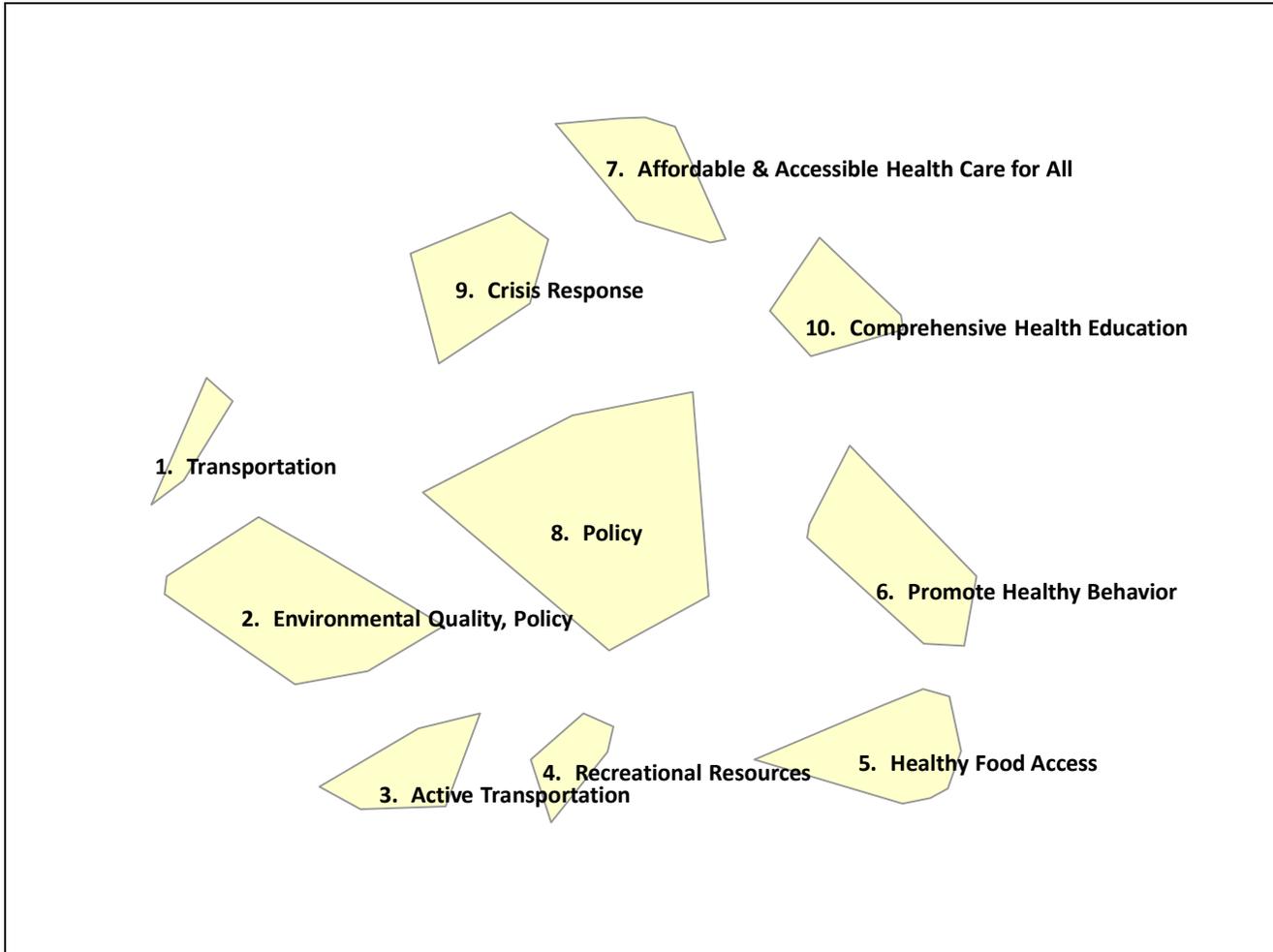
Listed in Table 8 is each cluster in the map, along with a description of the conceptual theme and examples of ideas that comprise the cluster.

Table 8. Final Conceptual Clusters Chosen by the Stakeholders

Cluster Name	Summary of Concept and Examples of the Ideas
Transportation	Ideas concerned with the development of more and better transportation options. Options were deemed important for the ability to get to medical appointments. Ideas also concerned transportation between towns and regions. *Example ideas:* • More and better access to public transportation in towns and regions. • More transportation options to appointments
Active transportation	Ideas clustered into the active transportation theme highlighted the issue of building more walkable and bikeable communities. This emphasized the need for safety and more connected sidewalks, paths, and greenways. *Example ideas:* • Building more walkable communities with mixed uses. • Safer ways to walk and bicycle

Cluster Name	Summary of Concept and Examples of the Ideas
Recreational resources	Ideas focused on promoting fitness and the resources to facilitate fitness. The ideas highlight the need for park and recreational facilities and for the promotion of walking and biking. *Example ideas:* • More parks and recreational facilities • Free or low cost exercise group activities at local community centers
Access to healthy food	The ideas generated did not speak directly to preserving farm land, but spoke emphatically about easier access to, visibility of, and affordability of fresh, healthy food. *Example ideas:* • Easier access to, and affordability of healthy foods • More visible and consistent local, fresh, seasonal food options.
Environmental quality, policy	Ideas concerned with various means of improving air and water quality, including land use strategies and promotion of density. *Example ideas:* • Improved air and water quality through research, development, technology and adopted best practices. • The reduction of fossil fuel pollution and its use in our daily lives in order to create a healthier air, soil, and water environments for all of us
Affordable and accessible health care for all	Ideas in this set spoke to the need for healthcare access, including dental and mental health services, and emphasized equitable access for all. *Example ideas:* • Affordable access to care from nurse practitioners in poor areas of the state. • Universal access to quality health care -- everybody in, nobody out • A more robust, more accessible, mental health services infrastructure
Crisis response	Ideas in this cluster were related to helping families manage crisis and facilitate their access to resources. *Example idea:* • One portal of entry for family and human services, so families can be connected to available resources.
Comprehensive health education	Ideas are concerned with public health education about preventive and self-care. They stress the importance of public health campaigns to improve health in the region. *Example ideas:* • Comprehensive health promotion and disease prevention education in the school system. • Access to early childhood education for all children. • More thorough patient education whereby they have a solid understanding of disease prevention, health promotion and disease management, if applicable
Promote healthy behavior	These ideas, although similar to public health education, were less focused on comprehensive education and more focused on demonstration and promotion of healthy behaviors in general and healthy eating choices specifically, to help shift cultural norms and change behavior. *Example ideas:* • Promote and educate the importance of physical activity and being active regularly, for the entire family • Programs to help parents learn how to cook nutritious meals on a budget
Policy	These ideas, located in the center of the map, were often related to ideas in other clusters. These tended to be more holistic, and can be seen as speaking to both lifestyle and policy. *Example ideas:* • All workplaces being free of any indoor tobacco smoke exposure • More physical education in schools

Importance Ratings

Participants rated each idea that they had generated in two ways. First, ideas were rated in terms of their ability to address major health inequalities in the region ("Inequality Scale"), and, second, they were rated in terms of how much they and their friends and family would support the idea ("Support Scale"). Certainly, each idea generated by participants has some merit or inherent importance. This is reflected in the fact that, overall, participants tended to rate all the items fairly high. The relative importance, however, does vary and is illustrated by the ratings.

From the ratings of individual items, an average cluster rating was calculated; this is the mean rating of all items that fell within a given conceptual cluster. The average ratings for both scales for all 10 clusters are shown below. Across all items, regardless of cluster, the average rating for addressing inequality (Inequality Scale) was 3.73, and the average rating on the Support Scale was 3.86. Overall, participants rated items very similarly on both scales.[40] This indicates that ideas deemed influential for addressing inequalities were also seen as important to support personally.[41]

Table 9. Average Cluster Ratings
(Scale: 1= not at all important; 5= very important)

Clusters	Address Inequality[42]	Would Support[43]
Comprehensive health education	4.03	4.10
Affordable and accessible health care for all	4.02	4.08
Transportation	3.92	4.06
Promote healthy behavior	3.82	3.85
Active transportation	3.79	3.94

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[40] Correlations are presented in the appendix.

[41] Because the two scales were highly correlated, the bulk of the remaining discussion is focused on the addressing inequality ratings.

[42] "Rate each statement in terms of its ability to address major health inequalities in the region. Use a five-point scale where 1 means not at all important and 5 means very important."

[43] "Rate how much you, your family and friends, would support each statement. Use a five-point scale where 1 means not at all important and 5 means very important."

Clusters	Address Inequality[42]	Would Support[43]
Healthy food access	3.78	3.91
Crisis response	3.71	3.94
Policy	3.59	3.71
Recreational resources	3.38	3.63
Environmental quality, policy	3.17	3.34

The ratings of clusters were also analyzed according to subgroups by race and by age, revealing some variations that the PHWG team was urged to consider. Differences across subsets of the participants—for the three highest rated clusters overall—are summarized in the table below.

Table 10. Statistically Significant Differences in Average Ratings for Addressing Inequality, for Highest-Rated Clusters

Subgroup Difference Tested	Cluster		
	Trans-portation	*Affordable and accessible health care for all*	*Comprehensive health education*
White respondents rated cluster lower on average than persons of other races/ethnicity	Not different	Groups were different	Groups were different
Respondents aged 25-34 rated cluster lower on average than other age groups	Not different	Groups were different	Not different

"Go Zones"

Ideas cluster together because they exemplify a theme or concept; but some ideas, even within a cluster, are rated higher than others. A closer look at the three highest rated clusters was conducted by examining how the individual items in the cluster were rated on average by subgroups. The results are displayed in a series of plot diagrams, or "go-zone charts"—one for each cluster where there were statistically significant differences between groups.

For example, the figure below shows the ideas in the "affordable and accessible health care for all" cluster, as rated for addressing inequality, by different age groups. The ideas in the upper right hand quadrant of the go-zone

are those rated higher than average by both participants aged 25-34, and those not aged 25-34 (e.g., by all other age groups). The upper right quadrant reflects the most pressing or important ideas, and these warrant serious consideration in action plans to remediate health disparities. In this analysis, the high value items are labeled 5, 6, 10, 24, 31, 36, 94, 95, and 97. See page B-7 for definitions of items.
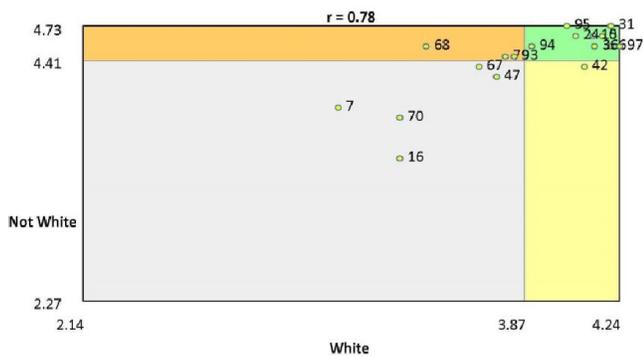
Go Zone: Address Inequality Ratings of Affordable & Accessible Health Care for All by Age
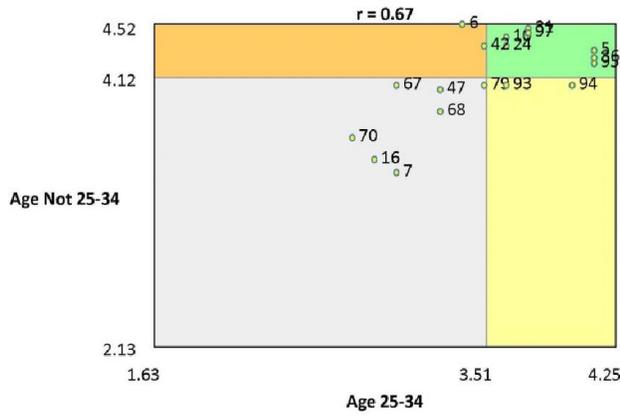
High value items in cluster: 5, 10, 24, 31, 36, 95, 97

Go Zone: Address Inequality Ratings of Affordable & Accessible Health Care for All by Race

High value items in cluster: 5, 6, 10, 24, 31, 36, 94, 95, 97

The appendix presents additional go-zone analysis, to identify the ideas deemed of greatest importance, for each of the 10 clusters, this time using the ratings of ideas on scales representing (1) support for the idea, and (2) addresses inequality.

CONNECT Regional Priorities

There is a good deal of overlap between the conceptual clusters developed by stakeholders in the concept mapping process and the top planning priorities that emerged from a series of public input steps during the regional planning process. The table below cross-walks the key issues raised in the two input processes.

Table 11. Relationship of CONNECT Planning Priorities, Health Data, and Concept-Mapping Results

Priorities	Extant Data and Concept-Mapping Data
Control cost of providing services	Demographics, social, economic
Support our communities	Demographics, social, economic *Concept-mapping theme:* access to healthy food
Support local farms	Concept-mapping theme: access to healthy food
Cost of commuting **More transportation choices**	*Concept-mapping themes:* transportation; active transportation
Parks and open spaces	Behavior risk physical activity Behavior risk obesity *Concept-mapping theme:* recreational resources; active transportation
Improved air quality	Environmental data *Concept-mapping themes:* environmental quality, policy; transportation; active transportation
Improved water quality	Environmental data Concept-mapping theme: environmental quality, policy [only development items]
More housing choices	
Work closer to home	

Visually, in the map of the 10-cluster solution, the entire southwest (lower left) and southern (lower) parts of the map resonate with the regional planning priorities. These areas of the map speak to deep stakeholder concern with infrastructure, health behaviors, and access to healthy food

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Recommendations

Relevance

The relevance of the clusters, as identified by key stakeholders, is recapped in Table 12 below. Each cluster was generated by aggregating individual sortings of creative ideas for improving the health of the region. The table outlines the clusters that were the highest rated for addressing health disparities; those rated highest for both support and addressing inequity; and those that are aligned with the top ten regional priorities are also identified. Notable in this recap is that transportation is relevant according to each lens that is applied. Stakeholders clearly identify public transportation as an urgent need to improve health in the region and to address health disparities.

It is also important to note that the two clusters rated highest for addressing health disparities (Cluster #10 Comprehensive health education and #7 Affordable and accessible health care for all) are not directly aligned with the CONNECT region's planning priorities. Nonetheless, there are linkages between the region's health disparities and the CONNECT region's planning priorities. For example, an important aspect of affordable and accessible health care for all is the availability of transportation options so that health care and health promotion services can be readily obtained by all CONNECT region residents regardless of where they live and their personal circumstances. Further, the emphasis on comprehensive health education (e.g., health literacy) suggests that public health sensibilities belong in the planning process. It will be incumbent upon the PHWG to continue to bring these issues to the forefront of future CONNECT action planning.

Table 12. Relevance of Clusters

Clusters To Improve the Health of the 14-County Region	Highest Rating on both Support and Address Inequality Scales	Highest Rated for Addressing Inequality	Aligned With Regional Priorities
10. Compre-hensive Health Education	X	X	
7. Affordable and Accessible Health Care for All	X	X	
1. Trans-portation	X	X	X
3. Active Transportation		X	X
5. Healthy Food Access		X	X
6. Promote Healthy Behavior		X	
4. Recreational Resources			X
2. Environ-mental Quality, Policy			X
9. Crisis Response			
8. Policy			

Disparities

The concept map points to avenues for dealing with health disparities that are not captured elsewhere in the regional planning process; specifically, the themes of comprehensive health education and affordable, accessible health care for all. These two clusters are not tied directly to the top 10 regional planning priorities, but, along with transportation, were deemed the most relevant to health disparity remediation in the region. Efforts to enact the following changes were supported by the CM exercise.

- Ensure the availability of more transportation options that help people get to medical facilities.
- Fill gaps in health care access for all, including dental and mental health services. The ideas developed by the stakeholders were thoroughly infused with the notion of access for all, i.e., affordable and equitable access.
- Retain and strengthen public health education and campaigns focused on disease prevention and self-care/self-management.

Other areas identified as important to addressing health disparities in the CONNECT region included shifting cultural norms so that health behaviors are more widely valued and promoted, the promotion of active transportation such as walking and bicycling, and promoting greater access to healthy foods.

CONNECT Regional Priorities

Many of the stakeholders' health concerns were aligned with the regional planning priorities as identified through previous public input processes.

The CM process showed that stakeholders advocate for motorized and non-motorized transportation infrastructure changes to improve the overall health of communities in the region. Addressing these issues would align with the creative ideas proposed by the stakeholders:

- Better and more public transportation options
- More walkable and bikeable communities, where sidewalks, paths, and greenways are both safe and connected.

Efforts to decrease food deserts, increase community and school gardens, farmers' markets, and food entrepreneurship, along with sensible urban and rural zoning to encouraging farming, would be consistent with the stakeholder input.

Other areas identified as both relevant to improving the health of the region, and aligned with the regional planning priorities, suggest the need for the following actions:

- Develop and enhance recreational infrastructure, resources, and the promotion of recreational resources in order to encourage more physical activity among all populations and, consequently, improve the overall

health of the population.
- Work towards improving air quality and reducing fossil fuel pollution throughout the CONNECT region in order to provide CONNECT region residents with a cleaner and healthier physical environment.

Conclusions and Recommendations

The use of extant data to identify the health status and health disparities within the CONNECT region combined with a structured process to solicit stakeholder input regarding health disparities to be addressed and means for doing so must also take into account the planning priorities that have emerged from the CONNECT Our Future process. As noted in the Concept Mapping section of this report, there is a good deal of overlap between the conceptual clusters developed by stakeholders through the concept-mapping process and the top planning priorities that emerged from public input into the regional planning process. There is also some relationship between the detailed demographic, socioeconomic, and health status indicators that were identified for this region. The following section identifies how these disparate streams of information are related.

Top Ten Planning Priorities

Table 13 illustrates the key issues raised through public input regarding the most important planning priorities for the region and a separate data gathering exercise in which stakeholders in the region identified their most important health related issues. Health status, health outcome, demographic, and socioeconomic data compiled for this report that link to the CONNECT region's highest planning priorities are also identified in the table below.

Table 13. Relationship of CONNECT Planning Priorities, Health Data and the Concept-Mapping Results

CONNECT Region Top Planning Priorities	Concept-Mapping Theme	Extant Data
Control cost of providing services		Demographic data (population size, composition, and distribution), socioeconomic data
Support our communities	Access to healthy food	Demographic data (population size, composition, and distribution), socioeconomic data
Support local farms	Access to healthy food	
Cost of commuting	Transportation; active transportation	Demographic data (population size, composition, and distribution), socioeconomic data
More transportation choices	Transportation; active transportation	
Parks and open spaces	Recreational resources; active transportation	Behavior risk physical activity Behavior risk obesity
Improved air quality	Environmental quality, policy; transportation; active transportation	Air quality data
Improved water quality	Environmental quality, policy [only development items]	Water quality data
More housing choices		Demographic data (population size, composition, and distribution), socioeconomic data
Work closer to home		Demographic data (population size, composition, and distribution), socioeconomic data

Five health-related issues that were identified through the CM process cut across several of the region's highest priority planning issues:

• Access to healthy foods
• Transportation
• Active transportation
• Recreational resources
• Environmental quality and policy

Several data sets accessed for identification and assessment of the region's health status and health disparities also related to several of the highest planning priorities, but most of these data are indirectly related to these priorities as they describe the populations who may be affected by these policies in general as well as the social and economic circumstances of these populations. Notably, only air and water quality data are directly related to the region's planning priorities and, as noted in the environmental health section of this report, these data are very limited, especially compared to the extensive population health data routinely collected by federal, state, and local agencies. These ideas are expanded in the recommendation sections below.

Social Indicators of Health

According to the World Health Organization, "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."[44] The social indicators of health typically refer to the various social, economic, and demographic conditions within a community or among a population that serve as barriers to physical, mental, and social well-being. These factors have deleterious impacts on that community or population even though they are not necessarily the direct causes of poor health, illness, or premature death. Common social indicators of health include poverty, employment and unemployment, housing, educational attainment, racial and ethnic discrimination, and other similar factors.

Poverty, for example, is associated with a number of social and economic factors that indirectly reduce access to health care services, the adoption of a healthy life style, or simply the avoidance of unhealthy and stressful environments. Poverty alone may limit individuals to unhealthy, dangerous, and inconvenient housing—all of which may have negative health consequences. Poverty may also limit access to and use of health care services due to lack of transportation options or health insurance. Poverty may also be associated with below average educational attainment which, among some people, may limit their ability to obtain and use information about care options, exercise, healthy food consumption, and other behaviors that affect their health and well-being.

Nearly all of the CONNECT region's planning priorities do relate to social indicators of health, with the exception of cost control for government services. As such, regional planning is deeply and inextricably relevant to improving population health.

Health Indicators/Disparities

Both race[45] and socioeconomic status are clearly related to health status and health disparities in the CONNECT Our Future planning region. Health disparities between the white non-Hispanic and African American non-Hispanic populations, in particular, clearly illustrate the impact of racial factors on health status and overall well-being.

Racial differences are very closely associated with maternal and children's health in this region, as indicated by higher teenage pregnancy and births among African American women than among white women throughout the region. Similarly, there is higher infant mortality and lower birth weights among babies born to African American mothers. Each of these outcomes are also likely to have negative impact on the life chances and future health status of these children as they grow.

The most significant finding is that the mortality rates for African Americans are consistently higher than the mortality rates for the population at large in the same county. This pattern was evident even within those

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[44] "Preamble to the Constitution of the World Health Organization," The International Health Conference, (New York: 1946), http://www.who.int/about/definition/en/print.html

[45] The absence of county-level health data for the region's Latino population and other racial groups has limited discussion of social indicators of health to the African American population and to economically disadvantaged populations that were not otherwise distinguished by race or ethnicity.

CONNECT region counties that are characterized by more favorable economic status and more desirable health indicators. That is, even in counties with lower than average mortality, African American deaths rates are still higher than those of the population at large.

Concept-Mapping Findings

CM participants took a broad, long-term view towards addressing the health status and health disparities among the CONNECT region's residents. Several of the health improvement clusters that were identified through the concept mapping process relate to specific growth priorities that the CONNECT Initiative identified for the entire region:[46]

- CM participants advocated for better and **more public transportation choices** as well as for active (i.e., non-motorized) transportation opportunities. These include implementing more walkable and bicycle-friendly communities where sidewalks, paths, and greenways are both safe and connected.

- Easier access to, visibility of, and affordability of local, fresh, healthy foods to address health inequities related to diet was another major recommendation. Specific suggestions in this cluster include efforts to decrease food deserts, increase community and school gardens, and promote local farmers' markets and food entrepreneurship, along with sensible urban and rural zoning to encouraging farming. These health-improvement suggestions are consistent both with region-wide priorities to **support local farms** as well as to promote and **support communities** throughout the region.

- CONNECT region residents also see infrastructure as a key element that can either facilitate or challenge fitness behavior. Their recommendations include support for more recreational resources and promotion of their use to promote greater fitness overall. Implementation of these suggestions would positively impact the growing problem of obesity among children and adults. These health suggestions are closely

aligned with the regional priority of assuring **parks and open space** are close to where all CONNECT residents live.

- Participants also put forth suggestions with various means of improving **air and water quality**, including land-use strategies and promotion of greater density in the built environment. Actions suggested in other clusters—such as enhancements in transportation options—would also have a positive impact on air quality.

The CM exercise also provided several avenues for dealing with health disparities that are not captured elsewhere in the regional planning process, specifically, the themes of comprehensive health education, and affordable, accessible health care for all. These two clusters are deeply relevant to crafting health disparity remediation in the region, and are critical issues that are deeply influenced by state and local policies and practice.

- In terms of the affordable and accessible health care for all cluster, the main recommendations spoke to the need for broader health care access—including dental and mental health services for all CONNECT residents—and they emphasized equitable access for all. Equitable access means that those who need services can actually get to these services. Transportation is often a barrier to better health, especially for rural and minority residents with poor health and few local health care services.

- The comprehensive health education cluster stressed the importance of public health education and campaigns to improve health in the region, prevent disease, and teach self-care management. A cluster for promoting healthy behavior was similar, but focused more on demonstrating and promoting healthy behaviors in general and healthy eating choices specifically to help shift cultural norms and change behavior throughout the region.

Addressing Health Disparities

Lack of access to care, evidence of risky health behaviors, and poor health outcomes among, people living in poverty, African Americans, and people living in more isolated, rural locations all point to the significance of these factors in identifying solutions for health issues that

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[46] Related CCOG priorities include support local farms; cost of commuting; more transportation choices; parks and open spaces; support our communities, and improved air quality.

should be incorporated into the CONNECT Our Future region-wide planning initiative.

Based on the summary information presented in this report, planners will need to consider greater access to physical activity and healthy foods throughout the region in order to address obesity, diabetes, and other poor health outcomes that are disproportionately associated with income and race. Plans to maintain and support agriculture, especially small family farms, can help to promote greater access to local healthy foods as well. Transportation planning that provides greater access to health care services and facilities, especially for minorities and in rural areas, will be needed. Alternatively, the decentralization of health care resources and facilities may need to be encouraged to strengthen the infrastructure in local communities and to expand access to services, in order to reduce some health disparities among poor and underserved minority populations.

Recommendations

Community health assessment and remediation efforts, and regional planning efforts have numerous interests in common and these interests may often be addressed through common solutions. Many of the health disparities and deficits identified within the CONNECT region through either the CM process or the analysis of health status indicators may be addressed effectively through regional planning solutions, especially if those solutions are designed with explicit awareness of their implications to residents health. Amelioration of the most serious racial, economic, and geographic health disparities within the CONNECT region—as well as planning for improving the health status of the entire region—will require greater explicit integration of these concerns within various aspects of the region-wide planning process and local planning. The following recommendations are based on this assumption.

• Regional and local planning initiatives should recognize the impact that planning decisions, strategies, and tactics may have as benefits or detriments to the health of local populations. To that end, it is suggested that health impact assessment be routinely incorporated within planning analysis.

• Local and regional health officials (e.g., local health

departments, health planners, health analysts) should be consulted regularly, and they should be invited to participate actively in the planning process wherever possible.

• More complete population health data need to be developed and made available so that local health needs may be more closely determined, and so that their relationship to other planning issues may be assessed. State and local agencies, therefore, need to expand local behavioral risk factor surveys,, youth risk behavior surveys, and other data collection efforts to capture more local information, especially for minorities and other groups within the population. County-level data on childhood obesity, for example, would be very helpful in planning for parks and recreational facilities.

• Planning efforts need to address the health and well-being of racial and ethnic minorities—especially African Americans—who disproportionately suffer poorer health status and outcomes than the rest of the population in the CONNECT region. Other racial and ethnic minorities—Latinos and Asians in particular—deserve similar attention, but data concerning their health status and disparities are generally not available. Greater information about these populations should also be collected and made available locally.

• The study results suggest that public health campaigns that are designed to address health disparities and health status within the region be routinely examined to assess the level of cultural competency embedded within the campaign. To be most effective today, every health planning effort and every public health campaign should provide culturally competent messaging for all populations. Similarly, in order to unambiguously welcome and urge target populations to participate in regional planning efforts, messages will need to be constructed and delivered in culturally competent ways.

CONNECT Our Future
Vibrant Communities – Robust Region

Anson, Cabarrus, Cleveland, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Stan, Chester, Lancaster, Union, York, Anson, Cabarrus, Cleveland, Gaston, Iredell, Linc, Mecklenburg, Rowan, Stanly, Union, Chester, Lancaster, Union, York, Anson, Cab, Cleveland, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Stanly, Union, Chester, Lancaster, Union, York, Anson, Cabarrus, Cleveland, Gaston, Iredell, Lincoln, Mec, Rowan, Stanly, Union, Chester, Lancaster, Union, York, Anson, Cabarrus, Clevela, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Stanly, Union, Chester, Lancaster, York, Anson, Cabarrus, Cleveland, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Union, Chester, Lancaster, Union, York, Anson, Cabarrus, Cleveland, Gaston, Ired, Lincoln, Mecklenburg, Rowan, Stanly, Union, Chester, Lancaster, Union, York, An, Cabarrus, Cleveland, Gaston, Iredell, Lincoln, Mecklenburg, Rowan, Stanly, Unio, Chester, Lancaster, Union, York, Anson, Cabarrus, Cleveland, Gaston, Iredell, Linc, Mecklenburg, Rowan, Stanly, Union, Chester, Lancaster, Union, York, Anson, Cab

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