

HEALTHY

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HEALTHY NORTH CAROLINA

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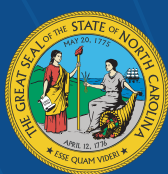
A PATH TOWARD HEALTH

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North Carolina Institute of Medicine

In partnership with



NC DEPARTMENT OF
**HEALTH AND
HUMAN SERVICES**
Division of Public Health

NC



The North Carolina Institute of Medicine (NCIOM) is a nonpolitical source of analysis and advice on important health issues facing the state. The NCIOM convenes stakeholders and other interested people from across the state to study these complex issues and develop workable solutions to improve health care in North Carolina.

The full text of this report is available online at: www.nciom.org

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Any opinion, finding, conclusion, or recommendations expressed in this publication are those of the Task Force and do not necessarily reflect the views and policies of the Blue Cross and Blue Shield of North Carolina Foundation, The Duke Endowment, and the Kate B. Reynolds Charitable Trust.

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Dedication

This report is published in memory of Eleanor Howell, MS, former Director of the State Center for Health Statistics.

TABLE OF CONTENTS

| | |
|-----|---|
| 4 | ACKNOWLEDGEMENTS |
| 6 | TASK FORCE AND WORK GROUP MEMBERS |
| 16 | ACRONYMS |
| 17 | EXECUTIVE SUMMARY |
| 21 | CHAPTER 1 |
| | Introduction |
| 27 | CHAPTER 2 |
| | Background |
| 33 | CHAPTER 3 |
| | Social & Economic Factors |
| 51 | CHAPTER 4 |
| | Physical Environment |
| 63 | CHAPTER 5 |
| | Health Behaviors |
| 81 | CHAPTER 6 |
| | Clinical Care |
| 93 | CHAPTER 7 |
| | Health Outcomes |
| 100 | CONCLUSION |
| 101 | REFERENCES |
| 117 | APPENDIX A |
| | Healthy North Carolina 2030 Indicators and Data |
| 121 | APPENDIX B |
| | Healthy North Carolina 2030 Process Details |
| 125 | APPENDIX C |
| | Detailed Community Session Input |

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The North Carolina Institute of Medicine's (NCIOM) Healthy North Carolina 2030 Task Force was convened in January 2019. Funding for the Task Force was provided by the Blue Cross and Blue Shield of North Carolina Foundation, The Duke Endowment, and the Kate B. Reynolds Charitable Trust.

The Task Force was co-chaired by Ronny Bell, PhD, MS, Professor and Chair of the Department of Public Health and Associate Director of the Center for Health Disparities, East Carolina University; John F.A.V Cecil, MIM, President, Biltmore Farms, LLC; Laura Gerald, MD, MPH, President, Kate B. Reynolds Charitable Trust; and Elizabeth Cuervo Tilson, MD, MPH, State Health Director and Chief Medical Officer, North Carolina Department of Health and Human Services (NC DHHS). The Work Groups were co-led by: Social and Economic Factors – Wanda Boone, PhD, Executive Director of Together for Resilient Youth and Donnie Varnell, Special Law Enforcement Projects Consultant, North Carolina Harm Reduction Coalition and Investigator, Dare County Sheriff's Office; Physical Environment – Myron Floyd, PhD, MS, Professor and Head, Department of Parks, Recreation, and Tourism Management, North Carolina State University and Larry Michael, REHS, MPH, Chief, Environmental Health Section, Division of Public Health, NC DHHS; Health Behaviors – Susan Kansagra, MD, MBA, Section Chief, Chronic Disease and Injury Section, Division of Public Health, NC DHHS and Carrie Rosario, DrPH, MPH, CHES, Associate Professor and Associate Department Chair, Department of Public Health Education, School of Health and Human Sciences, University of North Carolina-Greensboro; and Clinical Care – Randy Jordan, JD, MPA, Chief Executive Officer, North Carolina Association of Free and Charitable Clinics and Kia Williams, MD, MSPH, Associate Medical Director, BlueCross BlueShield of North Carolina. Their leadership and experience were important to the success of the Task Force's work.

The NCIOM would like to thank the members of the Task Force, Work Groups, and Steering Committee who gave freely of their time and expertise for this important work. The Steering Committee members provided expert guidance and content, helped develop meeting agendas, and identified expert speakers. For the complete list of Task Force, Work Group, and Steering Committee members, please see **Pages 6-15** of this report. In particular, Kathy Dail, Director, Community Health Assessment Program, Division of Public Health, NC DHHS, coordinated HNC 2030 work with NCIOM staff on behalf of the Division of Public Health.

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The Healthy North Carolina 2030 Task Force heard presentations from multiple experts through the course of the Task Force work. We would like to thank the following people for sharing their expertise and experiences with the Task Force (positions listed are as of the date of their presentation):

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In addition to the above individuals, the staff of the NCIOM contributed to the Task Force's work and the development of this report. Adam J. Zolotor, MD, DrPH, President and CEO, guided the work of the Task Force. Berkeley Yorkery, MPP, Associate Director, helped guide the work of the Task Force and made contributions to the writing of this report. Brienne Lyda-McDonald, MSPH, Project

Director, served as Project Director for the Task Force and was primary author of the final Task Force report. Erin Bennett, BA, NCIOM intern, researched and wrote many sections of the final Task Force report. Kaitlin Phillips, MS, edited the final Task Force report and provided social media publicity for the Task Force. Key staff support was also provided by Kisha Markham, BS, Administrative Assistant and Don Gula, MBA, Director of Administrative Operations. Former staff member, Chloe Donohoe, BS, served as Research Assistant for the project. Tibaria Alnouri, Summer Intern, researched and wrote several sections of the final Task Force report.

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ACRONYMS

ACC – Accountable Care Community

ACEs – Adverse Childhood Experiences

BRFSS – Behavioral Risk Factor Surveillance System

CDC – Centers for Disease Control and Prevention

DPH – Division of Public Health

FPL – Federal Poverty Level

HIV – Human Immunodeficiency Virus

HNC – Healthy North Carolina

HPV – human papillomavirus

IUD – intrauterine device

KEA – Kindergarten Entry Assessment

LARC – long-acting reversible contraceptives

LEA – Local Education Agency

LGBTQ – lesbian, gay, bisexual, transgender, and queer

MSM – men who have sex with men

NC DHHS – North Carolina Department of Health and Human Services

NC DPI – North Carolina Department of Public Instruction

NCIOM – North Carolina Institute of Medicine

PA – physician assistant

PrEP – pre-exposure prophylaxis

SNAP/EBT – Supplemental Nutrition Assistance Program/Electronic Benefits Transfer

SSB – sugar-sweetened beverage

STI – sexually transmitted infection

SUD – substance use disorder

VA – Veterans Health Administration

YRBS – Youth Risk Behavior Surveillance

EXECUTIVE SUMMARY

Healthy people and healthy communities are the foundation of a thriving, prosperous state, and improving the health, safety, and well-being of North Carolinians is a core part of the work of state government. In parallel with the national Healthy People initiative run by the United States Department of Health and Human Services, the North Carolina Department of Health and Human Services (NC DHHS) has released Healthy North Carolina (HNC) goals at the beginning of each decade since 1990. HNC is a set of health indicators with 10-year targets designed to guide state efforts to improve health and well-being. Identifying key indicators and targets allows NC DHHS, the Division of Public Health (DPH), local health departments, and other partners across the state to work together toward shared goals.

One of the goals of NC DHHS is to ensure that all North Carolinians have the opportunity for health. Health equity is the opportunity for all people to attain the highest level of personal health regardless of demographic characteristics.¹ Health begins in families and communities, and is largely determined by the social and economic contexts (responsible for 40% of the variation in health outcomes) in which we grow up, live, work, and age; the healthy behaviors (30%) that those contexts make easier or harder², and our physical environments (10%). These factors are called drivers of health (also known as social determinants of health) and they directly affect health outcomes like development of disease and life expectancy. HNC 2030 sets the stage to a focus on health equity and these overall drivers of health outcomes.

The HNC 2030 process from January-August 2019 integrated input from a Task Force, four work groups (Social & Economic Factors, Physical Environment, Health Behaviors, and Clinical Care), and communities across the state through a series of eight Community Input Sessions. Participants considered several priorities during the HNC 2030 process. Because the HNC 2030 indicators represent issues across many sectors of society, it is important that they be understandable to a broad audience. Each indicator is measurable using existing data sources.

The group had a preference for data measured at least every three years to allow for monitoring between now and 2030. When possible, there was also a preference for data available at the county level to allow for local goal setting and local action as well as comparisons within the state. In addition, the Task Force tried to align with statewide health improvement plans and measure sets when possible, including the Early Childhood Action Plan, the Opioid Action Plan, the Perinatal Strategic Plan, and the Medicaid Transformation Quality Strategy. The Task Force and work groups prioritized health equity by selecting indicators related to health disparities within the state. Overall, 21 health indicators were chosen across the topics of Social & Economic Factors, Physical Environment, Health Behaviors, Clinical Care, and Health Outcomes (Table 1).

NC DHHS, DPH, and local health departments will remain at the forefront of HNC 2030 efforts; however, they cannot achieve these goals alone. HNC 2030 should be more than a health plan for public health, it should be a health plan for the whole state. The inclusion of factors traditionally outside the sphere of public health (e.g., education, employment, housing) means that achieving the HNC 2030 goals will require engaging partners across multiple sectors to improve population health and drive health equity over the next decade.

As the new decade begins, the NC DHHS and DPH will be developing a population health improvement strategy and resources to be used at the local level. The broader view of the drivers of health and well-being with attention to health disparities is an exciting step toward making North Carolina a place for everyone to live a healthy life.

^A <https://www.ncdhhs.gov/about/dhhs-mission-vision-values-and-goals/mission-vision>

TABLE 1

HEALTH INDICATORS AND DATA

(TOTAL NC POPULATION, 2030 TARGET, AND DATA BY RACE/ETHNICITY, SEX, AND POVERTY LEVEL)

W = WHITE
 B/AA = BLACK/AFRICAN AMERICAN
 H/LX = HISPANIC/LATIN(X)
 A/PI = ASIAN/PACIFIC ISLANDER
 AI = AMERICAN INDIAN
 FPL = FEDERAL POVERTY LEVEL
 ‡ NOT AVAILABLE OR NOT APPLICABLE

* 2016-18 AVERAGE
 ^ INCLUDES HISPANIC ETHNICITY
 # DATA FROM 2015
 A - ASIAN ONLY
 B - PACIFIC ISLANDER
 C - ECONOMICALLY DISADVANTAGED STUDENTS, AS DEFINED BY NC DEPARTMENT OF PUBLIC INSTRUCTION

D - 50%-100% FEDERAL POVERTY LEVEL
 E - 101%-150% FEDERAL POVERTY LEVEL
 F - 151%-200% FEDERAL POVERTY LEVEL
 G - TWO OR MORE RACES
 H - STUDENTS WHO ARE NOT ECONOMICALLY DISADVANTAGED, AS DEFINED BY NC DEPARTMENT OF PUBLIC INSTRUCTION

| HEALTH INDICATOR | DESIRED RESULT | TOTAL POPULATION | |
|--|--|-----------------------------------|---|
| | | CURRENT (YEAR) | 2030 TARGET |
| INDIVIDUALS BELOW 200% FPL | Decrease the number of people living in poverty | 36.8% (2013-17) | 27.0% |
| UNEMPLOYMENT | Increase economic security | 7.2% (2013-17) | Reduce unemployment disparity ratio between white and other populations to 1.7 or lower |
| SHORT-TERM SUSPENSIONS (PER 10 STUDENTS) | Dismantle structural racism | 1.39 (2017-18) | 0.80 |
| INCARCERATION RATE (PER 100,000 POPULATION) | | 341 (2017) | 150 |
| ADVERSE CHILDHOOD EXPERIENCES | Improve child well-being | 23.6% (2016-17) | 18.0% |
| THIRD GRADE READING PROFICIENCY | Improve third grade reading proficiency | 56.8% (2018-19) | 80.0% |
| ACCESS TO EXERCISE OPPORTUNITIES | Increase physical activity | 73% (2010/18) | 92% |
| LIMITED ACCESS TO HEALTHY FOOD | Improve access to healthy food | 7% (2015) | 5% |
| SEVERE HOUSING PROBLEMS | Improve housing quality | 16.1% (2011-15) | 14.0% |
| DRUG OVERDOSE DEATHS (PER 100,000 POPULATION) | Decrease drug overdose deaths | 20.4 (2018) | 18.0 |
| TOBACCO USE | Decrease tobacco use | YOUTH 19.8% (2017) | 9.0% |
| | | ADULT 23.8% (2018) | 15.0% |
| EXCESSIVE DRINKING | Decrease excessive drinking | 16.0% (2018) | 12.0% |
| SUGAR-SWEETENED BEVERAGE CONSUMPTION | Reduce overweight and obesity | YOUTH 33.6% (2017) | 17.0% |
| | | ADULT 34.2% (2017) | 20.0% |
| HIV DIAGNOSIS (PER 100,000 POPULATION) | Improve sexual health | 13.9 (2018) | 6.0 |
| TEEN BIRTH RATE (PER 1,000 POPULATION) | | 18.7 (2018) | 10.0 |
| UNINSURED | Decrease the uninsured population | 13% (2017) | 8% |
| PRIMARY CARE CLINICIANS (COUNTIES AT OR BELOW 1:1,500 PROVIDERS TO POPULATION) | Increase the primary care workforce | 62 (2017) | 25% decrease for counties above 1:1,500 providers to population |
| EARLY PRENATAL CARE | Improve birth outcomes | 68.0% (2018) | 80.0% |
| SUICIDE RATE (PER 100,000 POPULATION) | Improve access and treatment for mental health needs | 13.8 (2018) | 11.1 |
| INFANT MORTALITY (PER 1,000 BIRTHS) | Decrease infant mortality | 6.8 (2018) | 6.0 |
| | | Black/white disparity ratio = 2.4 | Black/white disparity ratio = 1.5 |
| LIFE EXPECTANCY (YEARS) | Increase life expectancy | 77.6 (2018) | 82.0 |

| W | B/AA | H/LX | O | A/PI | AI | SEX | | FEDERAL POVERTY LEVEL | | |
|---------------------------|--------------------|-------------------|--|--------------------|--------------------|-------|--------|-----------------------|--------------------|-------|
| | | | | | | MALE | FEMALE | <200% | 200-399% | 400%+ |
| 30.7% | 51.1% | 63.6% | 46.1% ^G | 30.6% | 51.5% | 34.8% | 38.7% | ‡ | ‡ | ‡ |
| 5.7% [^] | 11.7% [^] | 7.1% [^] | 7.3% [^] 11.0% ^{^G} | 5.2% [^] | 10.3% [^] | 6.4% | 6.7% | ‡ | ‡ | ‡ |
| 0.73 | 3.00 | 0.88 | 1.69 | 0.18 ^A | 2.46 | 1.98 | 0.74 | 2.09 ^C | ‡ | ‡ |
| 203 [#] | 915 [#] | 209 [#] | ‡ | ‡ | 488 [#] | 649 | 50 | ‡ | ‡ | ‡ |
| 17.5% | 36.0% | 23.2% | 37.2% | 11.1% | ‡ | 23.8% | 23.5% | 47.9% | 19.9% | 8.3% |
| 70.1% | 40.8% | 42.6% | 59.5% ^G | 75.6% ^A | 44.5% | 54.0% | 59.8% | 42.6% ^C | 70.6% ^H | ‡ |
| DATA NOT AVAILABLE | | | | | | | | | | |
| 26.4 | 12.9 | 5.4 | 4.4 | ‡ | 32.6 | 27.8 | 13.2 | ‡ | ‡ | ‡ |
| 20.6% | 17.0% | 20.7% | 19.0% | ‡ | ‡ | 23.0% | 16.5% | ‡ | ‡ | ‡ |
| 25.9% | 22.5% | 12.2% | 17.1% | ‡ | ‡ | 29.9% | 18.5% | 32.8% | 21.6% | 17.2% |
| 17.2% | 12.5% | 17.8% | 13.1% | ‡ | ‡ | 21.7% | 10.8% | 14.5% | 17.6% | 21.2% |
| 36.1% | 31.5% | 28.9% | 24.3% | ‡ | ‡ | 38.7% | 28.3% | ‡ | ‡ | ‡ |
| 32.6% | 38.7% | 37.0% | ‡ | ‡ | ‡ | 37.6% | 31.0% | 41.0% | 32.7% | 24.1% |
| 4.9 | 40.8 | 17.7 | ‡ | 4.3 | 5.9 | 23.1 | 5.4 | ‡ | ‡ | ‡ |
| 12.9 | 24.1 | 34.3 | 6.9 | ‡ | 38.3 | ‡ | ‡ | ‡ | ‡ | ‡ |
| 10% | 13% | 31% | 8% | 9% | 18% | 14% | 11% | 21% | 12% | 4% |
| NOT APPLICABLE | | | | | | | | | | |
| 74.8% | 60.5% | 57.5% | 66.0% | ‡ | 54.3% | ‡ | ‡ | ‡ | ‡ | ‡ |
| 17.8 | 5.7 | 5.8 | 7.7 | ‡ | ‡ | 22.4 | 5.9 | ‡ | ‡ | ‡ |
| 5.0 | 12.2 | 4.8 | 5.0 | ‡ | 9.3 | 8.0 | 5.5 | ‡ | ‡ | ‡ |
| 78.3 [*] | 75.5 [*] | ‡ | 87.0 [*] | ‡ | 75.6 [*] | 74.8 | 80.3 | ‡ | ‡ | ‡ |

Source: See descriptions of health indicators throughout this report for information on data sources.

CHAPTER 1

INTRODUCTION



INTRODUCTION

Overview of Healthy North Carolina 2030

Healthy people and healthy communities are the foundation of a thriving, prosperous state, and improving the health, safety, and well-being of North Carolinians is a core part of the work of state government.⁸ In parallel with the national Healthy People initiative run by the United States Department of Health and Human Services, the North Carolina Department of Health and Human Services (NC DHHS) has released Healthy North Carolina (HNC) goals at the beginning of each decade since 1990. HNC is a set of health indicators with 10-year targets designed to guide state efforts to improve health and well-being. Identifying key indicators and targets allows NC DHHS, the Division of Public Health (DPH), local health departments, and other partners across the state to work together toward shared goals.

One of the goals of NC DHHS is to ensure that all North Carolinians have the opportunity for health. Health equity is the opportunity for all people to attain the highest level of personal health regardless of demographic characteristics.¹ Although traditionally discussions around health have focused on clinical health care, research has shown that clinical care only accounts for around 20% of health outcomes. While access to medical care is important, health begins long before medical care is needed.

Health begins in families and communities, and is largely determined by the social and economic contexts (responsible for 40% of the variation in health outcomes) in which we grow up, live, work, and age; the healthy behaviors (30%) that those contexts make easier or harder², and our physical environments (10%). Some of the social, economic, behavioral, and environmental factors that affect health include:

- safety of families and communities,
- exposure to environmental contaminants in air, water, and soil,
- quality of housing and education,
- access to transportation and healthy food,
- availability of employment opportunities and a living wage,
- exposure to and use of alcohol, tobacco, and other drugs, and
- opportunities for physical activity.

These factors are called drivers of health (also known as social determinants of health) and they directly affect health outcomes like development of disease and life expectancy. Underlying these drivers of health are the public policies that influence opportunities for education, employment, and safety; shape our communities; and promote or discourage various behaviors.

EXAMPLES

Drivers of Health and their Effects on Health Outcomes

44% of asthma cases in children are related to home-based exposures (Lanphear, 2001)

Food insecurity significantly affects adult Type 2 diabetes mellitus outcomes (Seligman, 2012)

Living in a neighborhood with economic disadvantages increases risk of coronary heart disease (Diez Roux, 2001)

When opportunities or resources to be healthy are not available, people's health and well-being are negatively impacted. Health inequities are created when people cannot attain optimal health because of unjust, unnecessary, and avoidable circumstances (e.g., greater barriers to accessing healthy foods, transportation, physical activity, and health care in historically segregated, low-income and racial and ethnic minority communities).³ These inequities lead to health disparities, or differences in health status and outcomes between groups based on characteristics like race, ethnicity, gender, geography, educational attainment, and income.⁴

Long-term sustainable improvements in the health and well-being of North Carolinians will only occur by addressing the social, economic, and place-based challenges that keep people from achieving optimal health. National and state public health leaders are focusing on health equity by shifting focus from individual health topics to overall drivers of health outcomes, including social and economic factors, physical environment, health behaviors, and clinical care.

HNC 2030 embodies this shift to a focus on health equity and overall drivers of health outcomes, whereas HNC 2020 focused on specific clinical and health behavior topics. HNC 2030 uses the County Health Rankings population health model developed by the Robert Wood Johnson Foundation (see Figure 1)⁵, which identifies the primary drivers of health, as well as their proportional contribution to overall health outcomes.

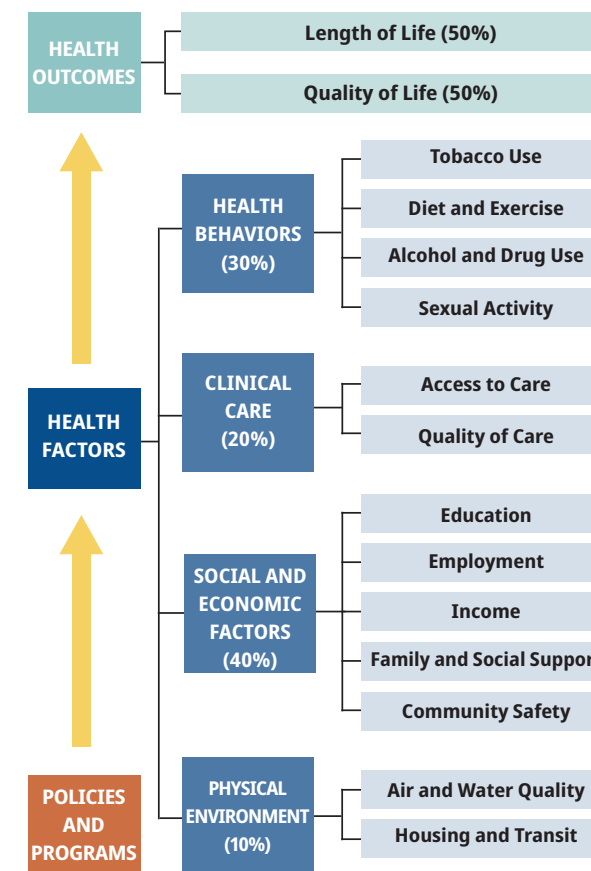
Although the framework used for HNC 2030 has required broader consideration of factors that affect health and well-being, the total number of health indicators has been reduced to 21 from 40 in 2020 and 100 in 2010 in order to focus attention, energy, and resources on a narrower set of priorities.

NC DHHS, DPH, and local health departments will remain at the forefront of HNC 2030 efforts; however, they cannot achieve these goals alone. The inclusion of factors traditionally outside the sphere of public health (e.g., education, employment, housing) means that achieving the HNC 2030 goals will require engaging partners across multiple sectors to improve population health and drive health equity over the next decade (See Appendix A for list of all health indicators and targets).

Process

The NC DHHS and DPH is accountable for developing HNC 2030 and partnered with the North Carolina Institute of Medicine (NCIOM) to lead the process. Funding for this work was provided by the Blue Cross and Blue Shield of North Carolina Foundation, The Duke Endowment, and the Kate B. Reynolds Charitable Trust. This work involved a total of eight months of meetings throughout 2019 with an overall Task Force, Work Groups for each of the driver of health topic areas (Social and Economic Factors, Physical Environment, Health Behaviors, and Clinical Care), and Community Input Sessions. The overall Task Force was chaired by Ronny Bell, PhD, MS, Professor and Chair of the Department of Public Health and Associate Director of the Center for Health Disparities, East Carolina University; John F.A.V Cecil, MIM, President, Biltmore Farms, LLC; Laura Gerald, MD, MPH, President, Kate B. Reynolds Charitable Trust; and Elizabeth Cuervo Tilson, MD, MPH, State Health Director and Chief Medical Officer, NC DHHS. Each of the Work Groups was co-led by two individuals who were also members of the Task Force: Social and Economic Factors – Wanda Boone, PhD, Executive Director of Together for Resilient Youth and Donnie Varnell, Special Law Enforcement Projects Consultant, North Carolina Harm Reduction Coalition and Investigator, Dare County Sheriff's Office; Physical Environment – Myron Floyd, PhD, MS, Professor and Head, Department of Parks, Recreation, and Tourism Management, North Carolina State University and Larry Michael, REHS, MPH, Chief,

FIGURE 1
Population Health Model



Source: County Health Rankings & Roadmaps, County Health Rankings Model. <https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model>

⁸ <https://www.ncdhhs.gov/about/dhhs-mission-vision-values-and-goals/mission-vision>

INTRODUCTION

Environmental Health Section, Division of Public Health, NC DHHS; Health Behaviors – Susan Kansagra, MD, MBA, Section Chief, Chronic Disease and Injury Section, Division of Public Health, NC DHHS and Carrie Rosario, DrPH, MPH, CHES, Associate Professor and Associate Department Chair, Department of Public Health Education, School of Health and Human Sciences, University of North Carolina-Greensboro; and Clinical Care – Randy Jordan, JD, MPA, Chief Executive Officer, North Carolina Association of Free and Charitable Clinics and Kia Williams, MD, MSPH, Associate Medical Director, BlueCross BlueShield of North Carolina. They were joined by 40 Task Force members who represented a wide range of expertise and interests from across the state. Seventeen Task Force members were also members of one of the Work Groups. A fourteen-person Steering Committee helped guide the process.

The HNC 2030 process integrated input from communities across the state through a series of eight Community Input Sessions, which took

place from February to April 2019 (see Figure 2 for dates, locations, and number of participants). The integration of community input was a new and intentional effort to represent the voices of people around the state in choosing the population health goals for the next decade. Of note, two of the community input sessions were held in the traditional homelands of the two largest American Indian tribes in the state (Eastern Band of Cherokee Indians and the Lumbee Tribe of North Carolina). While all sessions were open to any member of the community to attend, most participants represented public health or the health professions.

For more details about the HNC 2030 indicator selection process and timeline and results from Community Input Sessions, please see Appendix B and C.

Priorities for Indicator Selection

Participants considered several priorities during the HNC 2030 process. Because the HNC 2030 indicators represent issues across many sectors of society, it is important that they be understandable to a broad audience. Each indicator needs to be measurable using existing data sources, with a preference for data measured at least every three years to allow for monitoring between now and 2030. When possible, there was also a preference for data available at the county level to allow for comparisons within the state. In addition, the Task Force tried to align with statewide health improvement plans and measure sets when possible, including the Early Childhood Action Plan and the Opioid Action Plan. The Task Force and Work Groups prioritized health equity by selecting indicators related to health disparities within the state.

While the indicators selected for HNC 2030 are all important for North Carolina's population health status, they are not the only important health indicators for the state. HNC 2030 indicators were selected to represent a broad range of important issues for health in North Carolina and oftentimes represent larger issues. For example, primary care providers per population and health insurance status are indicators of broader health care access issues but are not the only important characteristics of that access. The discussions within each indicator description will provide the broader context within which that indicator was selected.

NEXT STEPS:

Partnerships to Improve Health – A Model for Addressing HNC 2030

Public health leaders across the state are charged with working toward the goals set by Healthy North Carolina. The new framework for HNC 2030 includes broader issues related to social and economic factors and the physical environment than those with which public health traditionally engages. The wide range of indicators selected for HNC 2030 brings new opportunities for public health to partner across sectors to address many drivers of health.

In addition, the NC DHHS has a vision to “optimize health and well-being for all people by effectively stewarding resources that bridge

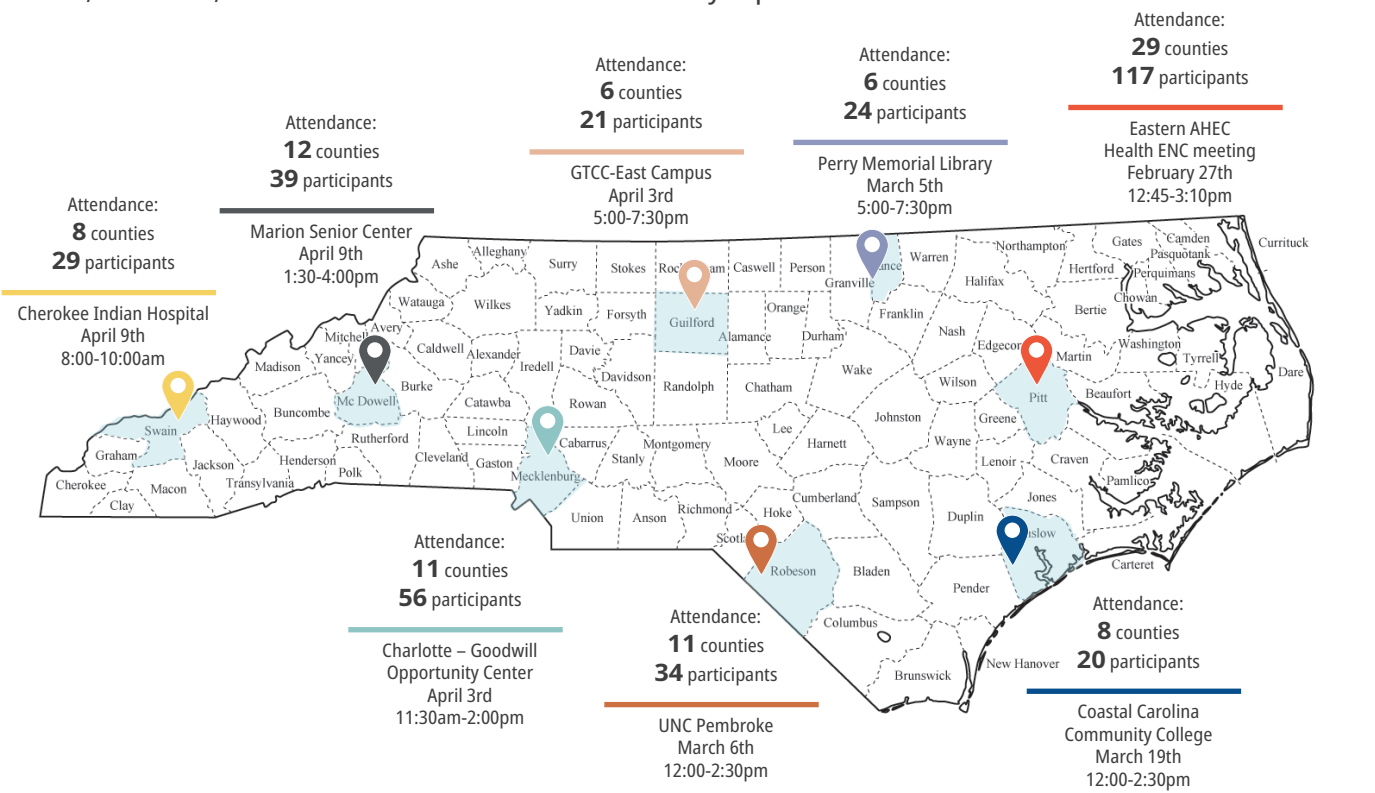
our communities and our health care system.”⁶ To do this, NC DHHS is taking a multi-layered approach to addressing the drivers of health, including:

1. Creating standardized screening questions to identify resource needs,
2. Deploying a statewide digital resource and referral platform to connect health and social services NCCARE360,
3. Mapping social drivers of health indicators,
4. Building infrastructure to support the recommendations of the Community Health Worker Initiative,
5. Implementing Medicaid transformation through Medicaid Managed Care to address whole person health including medical and non-medical drivers of health,
6. Testing public-private pilots of Accountable Care Community-style models focused on people enrolled in Medicaid Managed Care, and
7. Fostering multi-payer alignment around accelerating value-based payment and addressing non-medical drivers of health.

The NCIOM Task Force on Accountable Care Communities (ACC) published a report that describes a new model of multi-sector partnership at the community level and provides twenty-four recommendations to policymakers, public health leaders, providers, payers, human services organizations, and communities to promote ACC development. A guide for community members looking to develop these partnerships is also available online. Local health departments across the state may be natural leaders in developing the partnerships needed to address many of the issues related to health that were chosen as goals for HNC 2030. This is reflective of the Public Health 3.0 call to action for cross-sectoral collaboration to drive collective action.⁷ To complement the development of ACC models, the NC DHHS framework for addressing the drivers of health seeks to provide many of the tools to start addressing these issues. Partners from a variety

Accountable Care Communities (ACCs) address health from a community perspective. ACCs bring together a coalition of cross-sector stakeholders that share responsibility to address the drivers of health while reducing, or holding steady, health spending.

FIGURE 2
Dates, locations, and attendees at HNC 2030 Community Input Sessions



INTRODUCTION

of sectors will need to engage with public health leaders to develop strategies to improve the variety of social, economic, environmental, and behavioral factors that influence our health outcomes. Community members should also be engaged in these efforts so that local voices are always a part of any strategies for action at the local level.

Structure of this Report

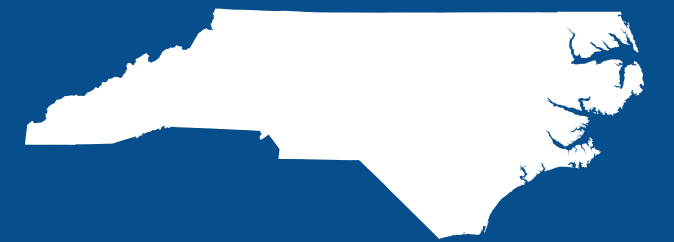
The presentation of the HNC 2030 health indicators is divided into five sections based on the drivers of health: Social and Economic Factors (**Chapter 3**); Physical Environment (**Chapter 4**); Health Behaviors (**Chapter 5**); Clinical Care (**Chapter 6**); and Health Outcomes (**Chapter 7**). At the beginning of each chapter is a description of how those issues drive health. Selected health indicators are presented within their topic areas, including a description of how the indicator impacts health, disparities across populations, how the target for HNC 2030 was selected, and potential levers for change. Current data across populations is provided, when available, for race/ethnicity, sex, and poverty status with calculations showing the distance to the target for each of those populations. Indicators are numbered for reference purposes only. At the end of each section is a discussion of developmental measures, which are measures that would provide useful information about an aspect of population health that participants were interested in but could not select because of issues with the availability or quality of data.

Language

Throughout this report, data are referenced from surveys, vital statistics, and research studies. Population-specific data from these sources vary in reporting of Hispanic ethnicity with race. Data sources also vary in reporting terminology for Black/African American populations. References to racial groups have been standardized throughout the report as African American, American Indian, Asian, and white. Unless otherwise noted, these groups are all non-Hispanic and data for individuals indicating Hispanic ethnicity are reported separately.

CHAPTER 2

BACKGROUND

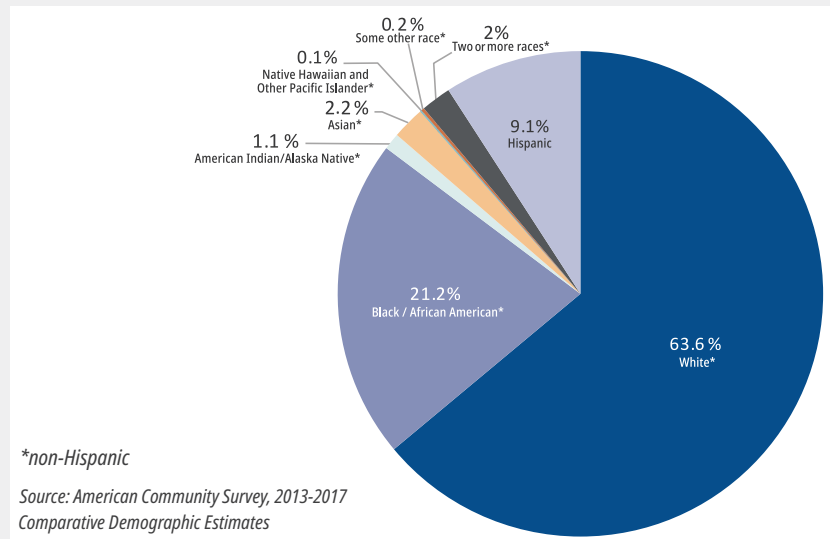


BACKGROUND

North Carolina Demographics

North Carolina is a diverse state in many ways, with a geography spanning coast to mountains. See below for basic demographic information about the state's residents.

North Carolina by Race/Ethnicity, 2013-2017 Estimate



Other North Carolina Demographics

| | |
|-------------------------------------|-------|
| TOTAL POPULATION¹ | |
| 10,052,564 | |
| GEOGRAPHY² | |
| Urban | 66% |
| Rural | 34% |
| AGE GROUP¹ | |
| Under 18 | 22.8% |
| 18-64 | 62.1% |
| 65 and older | 15.1% |

¹2013-2017 American Community Survey 5-Year Estimates: Age and Sex
²2010 Census

Health Trends in North Carolina and the Drivers of Health

Over the past decade, North Carolina's overall health ranking has improved from a low of 37th in 2014 to a high of 31st in 2015 and is now 33rd as of 2018 (ranking of 1st as best and 50th as worst) according to America's Health Rankings. The improvement in ranking is a result of successes in several areas. However, there are some growing challenges in the state that have prevented North Carolina from rising higher. See **Figure 3** for examples of these successes and challenges.

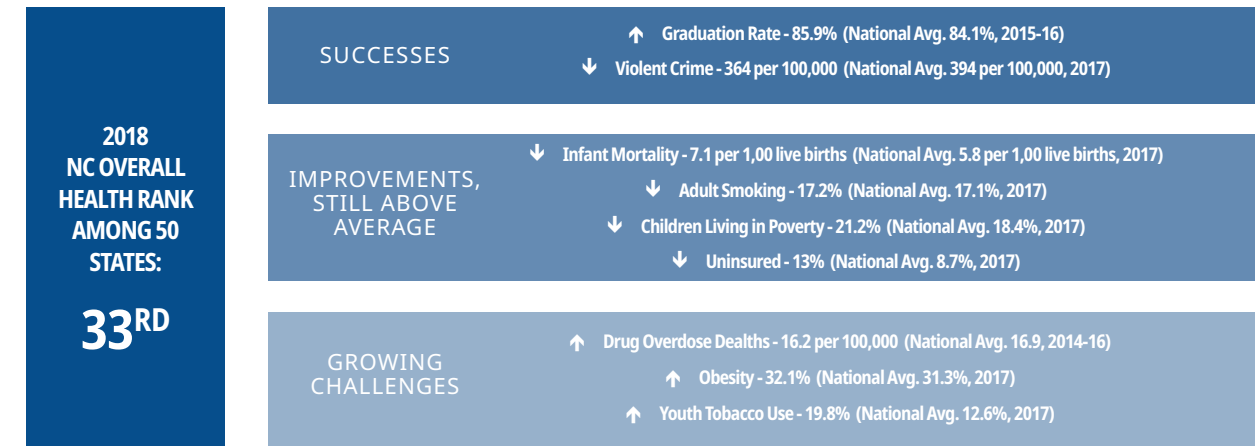
Included in **Figure 3** are some examples of non-clinical drivers of health that have not traditionally been considered, such as graduation rate, violent crime, poverty, and food insecurity. Many of these and other drivers of health have interrelated and compounding effects. For example, people with higher incomes have more opportunities to live in safe and healthy homes near schools with better funding. People with higher incomes generally have more opportunities to purchase healthy foods and more time and resources for leisure-time physical activity. Health insurance and health care also become more accessible with higher incomes.

Health behaviors are actions that are either beneficial or detrimental to an individual's health. The drivers of health have direct effects on individual opportunities to make healthy choices and can either limit or facilitate opportunities to engage in healthy activities and behaviors. For example, people who do not receive comprehensive sex education may not know the necessary safe sexual practices to avoid unintended pregnancy and sexually transmitted diseases. Individuals who lack access to full-service grocery stores that sell fresh fruits and vegetables may not be able to prepare healthy meals and those who do not have safe spaces or spare leisure time to exercise may have low physical activity. Consequently, individuals living within these circumstances tend to have higher rates of obesity, diabetes, and heart disease.⁸

In addition to the slow improvement in overall health in the state, stark disparities exist, particularly between different racial and ethnic groups. Throughout this report, disparities are described within each indicator. **Figure 4** provides examples of health outcome disparities in the state.

FIGURE 3

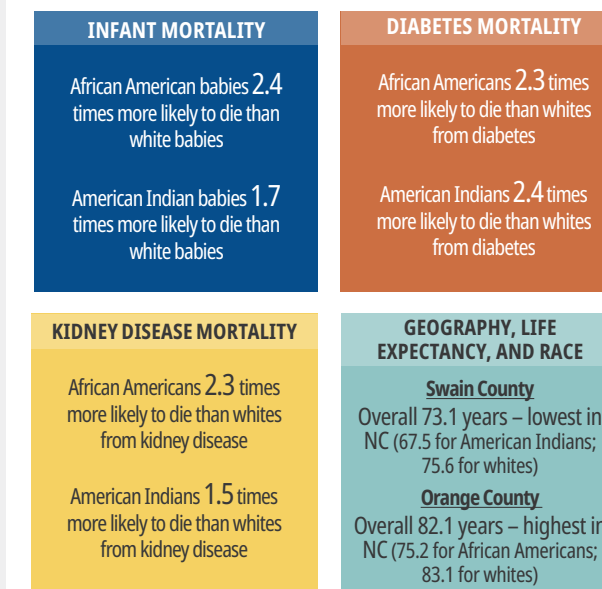
Health Status Successes and Challenges in North Carolina



Sources: America's Health Rankings (<https://www.americashealthrankings.org/explore/annual/>); Kaiser Family Foundation State Health Facts (<https://www.kff.org/other/state-indicator/nonelderly-0-64/?currentTimeframe=0&selectedDistributions=uninsured&selectedRows=%7B%22wrapups%22:%7B%22united-states%22:%7B%7D%7D,%22states%22:%7B%22all%22:%7B%7D%7D%7D&sortModel=%7B%22colId%22:%22Uninsured%22,%22sort%22:%22asc%22%7D>); NC DHHS NC Tobacco Prevention and Control Branch analysis of Youth Tobacco Survey Note: Data presented in this graphic are the most recent available to compare to national average.

FIGURE 4

Examples of Health Disparities in North Carolina



Sources: NC DHHS, Health Equity Report, 2018; NC DHHS, Life Expectancy, 2016-2018

Systems and Policies and the Drivers of Health

Often public policies are not included as a driver of health; however, public policies create the context within which the drivers of health exist. Federal, state, and local systems and policies shape the conditions in which individuals live, work, learn, and age.^{9,10} Public policies are those policies, and the systems and programs they create, that result from government action. The results of some public policies are easier to see: traffic and public safety laws, tax policies, education financing, and public assistance programs. Others may be harder to see in our daily lives but shape them nonetheless: zoning and land use policies; food safety regulations; agriculture policies; regulations around banking, communications, air and water quality; and laws around health insurance access and coverage. As such, public policy can often provide an avenue for intervening in the drivers of health.

“Public policies create the context within which the drivers of health exist. Federal, state, and local systems and policies shape the conditions in which individuals live, work, learn, and age.”

BACKGROUND

ACCUMULATING CHALLENGES:

William and the Drivers of Health

William grew up in a working-class neighborhood. He graduated from high school and went to work in a local factory because his family could not afford to pay for college. He made enough to make ends meet and had health insurance through his job. William worked long hours and didn't have a lot of time to exercise or make healthy meals at home. He gained weight and was eventually diagnosed with diabetes. A few years ago, the factory closed, and William lost his job and health insurance benefits. He found odd jobs around town to make some money but had to move to a low-cost rental apartment that was not being properly maintained by the property owner. He had to sell his car and rely on a friend to help him get around. He stopped going to regular medical appointments for his diabetes and also had to stop buying the medications he needed. One day William tripped on the carpet in his home that was buckled because of water damage and broke his arm. He became more limited in the work he could do and feared he may be evicted from his apartment.

“Structural racism refers to the way public policies, institutional practices, cultural representations, and other social norms interact to generate and reinforce inequities among racial and ethnic groups.”

Structural Racism and Health

The root cause for the health disparities we see in populations of color is the historical and continued structural racism that has resulted in inequitable opportunities for healthy lives. Structural racism refers to the way public policies, institutional practices, cultural representations, and other social norms interact to generate and reinforce inequities among racial and ethnic groups.^{11,12} This includes health care, housing, education, transportation and other policies that have either explicitly or implicitly resulted in discriminatory practices. Policies which are an example of structural racism include:

- **Redlining** – Exclusionary zoning laws across the country in the early- to mid-1900's prevented African Americans from buying property in certain neighborhoods. In 1933, the Home Owners' Loan Corporation introduced a color-coded system showing the “risk” of neighborhoods for mortgage lending. Red zones were those almost entirely populated by African American residents and considered high risk for mortgages. In 1934, the Federal Housing Administration continued the policies. These policies helped to produce the racially segregated, and often under-resourced, neighborhoods that are still found in many cities. This form of housing segregation was supported by lending policies into the 1970's, when new laws were enacted with the intention of ending explicit redlining.
- **Segregated schools** – Until the Supreme Court ruled in *Brown v. Board of Education* in 1954 that school segregation was unconstitutional, children of different races often went to separate schools by law. Despite the change in law, desegregation of schools took many years. Even today, due to historically segregated neighborhoods and other local policies, children do not always attend schools where the student population is racially or ethnically diverse. Schools that are racially isolated often are older and in poorer condition, have fewer resources, struggle to attract high-performing teachers, and offer fewer advanced courses and extra-curricular activities.¹³
- **High-interest loans** – African Americans and Hispanics are more likely to have high-interest home loans, even when controlling for credit score and other risk factors. This is largely due to the concentration of high-risk lenders who target people of color. These high-risk lenders are more likely to offer high-interest loans. These lenders charge higher rates to clients of color with the same credit score and risk factors as white clients.¹⁴

These structural policies pose challenges to achieving optimal health. Other examples of institutional racism reside within the health care system itself. The historical injustices of segregated hospitals, unethical research practices (e.g., Tuskegee Syphilis Study), and eugenics (e.g., forced sterilization) have resulted in a lack of trust in health care institutions for many people of color. Today, we see an underrepresentation of many racial/ethnic minority groups in the health professions¹⁵ and lower quality of care for people of color (e.g., receiving less information from health care providers, higher morbidity and mortality in coronary artery disease care, and more challenges getting appointments and care quickly).^{15,16,17}

“These impacts are numerous, including unemployment, fewer educational resources, harsher punishments in schools and the judicial system, intergenerational poverty, and the accumulated physiologic stress of discrimination regardless of socioeconomic status (i.e., “weathering”).”

These examples begin to illustrate the widespread social, economic, and health impacts of structural racism on people of color. These impacts are numerous, including unemployment, fewer educational resources, harsher punishments in schools and the judicial system, intergenerational poverty, and the accumulated physiologic stress of discrimination regardless of socioeconomic status (i.e., “weathering”).¹⁸ These issues encompass some of the upstream causes of the poor health outcomes that are seen for people of color. Correcting these injustices will require acknowledgement and understanding of the issues and intentional work to change them. Even with intentional efforts to eliminate these structural barriers to health equity, the work and the potential positive effects will take decades to accumulate. Structural racism, health equity, and health disparities were a part of discussions and the indicator selection process for HNC 2030. In several cases, indicators were chosen precisely because they are closely connected to structural racism in our

society. For example, children of color are more likely to experience suspension from school and adults of color face harsher punishments than their white peers for the same infractions. Lower educational attainment and incarceration both have long-term negative impacts on health and well-being by decreasing employment opportunities and income potential.^{19,20} Therefore, school suspension and incarceration rate were selected as indicators for HNC 2030.

Structural Racism and Health Outcomes – An Example

Looking to infant mortality, we see that African American women are more likely to live in communities that have fewer educational resources and employment opportunities due to historical segregation through housing and education policies. These socioeconomic factors are linked to birth outcomes and infant mortality. In addition, even for African American women who attain a higher socioeconomic status, pregnancy-related outcomes are worse than those of white women at lower socioeconomic levels (Harper et al., 2004). On top of the “weathering” that African American women’s bodies experience through the stress of discrimination, research is now showing that African Americans who increase their socioeconomic status may face added negative health effects through increased experiences of acute discrimination as they work and live in predominately white environments (Colen et al., 2018). Inside the medical system, disparate treatment of African American mothers may also play a role. Studies show that implicit bias in health care delivery may prevent African American women from receiving sufficient patient education in the prenatal period about risks to maternal and fetal health (Lu, et al., 2010), and may also contribute to African American women’s increased risk of life-threatening conditions such as preeclampsia and postpartum hemorrhage (ACOG Postpartum Toolkit, 2018; Howell et al., 2018; Gyamfi-Bannerman et al., 2018). Thus, stress-related impacts on the body, coupled with the implicit bias in health care, contribute to the disparate birth outcomes we continue to see for African American women and their babies (Lu et al., 2010).

CHAPTER 3

SOCIAL & ECONOMIC FACTORS



INTRODUCTION

Factors like education, employment, income, family and social support, and community safety provide the foundation for health and well-being. These social and economic factors strongly determine where we live, the jobs we have, the people we interact with, and our day-to-day experiences. These factors are also highly inter-related. For example, educational attainment drives opportunities for employment, and thus income. Families with lower incomes have a higher likelihood of living in areas with poor quality schools and have fewer resources to send their children to college. People with higher incomes can choose safer communities to live in.

Social and economic factors drive all the topics that are covered throughout this report:

- **Physical Environment** – Our incomes often determine how close we live to areas for safe physical activity, the quality of our homes, our access to healthy foods, and distance from known risks (e.g., tobacco shops).
- **Health Behaviors** – Many social and economic factors create the opportunity, or lack of opportunity, for people to participate in behaviors that are important for supporting a healthy life.
- **Clinical Care** – People in low-income jobs often lack health insurance, decreasing access to the care they need. Areas of the state with fewer resources also tend to have less geographic access to health care providers.
- **Health Outcomes** – All of these factors combine to drive our health from birth to death, with people who face greater social and economic challenges suffering higher rates of morbidity and mortality.

Social and economic factors often have long-lasting impacts on families. Families who face social and economic challenges may lack equitable access to opportunities or the resources needed for social mobility, leaving their children with similar prospects for the future. In North Carolina, as in the rest of the country, people of color are disproportionately affected by these factors due to historical and current structural racism. The social and economic health indicators selected for HNC 2030 highlight the impact of structural racism in our society directly (e.g., school suspension and incarceration) and indirectly (e.g., poverty and unemployment).

Read an example below of how social and economic factors can impact an individual's opportunities to achieve health and well-being.^E For each health indicator, this report includes recommended evidence-informed policies and practices to address that indicator of interest. We recommend community coalitions use multi-sector partnerships to pursue all the strategies recommended.

Social & Economic Factors and Health – Jennifer's Experience

Jennifer was raised by a single mother in a small, rural community in Western North Carolina. Her mother worked long hours at a minimum wage job and couldn't spend much time at home. Aside from the stress of her living situation, Jennifer had a learning disability that was never identified by her local schools and she barely got by with passing grades. When she was 16, she quit school to start working. Like her mother, her job had low wages and no opportunities for career advancement. A year after she quit school, Jennifer gave birth to her first daughter. The baby was born several weeks prematurely and needed to be cared for at home for longer than Jennifer's employer allowed her to be away from work. Now, Jennifer's mother is supporting her daughter and granddaughter by taking on another job. The stress of it all weighs on both Jennifer and her mother. Both deal with high blood pressure and struggle with depression. They don't see how they can change their situation and worry what opportunities the new baby will have as she grows up.

HEALTH INDICATORS:

1 INDIVIDUALS BELOW 200% FEDERAL POVERTY LEVEL (FPL)

Decrease the Number of People Living in Poverty

2 UNEMPLOYMENT RATE

Increase Economic Security

3 SHORT-TERM SUSPENSION RATE

Dismantle Structural Racism

4 INCARCERATION RATE

Decrease the Incarceration Rate

5 ADVERSE CHILDHOOD EXPERIENCES

Improve Child Well-Being

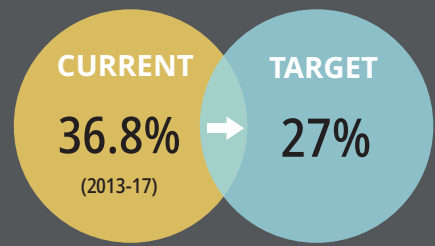
6 THIRD GRADE READING PROFICIENCY

Improve Third Grade Reading Proficiency

^E Examples are of hypothetical scenarios commonly faced by individuals with health-related social needs.

HEALTH INDICATOR 1: INDIVIDUALS BELOW 200% FEDERAL POVERTY LEVEL (FPL)

DESIRED RESULT: DECREASE THE NUMBER OF PEOPLE LIVING IN POVERTY



DEFINITION

Percent of individuals with incomes at or below 200% of the FPL

DETAILS

Not applicable

NC PERCENT OF INDIVIDUALS BELOW 200% FPL (2013-17)

37%

2030 TARGET

27%

RANGE AMONG NC COUNTIES

Not Available

RANK AMONG STATES (2017)

39th*

DATA SOURCE

American Community Survey

STATE PLANS WITH SIMILAR INDICATORS

North Carolina Perinatal Health Strategic Plan^F- indicator of addressing social and economic inequities for families

Early Childhood Action Plan^G- Families living at or below 200% of FPL is a sub-target of all 10 goals in the Early Childhood Action Plan

*Rank of 1st for state with lowest percent of individuals below 200% FPL

Rationale for Selection:

Income level is a strong predictor of a person's access to resources and health status. Low income restricts access to quality housing, transportation, food, and education, which limits opportunities for people to live healthy lives.^{F, G}

Context

Poverty is directly linked to negative health outcomes. Income is central to accessing resources needed to be healthy such as safe housing, nutritious food, education, and transportation, as well as health services and treatment. Income is one of the greatest predictors of disease and mortality rates.²¹ Low-income adults have higher rates of heart disease, diabetes, stroke, and other chronic disorders than their wealthier counterparts.²² Income is an even stronger predictor of health disparities than race when considering the rates of disease within racial/ethnic groups.²² People below 200% of the Federal Poverty Level (FPL) are more likely to rate themselves in fair or poor health (20%), have higher rates of obesity (36%), and are more likely to be a current smoker (25%).²³ They have fewer medical care options, are more likely to be uninsured, and the upfront costs of services are a greater burden for them.²² Mental health services can also be inaccessible for adults with low incomes.²⁴ Adults with family incomes below and near poverty experience more stress, particularly financial stress, which is detrimental to their overall health and well-being.

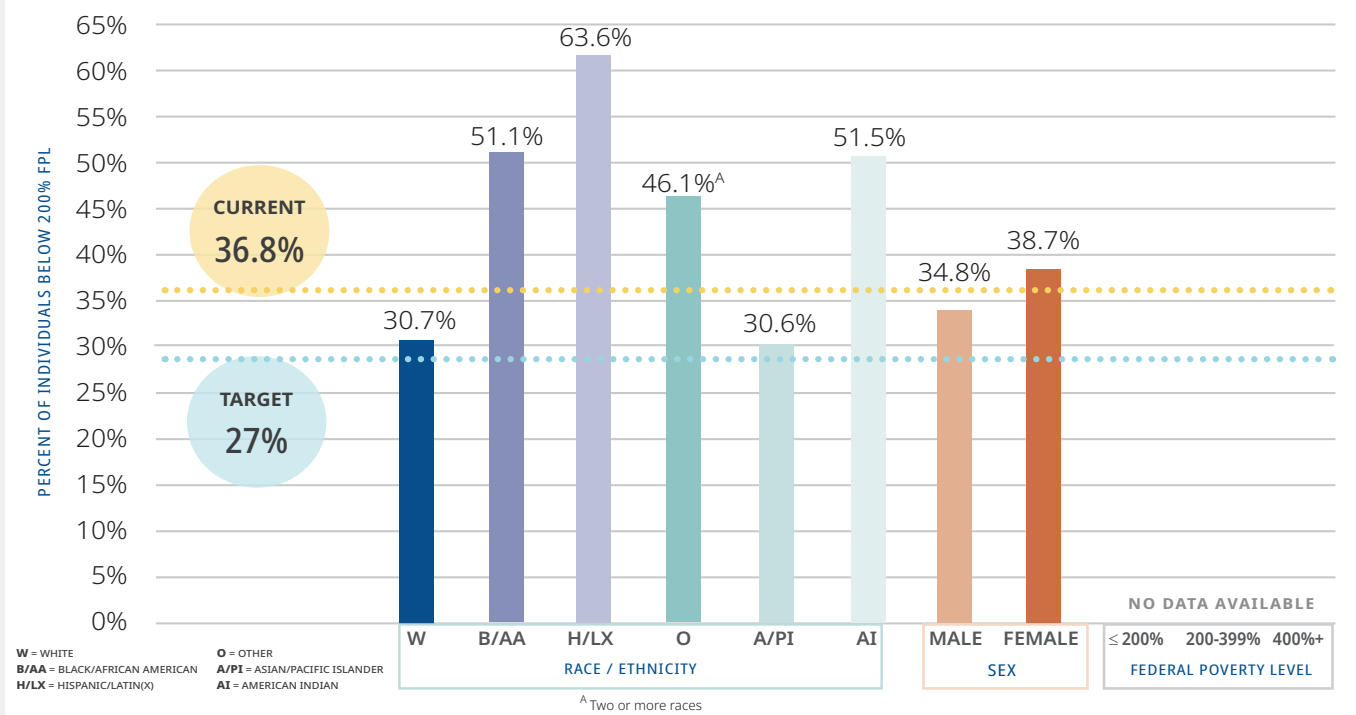
Lower-income earners are constrained in their options for where to live. Lower-cost housing tends to be in areas that are farther removed from services, require higher transportation costs, have overcrowding, and have greater exposure to hazardous toxins such as mold. These poor housing conditions correlate with the poor health conditions of low-income children such as asthma and elevated lead levels.²²

Children's health is positively correlated to parents' incomes, with children born to low-income mothers having a greater risk of low birth weight and higher rates of heart conditions, hearing problems, and intestinal disorders.²² Controlling for children's health at birth, those born to lower income parents are less healthy in adulthood than their wealthier peers.²⁵

The five-year average of individuals below 200% FPL between 2013-17 in North Carolina was 37% compared to approximately 33% of families nationwide.²⁶ For 2019, 200% FPL for individuals was \$24,980.²⁷

FIGURE 5

Percent of individuals below 200% Federal Poverty Level across populations in North Carolina and distance to 2030 target



Disparities

Nationally, children are the most likely of any age group to live in poverty, with 38.8% of people under the age of 18 living under 200% of the FPL compared to 26.2% aged 18 to 64 and 30.1% aged 65 and older.²⁸ Whites make up the largest share of those living with incomes below 200% of the FPL (58%). However, people of color are disproportionately more likely to live in poverty. In North Carolina, half of American Indians (52%) and African American (51%) and 64% of Hispanic individuals have incomes below 200% of the FPL, compared to 31% of whites.

2030 Target and Potential for Change

Although the percentage of individuals below 200% FPL has been decreasing slowly over the past decade, North Carolina ranks 39th out of 50 states in this indicator (single-year estimate, 2017).²⁹ The HNC 2030 group looked at averages in other states across the country and set an ambitious target of 27% of individuals living below 200% of the FPL by the end of the next decade. The state with the lowest percentage is New Hampshire at 16%, and many other states are around 25%. A faster decrease in the percentage than seen over the past decade will be seen as a success, even if the exact target is not met by 2030.

Levers for Change

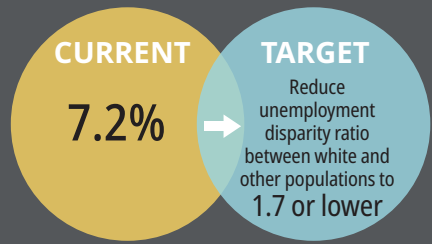
- Raise the minimum wage to \$15 per hour (Children's Defense Fund, 2019)
- Increase the state earned income tax credit
- Focus economic development on well-paying jobs
- Increase subsidized childcare
- Expand Medicaid eligibility
- Increase paid medical leave
- Improve teen pregnancy prevention
- Improve 3rd grade reading proficiency, high school graduation rates, and support and strengthen the community college system
- Reduce incarceration

^F North Carolina Department of Health and Human Services. North Carolina Perinatal Health Strategic Plan: 2016-2020. March 2016. <https://whb.ncpublichealth.com/phsp/>

^G North Carolina Department of Health and Human Services. North Carolina Early Childhood Action Plan. February 2019. <https://files.nc.gov/ncdhhs/ECAP-Report-FINAL-WEB-f.pdf>

HEALTH INDICATOR 2: UNEMPLOYMENT RATE

DESIRED RESULT: INCREASE ECONOMIC SECURITY



DEFINITION

Percent of population aged 16 and older who are unemployed but seeking work

DETAILS

Data based on 5-year average

NC UNEMPLOYMENT RATE (2013-17)

State overall: 7.2%;

Disparity ratios:

Black/white – 2.1

American Indian/white – 1.8

2030 TARGET

Reduce the unemployment disparity ratio between white and other populations to 1.7 or lower

RANGE AMONG NC COUNTIES

3.5 – 13.4%

RANK AMONG STATES (2017)

Not Available

DATA SOURCE

American Community Survey

STATE PLANS WITH SIMILAR INDICATORS

Not applicable

Rationale for Selection:

Employment opportunities are vital to providing income and, for many, health insurance. While the state’s unemployment rate is at an all-time low overall, there are still communities and populations that face challenges finding employment opportunities

Context

As of 2018, North Carolina’s unemployment rate has reached an all-time low of 3.9%. However, this figure masks significant disparities in access to economic opportunity as specific segments of the population face much higher rates, particularly rural residents and residents of color.

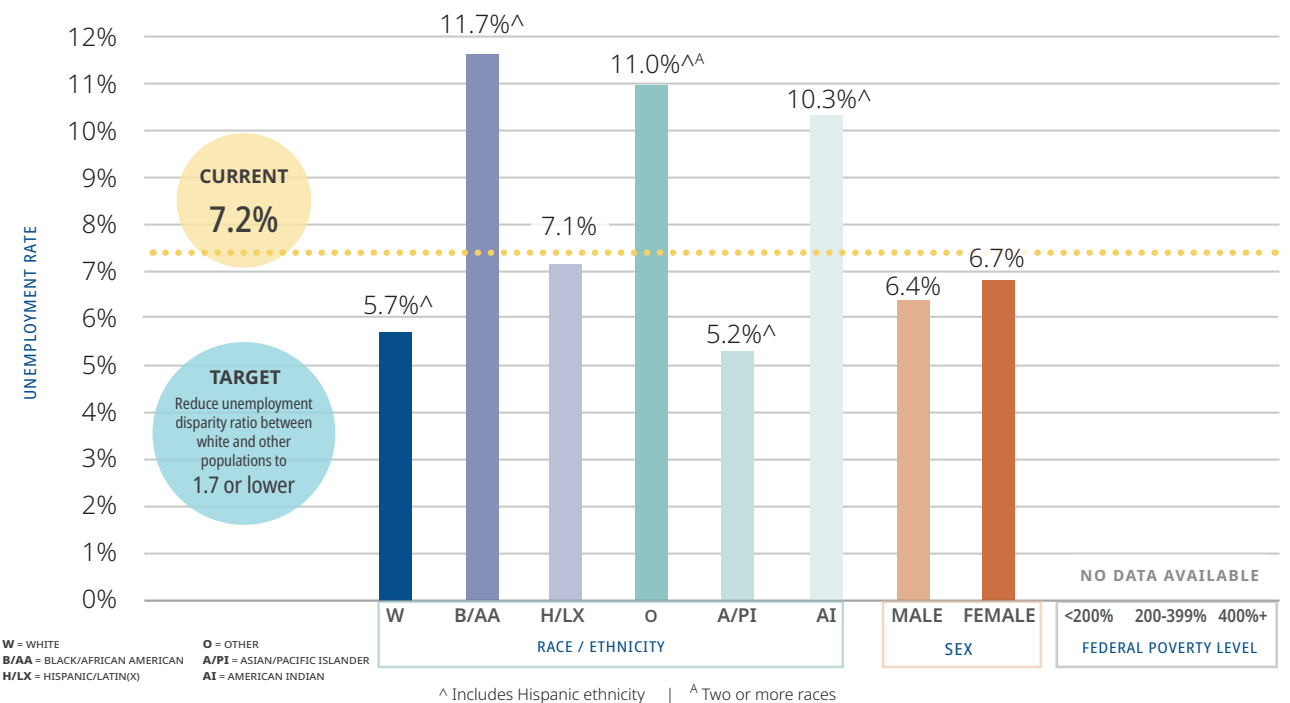
Though unemployment is not an orthodox measure of health, economic well-being is inextricably linked to health outcomes. Without the necessary savings to cushion against sudden unemployment, the lost source of income can push people into poverty. Loss of income poses clear financial barriers to accessing resources that protect and improve health. Furthermore, because employer insurance is the most common form of coverage, insuring 56% of the population, job loss can also mean a rise in the uninsured population.²⁸

Beyond the financial strain, unemployment is correlated with adverse health outcomes related to stress. Treated as a stress-inducing event, the experience of unemployment increases vulnerability to stroke, heart attack, heart disease, and arthritis. Those laid off are more likely to have fair or poor health, have higher admissions to hospitals, and have a greater need for medical attention and medication.³⁰ For mental health issues such as distress, depression, anxiety, psychosomatic symptoms, subjective well-being, and self-esteem, one study found unemployed individuals were twice as likely to experience these problems compared to those who were employed.³¹ Unemployment can also lead to increased unhealthy behaviors such as alcohol and tobacco consumption, poor diet, and less exercise which further exacerbates poor health and is compounded by limited income/resources to address illnesses.³²

“Though unemployment is not an orthodox measure of health, economic well-being is inextricably linked to health outcomes. Without the necessary savings to cushion against sudden unemployment, the lost source of income can push people into poverty.”

FIGURE 6

Unemployment across populations in North Carolina and distance to 2030 target



Disparities

Rural North Carolinians face higher levels of unemployment and poverty and earn less than urban residents.³³ In some rural counties the unemployment rate is twice that of well-off metropolitan areas.³³

Racial and ethnic disparities also exist, with unemployment rates for African Americans and American Indians nearly twice that of white populations (11.7%, 10.3%, and 5.7%, respectively, 2013-2017 average) and Hispanic populations also facing higher rates of unemployment (7.1%) as compared to the white population.²⁶ African Americans are also disproportionately represented in economically distressed rural areas. In 2018, unemployment in rural areas of the state was at 11.4% for African Americans and 5.9% for whites.³³

People who have been incarcerated face very high rates of unemployment, with one analysis finding that 27% of this population is unemployed.³⁴ Contributing factors include limited numbers of reentry programs, employment and housing discrimination, and lack of qualifications and training for jobs earning a livable wage.

Levers for Change

- Increase workforce development efforts targeted to reach those who need it most
- Increase percentage of jobs that pay a living wage
- Improve personal finance credit scores and access to financial capital
- Expand transit options in rural and low-income communities, and increase access to affordable personal vehicles
- Increase access to affordable childcare
- Improve educational outcomes and increase participation in post-secondary education
- Support economic opportunities that provide full-time employment and grow local businesses
- Support “fair-chance” hiring policies

^H This is largely due to seasonal employment patterns in agricultural industries. Unemployment is least severe in October hovering around 5% but spikes in December and January. This is true for all counties with high unemployment.

HEALTH INDICATOR 2: UNEMPLOYMENT RATE

DESIRED RESULT: INCREASE ECONOMIC SECURITY

2030 Target and Potential for Change

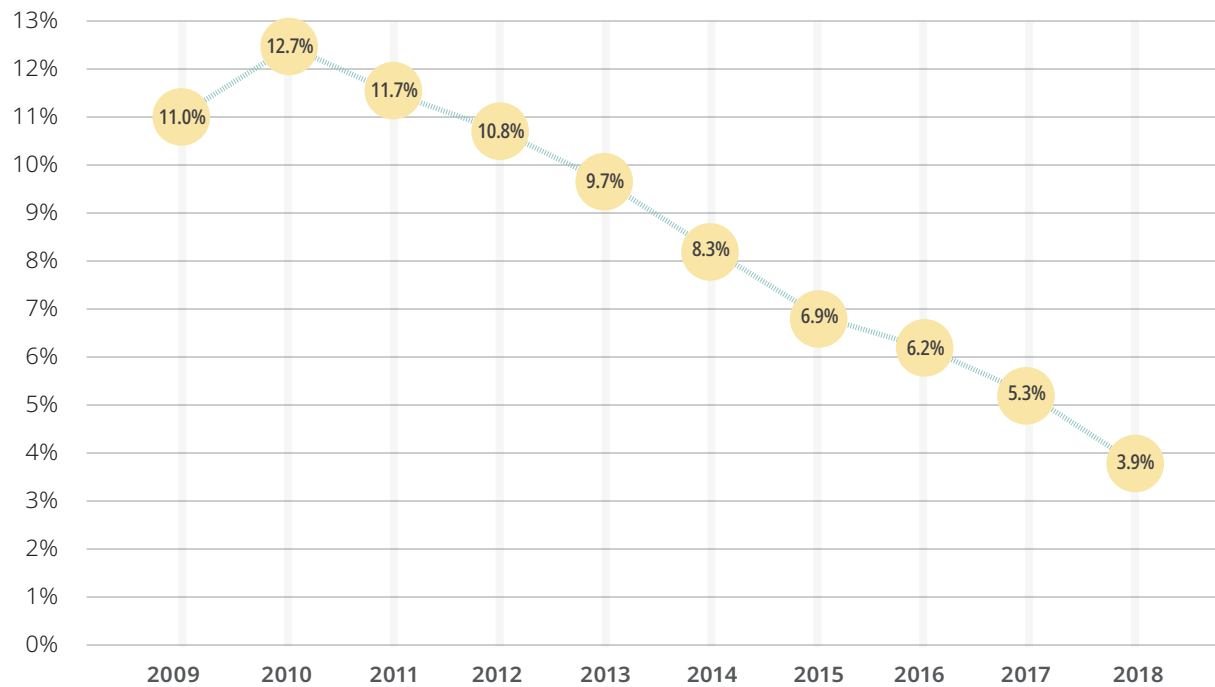
The state unemployment rate has been falling for nearly a decade and is likely near the lowest rate possible without negative consequences to other economic factors (e.g., inflation). While the overall unemployment rate has been at an historically low level, the disparities seen across geography and race/ethnicity in the state are concerning and are the primary reason the HNC 2030 group selected this health indicator. To set the target for 2030, the group looked at averages across counties in the state and other states and disparities among different racial and ethnic groups. Setting a target to lower or maintain the unemployment rate was identified as an unrealistic goal due to the greater economic climate in the country. Therefore, the group focused on the racial/ethnic

disparities in the state and selected a target for 2030 of reducing the disparity ratio^I between white and other populations to a maximum of 1.7. The current disparity ratio between African Americans and whites in North Carolina is 2.1 and for American Indians it is 1.8.^J This goal is relevant at both the state and county levels.

Overall unemployment rate between counties will continue to be an important factor to address in coming years, particularly in rural areas. The HNC 2030 target of reducing disparities among racial/ethnic groups can encourage even those counties with the lowest unemployment rates to look more deeply at the rates across populations in the county.

FIGURE 7

Percent of population in North Carolina aged 16+ unemployed but seeking work, not seasonally adjusted, one-year average



Source: American Community Survey. Employment Status, 1-Year Estimates.

^I A disparity ratio is determined by dividing a rate or percentage for one group by the rate or percentage for another group. Ratios above 1.0 indicate disparities between the two groups. For example, an unemployment disparity ratio of 1.5 would indicate that a group is 1.5 times more likely to be unemployed than the comparison group.

^J Calculations based on 5-year unemployment averages from the American Community Survey.

DISMANTLE STRUCTURAL RACISM

The disparities we often see in health outcomes for people of color are rooted in the historical and continued structural racism found in our society that have resulted in inequitable opportunities for healthy lives. Conscious and unconscious bias and stereotyping of people of color remains pervasive, influencing policies and institutions at the federal, state, and local levels.³⁵ This includes housing, education, and transportation policies that have either explicitly or implicitly resulted in discriminatory practices (e.g., redlining in housing, segregated schools, high-interest loan practices).

The impacts of structural racism are numerous, including unemployment, fewer educational resources, harsher punishments in schools and the judicial system, intergenerational poverty, and the accumulated stress of discrimination regardless of socioeconomic status (i.e., “weathering”).¹⁸ These issues encompass many of the upstream causes of the poor health outcomes that are seen for people of color. Correcting these injustices will require acknowledgement and understanding of the issues, and intentional work to change them. Two HNC 2030 indicators serve as measures of structural racism: short-term suspensions from school and incarceration rate. These are not the only possible measures closely related to structural racism. Other indicators selected for HNC 2030 are also affected by the experiences that people of color have as a result of structural racism, although they were not chosen explicitly for that reason.

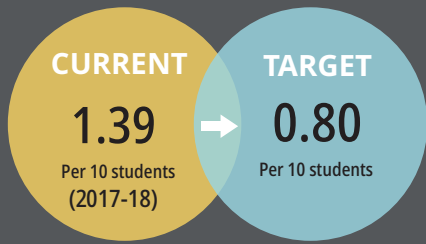
“Structural racism refers to the way public policies, institutional practices, cultural representations, and other social norms interact to generate and reinforce inequities among racial and ethnic groups.”^{12,11}

Structural Racism Example - School-to-Prison-Pipeline

The school-to-prison-pipeline refers to “the system of policies and practices that push students out of school and into the juvenile and adult criminal systems” (Youth Justice Project: Pipeline). Entry into the pipeline includes experiencing suspension, expulsion, truancy, drop-out, engagement with School Resource Officers, and court involvement (Youth Justice Project: Pipeline). There is extensive research and growing recognition of the linkage between early interaction and future entanglement in the criminal justice system. For example, suspension from school is linked with lower educational achievement and higher likelihood of involvement with the criminal justice system in the future (Rosenbaum, 2018). Youth of color, particularly boys, face disproportionately higher rates of school-based discipline and are therefore put at greater disadvantage for future interactions with the justice system.

HEALTH INDICATOR 3: SHORT-TERM SUSPENSION RATE

DESIRED RESULT: DISMANTLE STRUCTURAL RACISM



DEFINITION

Number of out-of-school short-term suspensions in educational facilities for all grades per 10 students

DETAILS

Includes Kindergarten – 12th grade; short-term suspension is 10 days or less; data reflect total numbers of short-term suspensions that may include multiple suspensions per student

NC SHORT-TERM SUSPENSIONS (2017-18)

1.39 per 10 students

2030 TARGET

0.80 per 10 students

RANGE AMONG NC LOCAL EDUCATION AGENCIES

0.0 – 8.22 per 10 students

RANK AMONG STATES

Not Available

DATA SOURCE

NC Department of Public Instruction

STATE PLANS WITH SIMILAR INDICATORS

North Carolina Perinatal Health Strategic Plan^k - indicator of addressing social and economic inequities

Rationale for Selection:

In the education system, children of color are disproportionately punished through mechanisms like short-term suspension from school. These punishments inhibit academic achievement and open a gateway that can, in time, lead to subsequent involvement with the justice system. Limitations in academic achievement can have lifelong effects on health and well-being.^k

Context

Exclusionary discipline (i.e., suspensions and expulsions) is a strong predictive factor for negative outcomes in students' academic achievement and high school completion. Some of the negative student outcomes associated with suspension include:

- lower academic performance,
- higher rates of dropout,
- failure to graduate on time,
- lower academic engagement, and
- continued targeting for future disciplinary action.³⁶

“In North Carolina, on average, there were 3 short-term suspensions for every 10 African American students compared to less than 1 short-term suspension for every 10 white and Hispanic students.”

These negative educational outcomes can have lifelong impacts on health as those with less education have more challenges finding employment that provides a living wage and have decreased levels of social supports. It is estimated that each additional year of education leads to around 11% more in annual income and high-paying jobs are more likely to provide benefits such as health insurance and paid leave.³⁷

Besides missing important class time essential for academic success, suspensions also force students to miss out on extracurricular activities key to accumulating the social experiences just as necessary for a high-quality life.

Disparities

Across the nation, students of color are suspended and expelled at higher rates than their peers even though studies have shown no difference in behavior among students by race/ethnicity.³⁸ In North Carolina, on average, there were 3 short-term suspensions for every 10 African American students compared to less than 1 short-term suspension for every 10 white and Hispanic students (See Figure 9).³⁹

North Carolina's suspension data reveal other stark disparities across different groups of students, including American Indian and multiracial students who are more likely to be suspended than their white, Asian, and Hispanic peers. Children receiving special education services account for 24% of all suspensions.³⁹ Boys receive the majority of suspensions, representing half of school populations but nearly two-thirds of suspensions. However, African American and American Indian girls had notably higher rates of suspension than their white peers, receiving 1.81 and 1.36 suspensions per 10 students, respectively, compared to 0.30.³⁹

FIGURE 8

Short-term suspension rates across populations in North Carolina and distance to 2030 target

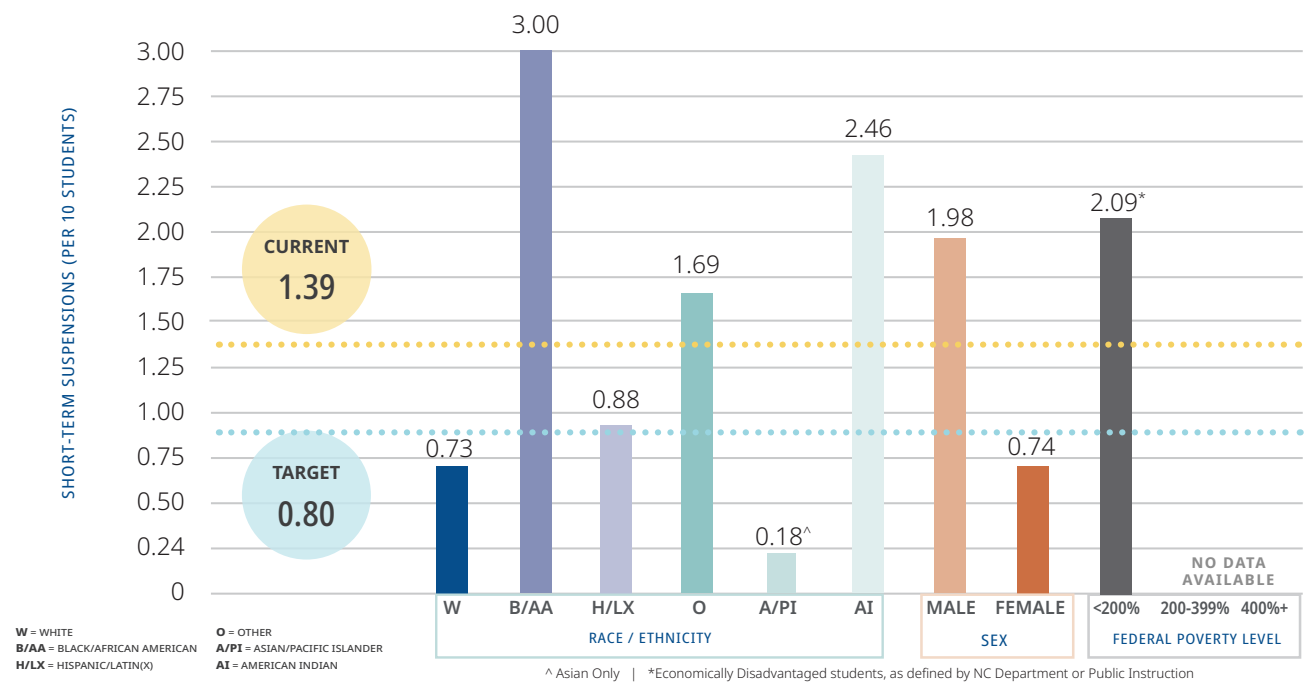
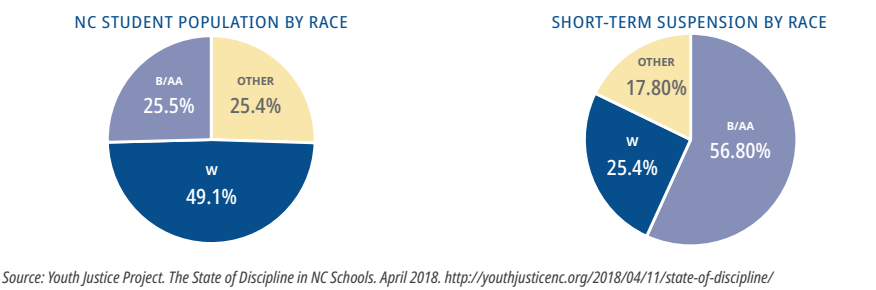


FIGURE 9

North Carolina Student Population and Short-Term Suspensions by Race



2030 Target and Potential for Change

The HNC 2030 group considered the current data across student race/ethnicity as a primary method for target setting. With white, Hispanic, and Asian around or below 0.80 suspensions per 10 students, this was chosen as the target for all students. Meeting this target is largely dependent upon eliminating the disparities we see in the use of short-term suspension for African American and American Indian students. With the growing understanding of disproportionate use of exclusionary discipline approaches, the group felt confident that significant movement toward the target could be achieved in the next decade.

Levers for Change

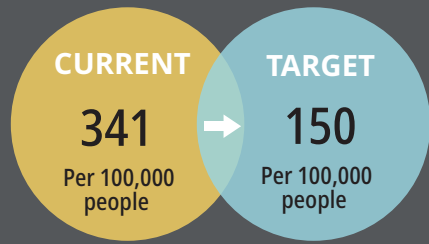
(Kostyo et al, 2018)

- Train teachers, administrators, school resource officers, and others working with students on implicit bias
- Develop collaborative learning groups for schools to share best practices
- Include suspension rate in measures of school quality
- Develop statewide system of restorative justice programs
- Provide informational resources for schools on how to reduce disciplinary actions
- Promote non-exclusionary approaches to discipline

^k North Carolina Department of Health and Human Services. North Carolina Perinatal Health Strategic Plan: 2016-2020. March 2016. <https://whb.ncpublichealth.com/phsp/>

HEALTH INDICATOR 4: **INCARCERATION RATE**

DESIRED RESULT: **DECREASE THE INCARCERATION RATE**



DEFINITION

Incarceration in North Carolina prisons per 100,000 population

DETAILS

Rate based on jurisdictional population with sentences greater than one year

NC INCARCERATION RATE (2017)

341 per 100,000 people

2030 TARGET

150 per 100,000 people

RANGE AMONG NC COUNTIES

NOT APPLICABLE

RANK AMONG STATES

21st*

DATA SOURCE

US Bureau of Justice Statistics

STATE PLANS WITH SIMILAR INDICATORS

Not Applicable

*Rank of 1st for state with lowest incarceration rate

Rationale for Selection:

People of color, notably African American men, are imprisoned at disproportionate rates and tend to face harsher punishment for similar crimes as their white counterparts. There are enormous health, social, and economic consequences of incarceration for both the imprisoned person, their families, and our communities.

Context

Incarceration is a key health indicator for its sweeping effects on communities, families, and individuals. Communities with high rates of incarceration are affected by damage to social networks and family ties, increased poverty and crime, and reduced life expectancy.⁴⁰ High rates of incarceration weaken communities and contribute to adverse health outcomes.⁴¹ For much of the 20th century, the incarceration rate in the United States (and internationally) averaged 110 inmates per 100,000 persons. A shift in U.S. crime policy at the local, state, and federal levels toward mandatory lengthy jail and prison sentences in the 1980s led to the prison boom (450 inmates per 100,000 persons) or mass incarceration.

Families with an incarcerated adult member face economic hardships including housing insecurity, difficulty meeting basic needs, and increased use of public assistance.³⁵ Incarceration of a parent is a traumatic experience for a child, increasing their risk of depression and anxiety, antisocial behavior, substance abuse, involvement with crime, disengagement from school, and risky sexual behaviors.³⁵ (See Adverse Childhood Experiences, **Pages 46-47**)

Inmates are likely to develop chronic conditions such as hypertension, diabetes, arthritis, and asthma and are more at risk of contracting communicable diseases such as HIV, hepatitis C, and tuberculosis. Incarcerated individuals experience poor diets (high calorie, high fat, low nutrient density foods), low sanitation standards, presence of infestations, inmate violence, excessive use of force by officers, sexual violence, and lack of social connection.⁴³ Inmates are also at higher risk of dying from a drug overdose or suicide. These risk factors are exacerbated by conditions upon reentry into society such as limited resources, less educational attainment, disadvantages in employment, absence of drug rehabilitation resources, and unstable housing. Without proper rehabilitation, released into a less structured environment, and significantly disadvantaged due to their criminal records, the formerly incarcerated often fall into poverty and reoffend.

Disparities

Application of law enforcement and sentencing has led to disproportionate incarceration rates, with African Americans making up 52% of the total incarcerated population, but only 22% of the state population.^{44,45} For example, although drug use is lower among African Americans and rates of trafficking are not different based on race/ethnicity, African Americans are 6.5 times more likely to be incarcerated for drug-related offenses.³⁵ Numerous studies have shown systematic differences exist in outcomes for people of color from arrest, case processing, sentencing, and parole, all of which increase their likelihood of serving time in jail or prison.³⁵

FIGURE 10

Incarceration rates across populations in North Carolina and distance to 2030 target

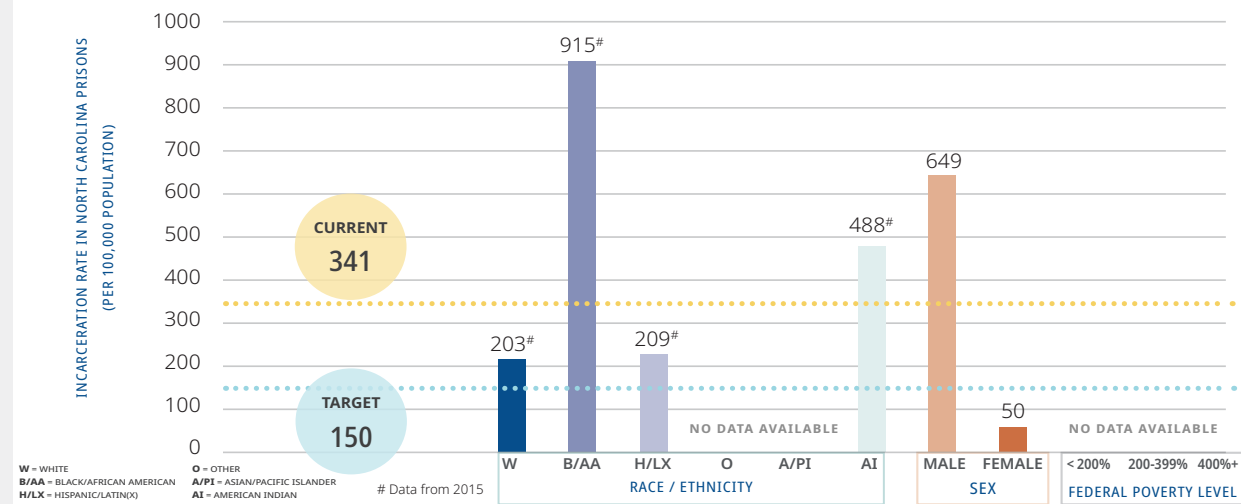
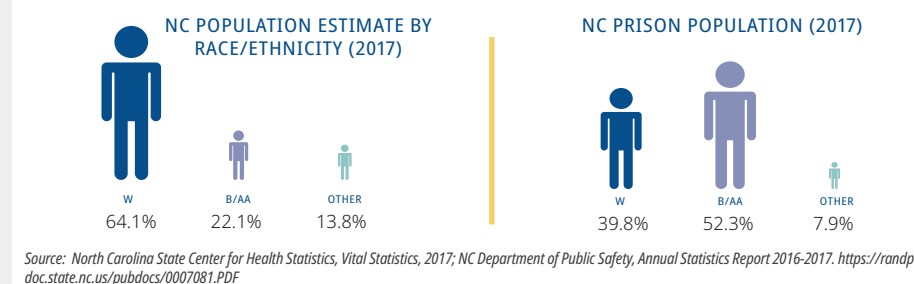


FIGURE 11



Incarceration rates across North Carolina's counties also show disparities in the state. Figures from 2015 show the highest incarceration rate for African Americans was in Graham County with 2,864 per 100,000 African American residents (compared to 279 per 100,000 for whites) and for American Indians at 3,426 per 100,000 American Indian residents in Gates County (compared to 174 per 100,000 for whites).⁴⁷ In North Carolina, 17% of inmates have mental illnesses (3-4 times more than the general public).⁴⁴

2030 Target and Potential for Change

North Carolina currently has the 21st lowest incarceration rate of the 50 states and the rate has been declining over the past decade. With this trend and considering the lowest state rate (Massachusetts – 120 per 100,000), the HNC 2030 group selected an aggressive target of 150 people incarcerated per 100,000 population. Meeting this target will be very challenging and is almost entirely dependent upon sharply reducing the disparities we see in the disproportionate incarceration of African American and American Indian populations. While rates have been trending down, faster decreases in these trends in the next decade will be viewed as a success.

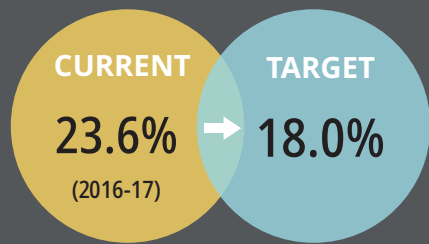
Levers for Change

(National Research Council, 2014)

- Revise current criminal justice policies to reduce the rates of incarceration
- Improve conditions and programs in jails and prisons to reduce harmful impact and foster successful reintegration into community
- Improve educational outcomes, particularly for boys of color
- Reduce intergenerational and neighborhood poverty
- Improve access to treatment for substance use disorders, physical illnesses, and mental illnesses
- Increase employment opportunities and job training programs in disadvantaged communities
- Implement standardized, evidence-based programs to reduce recidivism

HEALTH INDICATOR 5: ADVERSE CHILDHOOD EXPERIENCES

DESIRED RESULT: IMPROVE CHILD WELL-BEING



DEFINITION

Percent of children who have experienced two or more of the following:

- Hard to get by on money
- Parent/guardian divorced or separated
- Parent/guardian died
- Parent/guardian served time in jail
- Saw or heard violence in the home
- Victim/witness of neighborhood violence;
- Lived with anyone mentally ill, suicidal, or depressed;
- Lived with anyone with alcohol or drug problem;
- Often treated or judged unfairly due to race/ethnicity

DETAILS

Measure relies on parental report of experiences or aspects of their children's lives

NC CHILDREN WITH 2+ ACES (2016-17)

23.6%

2030 TARGET

18.0%

RANGE AMONG NC COUNTIES

Not Available

RANK AMONG STATES

32nd*

DATA SOURCE

Children's National Health Survey

STATE PLANS WITH SIMILAR INDICATORS

Early Childhood Action Plan^L - indicator of safe and nurturing relationships

*Rank of 1st for state with lowest percent of children with 2+ ACES

Rationale for Selection:

Children's experiences of adversity and trauma can have lifelong impacts on health and well-being. Trauma-informed and resilience building practices are gaining attention and are being implemented to help children overcome their experiences and circumstances.^L

Context

Children thrive in safe, stable, and nurturing environments. Adverse experiences, such as exposure to trauma, violence, or neglect during childhood, increase the likelihood of poor physical and mental health as a child grows up.⁴⁸ The more Adverse Childhood Experiences (ACEs) an individual has, the greater the risk for health-related challenges in adulthood. This includes a higher risk for coronary heart disease, stroke, asthma, and chronic obstructive pulmonary disease, much higher risk of depression, higher rates of risky health behaviors like smoking and heavy drinking, and more socioeconomic challenges.⁴⁹ Research has shown that exposure to these Adverse Childhood Experiences (ACEs) can impact children's neurobiological development, negatively affecting their learning, language, behavior, and physical and mental health. Decreasing childhood exposures to trauma, building resilience, strong relationships with caregivers, and providing safe, stable environments can help children overcome the impact of ACEs.

While two-thirds of people have at least one ACE, the more ACEs a child accumulates the more at risk to chronic disease and risky health behaviors they become.⁴⁸ In North Carolina, almost 1 in 4 children ages 0-17 has experienced two or more ACEs, including 18% of children ages 0-5.^{M,50}

Disparities

Factors associated with greater risk of two or more ACEs for children in North Carolina include:

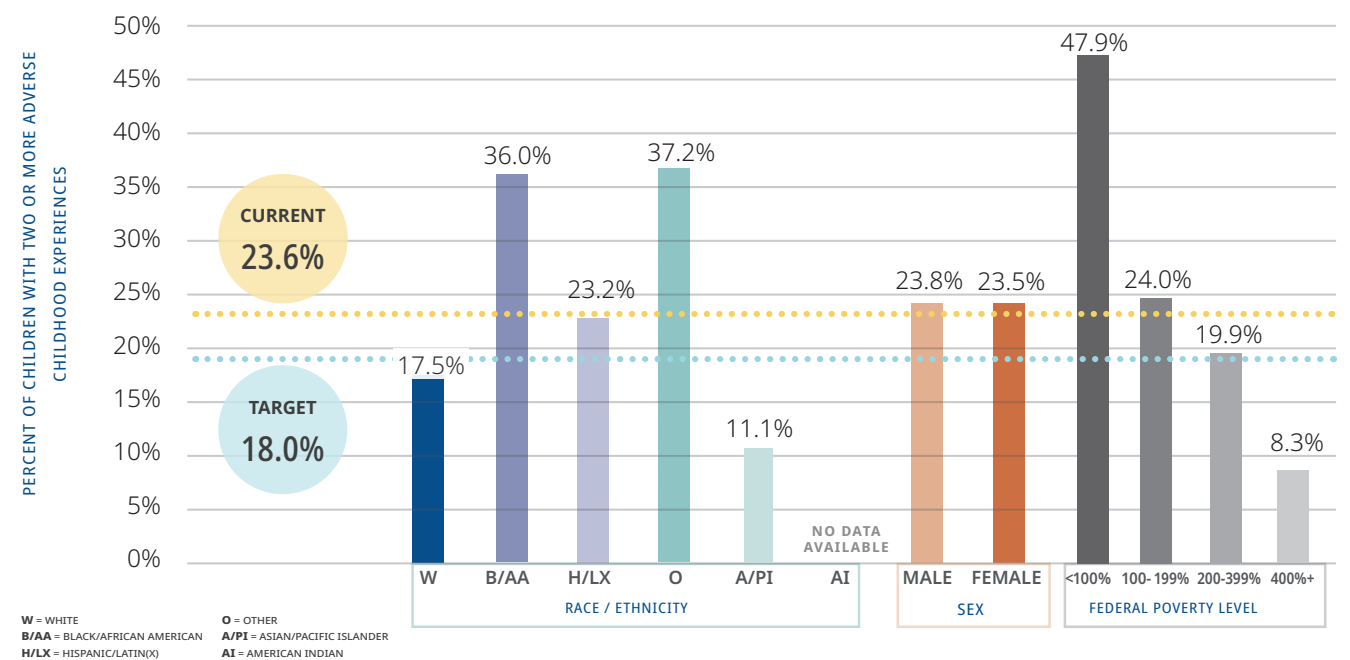
- **Living arrangements:** living with a caregiver other than their parents, those in non-married two parent households, and those in single mother households⁵⁰
- **Income:** children in low-income households
- **Care Needs:** Children with complex health care needs or emotional, behavioral, or developmental issues
- **Race and ethnicity:** African American or Other, non-Hispanic (i.e., not white, Asian, or Hispanic)

2030 Target and Potential for Change

North Carolina is currently tied at 32nd of the 50 states in the number of children with two or more ACEs, with 23.6% of children (with 1st representing the lowest percent of children with two or more ACEs). Aiming for a 25% decrease in this number by 2030, the HNC work group chose a target of 18.0% of children with two or more ACEs. In setting the ambitious target, they took into account data for the states with the lowest averages (2016-17 - California: 14.8%; Maryland: 15.6%; New Jersey: 15.6%), and the United States average (20.5%).

FIGURE 12

Percent children with two or more Adverse Childhood Experiences across populations in North Carolina and distance to 2030 target

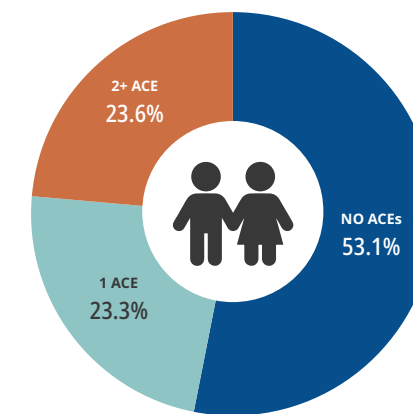


W = WHITE
B/AA = BLACK/AFRICAN AMERICAN
H/LX = HISPANIC/LATINX
O = OTHER
A/PI = ASIAN/PACIFIC ISLANDER
AI = AMERICAN INDIAN

Due to societal forces that entrench ACEs in the lives of many people with lower incomes and people of color, reaching the selected target will be challenging. Movement toward the target will be viewed as a success in decreasing childhood exposure to trauma. At the same time, negative impacts on the children experiencing these challenges can be mitigated by increasing trauma-informed practices in medical, educational, and other settings, and implementing strategies and programs to support families and children and foster resilience.

FIGURE 13

ACEs Among Children in North Carolina, 2016-17



Source: Children's National Health Survey

Levers for Change

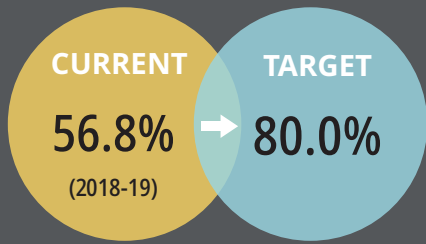
- Increase minimum wage and employment opportunities
- Increase opportunities for trauma-informed parenting support
- Expand community and domestic violence prevention initiatives
- Increase access to behavioral health treatment
- Increase access to evidence-based parenting programs and home visiting programs

^L North Carolina Department of Health and Human Services. North Carolina Early Childhood Action Plan. February 2019. <https://files.nc.gov/ncdhhs/ECAP-Report-FINAL-WEB-f.pdf>

^M Data collected through the Children's National Health Survey by parent report of the experiences of their children.

HEALTH INDICATOR 6: THIRD GRADE READING PROFICIENCY

DESIRED RESULT: IMPROVE THIRD GRADE READING PROFICIENCY



DEFINITION

Percent of children reading at a proficient level or above based on third grade End of Grade exams

DETAILS

Proficiency defined as Level 3 or higher

NC THIRD GRADE READING PROFICIENCY (2018-19)

56.8%

2030 TARGET

80.0%

RANGE AMONG NC LOCAL EDUCATION AGENCIES

24.6 – 81.7%

RANK AMONG STATES

Not Applicable

DATA SOURCE

NC Department of Public Instruction

STATE PLANS WITH SIMILAR INDICATORS

Early Childhood Action Plan^o- indicator of learning and children being ready to succeed
Every Student Succeeds Act Consolidated State Planⁿ- Measure of progress: State Level Reading Grades 3-8

Rationale for Selection:

Reading proficiency is a strong predictor of educational and other health-related outcomes. Children who are not proficient in reading by the end of third grade face greater challenges in subsequent years of their education. Large disparities exist for African American, Hispanic, and American Indian children.^{N,O}

Context

Early reading proficiency is a key indicator for academic and career success. Third grade is a pivotal point in primary education, because, up until third grade, children are learning to read; after third grade, children must be able to read to learn. Therefore, students who do not meet third grade reading proficiency requirements are at risk of being left behind. In North Carolina, over 40% of students, or more than 53,000 each year, are not reading on grade level by the end of third grade. These children are at increased risk for ongoing academic difficulties, leaving school without a diploma, and fewer employment prospects.⁵¹

“Children who have low reading proficiency are more likely to drop out of school before graduation, which can have lifelong economic consequences, including low-wage jobs and limited access to health care.”

For those who are not achieving grade-level reading by the end of third grade, disadvantages will compound as they grow older.

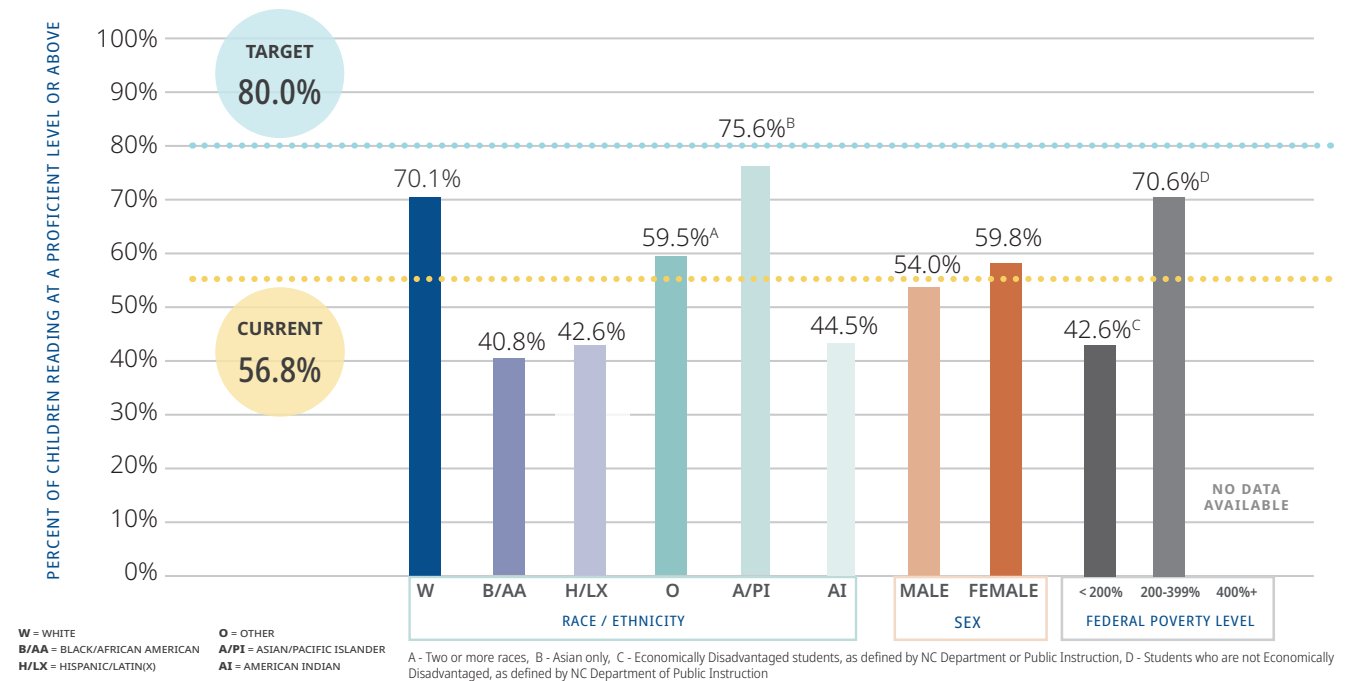
Children who have low reading proficiency are more likely to drop out of school before graduation, which can have lifelong economic consequences, including low-wage jobs and limited access to health care.^{51,52} Literacy levels have been linked to increased risk of hospitalization and numerous adverse health outcomes.⁵³ Studies show people with lower literacy levels are more likely to miss school, smoke, have depressive symptoms as a child, have severe asthma, and are less likely to breastfeed their children.⁵⁴

Disparities

In the 2018-19 school year, only 4 in 10 students from economically disadvantaged families^p and children in foster care were reading at or above grade level at the end of third grade.³⁹ Around 40% of African American, American Indian, and Hispanic third graders were reading at or above third grade level compared to 70% and 76% of white and Asian students, respectively. Children who had disabilities (23.0%), were English learners^q (27.7%), or who were homeless (32.8%) were least likely to be proficient in reading. Performance varies widely by school district. Seventy percent or more of students are at or above proficient on the third grade reading assessment in five school districts (Camden, Chapel Hill-Carrboro City, Elkin City, Polk, and Madison) while ten fall below 40% (Bertie, Edgecombe, Greene, Halifax, Nash-Rocky Mount, Northampton, Scotland, Warren, Washington, and Weldon).

FIGURE 14

Percent children who are proficient in reading at the end of third grade across populations in North Carolina and distance to 2030 target



2030 Target and Potential for Change

The HNC 2030 group reviewed data across several years and all Local Education Agencies (LEAs) to develop a target for third grade reading proficiency. Over the past five years, proficiency rates have declined from 60.2% in the 2013-14 school year to 55.9% in 2017-18, with a slight increase to 56.8% in 2018-19. Across LEAs, the highest proficiency rate is in Camden County at 82%; only four other LEAs (Chapel Hill-Carrboro City, Elkin City, Polk, and Madison) have proficiency rates between 74-77%. Despite this, the HNC 2030 group chose to select an ambitious target to make a statement to state and local leaders about how critically important reading proficiency is to lifelong health and well-being. Turning the trend and making improvements toward the goal of 80% of children reading at a proficient level by 2030 will be considered a success. Making a change in recent trends will be largely dependent upon eliminating the disparities we see in proficiency rates for African American, Hispanic, and American Indian students.

Levers for Change

(North Carolina Early Childhood Action Plan, 2019)

- Expand access to NC Pre-K, 4-, and 5-star early learning programs and other high-quality early childhood programs, particularly for children who are homeless, in foster care, are from immigrant families, or who have disabilities or other special healthcare needs
- Increase funding to public schools and early learning programs that serve children with the highest barriers to success, including children from low-income families and people of color
- Improve the rigor and responsiveness of birth through third grade teacher and administrator preparation programs
- Raise wages to attract, recruit, and retain highly qualified birth through third grade teachers
- Increase access to home visiting programs for young children
- Expand use of evidence-based literacy programs connected to health care (e.g., Reach Out and Read)

^NConsolidated Plan for the Elementary and Secondary Education Act of 1965, as amended by the Every Student Succeeds Act. September 2017. <http://www.ncpublicschools.org/docs/succeeds/nc-essa-state-plan-final.pdf>

^ONorth Carolina Department of Health and Human Services. North Carolina Early Childhood Action Plan. February 2019. <https://files.nc.gov/ncdhhs/ECAP-Report-FINAL-WEB-f.pdf>

^P“Economically disadvantaged” indicates those students eligible for free and reduced-price lunch under the National School Lunch Program (NSLP) for agency reporting purposes (NCDPI, 2017).

^QStudents who are in the process of learning English.

DEVELOPMENTAL MEASURES

The social and economic factors measure below is one that the HNC 2030 group feels is important to population health but does not have reliable or robust data available at this time. A description of the data needed for this measure is listed as “developmental data needs.” State and local public health or other entities should consider identifying methods for collecting this data.

Developmental Progress at Kindergarten Entry

The quality of educational systems is typically evaluated through student achievement and outcome measures, such as end of grade exam scores, drop-out, and graduation rates. These are important indicators for schools, yet the building blocks for learning begin much earlier. Students who enter Kindergarten at a deficit compared to their peers may face ongoing challenges throughout their years of education and can experience poor outcomes. A child’s readiness for Kindergarten is dependent on a variety of cognitive, social, and behavioral factors.

The North Carolina Department of Public Instruction’s (NC DPI) Office of Early Learning is currently implementing a Kindergarten Entry Assessment (KEA). The KEA was developed with input from teachers, parents, and other stakeholders and includes five domains that are consistent with research and expertise in the area of school readiness: approaches to learning, cognitive development, emotional-social development, health and physical development, and language development and communication.⁵⁵ For the 2017-18 school year, 49.9% of children entering Kindergarten were assessed as ready for Kindergarten.⁵⁶

Developmental data needs:

- The comprehensive KEA has been implemented across the state since the 2016-2017 school year. Currently data are available for individual elementary schools, but not at the district level. As the assessment results continue to be analyzed and explored, local and statewide practitioners and policymakers should consider how these data can be used to inform decisions that can better support incoming students and the educators and staff who serve them.

CHAPTER 4

PHYSICAL ENVIRONMENT



INTRODUCTION

The places we live, learn, work, play, and age make up our physical environment. That environment is defined by structures, such as sidewalks, homes, and stores, but also by the air we breathe, the food we eat, and the water we drink, cook, and bathe with. These components of our environment directly and indirectly affect our health.

- **DIRECT EFFECTS ON HEALTH** – The cleanliness of our water determines what contaminants we are exposed to, such as lead-poisoning hazards, that can have long-term impacts on our health and likelihood of disease morbidity. Access to safe and healthy food impacts both short- and long-term well-being. The air we breathe can determine our exposure to particulate matter and other toxins that can cause or exacerbate asthma or other respiratory conditions. Exposure to secondhand smoke is an independent risk factor for coronary heart disease, stroke, low birthweight babies, lung cancer in adults as well as Sudden Infant Death Syndrome and respiratory and middle ear disease in children.
- **INDIRECT EFFECTS ON HEALTH** – Built environments and public policy (e.g., tobacco-free policies) often determine our proximity to safe places to play or participate in other physical activities, our ability to get from place to place, and exposure to harmful conditions in our own homes and communities.

Many of the environmental conditions we are exposed to are determined by the social and economic factors we have in our lives, such as income and employment. The environments we live in often determine our ability to make choices about things like what we eat, how we spend our time, whether we exercise, and how long we spend commuting.

The HNC 2030 health indicators for the physical environment look at access to healthy food, proximity to places for physical activity, and prevalence of housing quality problems. However, these issues do not stand alone. Transportation, community safety, and health education are among the cross-cutting factors that play into the choices people make about how they navigate their environment and their opportunity to make choices that are good for their health.

TRANSPORTATION: Lack of public or personal transportation remains an obstacle for many people. Regardless of proximity, lack of sidewalks and unsafe pedestrian thoroughfares may mean people need to use public transportation to reach parks and other recreational facilities. Physical disabilities too may affect people's ability to navigate their communities.

NEIGHBORHOOD SECURITY: Neighborhoods experiencing crime or lacking in pedestrian-friendly areas (e.g., well-maintained sidewalks, crosswalks across busy roads, and well-lit pathways) may effectively keep in residents and prevent them from accessing parks or grocery stores within walking distance.

HEALTH EDUCATION: Measures of access prioritize proximity to facilities or structures and do not evaluate individual motivation to seek out resources. What people know about activities that promote health, or their level of health education, plays a role in boosting or inhibiting their ability to make healthy choices. For example, people who are less knowledgeable about healthy ways to eat may not take advantage of access to grocery stores with healthy foods regardless of how close they are to them.

Read an example below of how social and economic factors can impact an individual's opportunities to achieve health and well-being.^R For each health indicator, this report includes recommended evidence-informed policies and practices to address that indicator of interest. We recommend community coalitions use multi-sector partnerships to pursue all the strategies recommended.

Physical Environment and Health - Diego's Experience

Diego is a farm worker in rural North Carolina. He lives 15 miles from the nearest grocery store, so he often shops at a nearby corner store, where he buys packaged meat and canned goods. His cholesterol and blood pressure are high due to his diet. He shares a small home with five other farm workers with poor plumbing that the landlord refuses to repair. Diego and his roommates share one car between them, leaving him isolated from family and social activities.

HEALTH INDICATORS:

7 ACCESS TO EXERCISE OPPORTUNITIES

Increase Physical Activity

8 LIMITED ACCESS TO HEALTHY FOODS

Improve Access to Healthy Foods

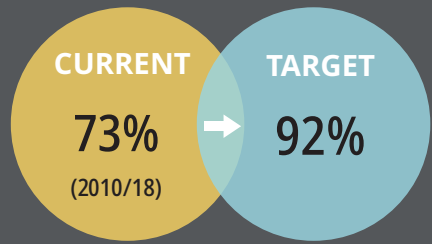
9 SEVERE HOUSING PROBLEMS

Improve Housing Quality

^R Examples are of hypothetical scenarios commonly faced by individuals with health-related social needs.

HEALTH INDICATOR 7: ACCESS TO EXERCISE OPPORTUNITIES

DESIRED RESULT: INCREASE PHYSICAL ACTIVITY



DEFINITION

Percent of the population living half a mile from a park in any area, one mile from a recreational center in a metropolitan area, or three miles from a recreational center in a rural area

DETAILS

Exercise access is based on census tract proximity to public parklands or recreational facilities such as "gyms, community centers, dance studios, pools," and other exercise facilities

NC ACCESS TO EXERCISE OPPORTUNITIES (2010/18)

73% of population

2030 TARGET

92% of population

RANGE AMONG NC COUNTIES

6 – 100%

RANK AMONG STATES

Tied for 40th*

DATA SOURCE

County Health Rankings and Roadmaps - Business Analyst, Delorme map data, ESRI, & US Census Tiger line Files

STATE PLANS WITH SIMILAR INDICATORS

Not Applicable

*Rank of 1st for state with best access to exercise opportunities

Rationale for Selection:

Exercise is linked to positive physical, psychological, and social outcomes. Communities that create spaces for physical activity have healthier people with decreased risks of obesity, heart disease, and other chronic conditions that increase morbidity and mortality.¹

Context

One of the most important things communities can do to improve the health of their people is to provide opportunities for physical activity.⁵⁷ Research shows that everyone, regardless of health status, benefits from being physically active. Regular physical activity fosters positive growth and development, improves brain health, and reduces the risk of a large number of chronic diseases.⁵⁷ Physical activity, or exercise, is a protective factor for many chronic health conditions, premature mortality, and poor cardiovascular health.⁵⁸

“Regular physical activity fosters positive growth and development, improves brain health, and reduces the risk of a large number of chronic diseases.”

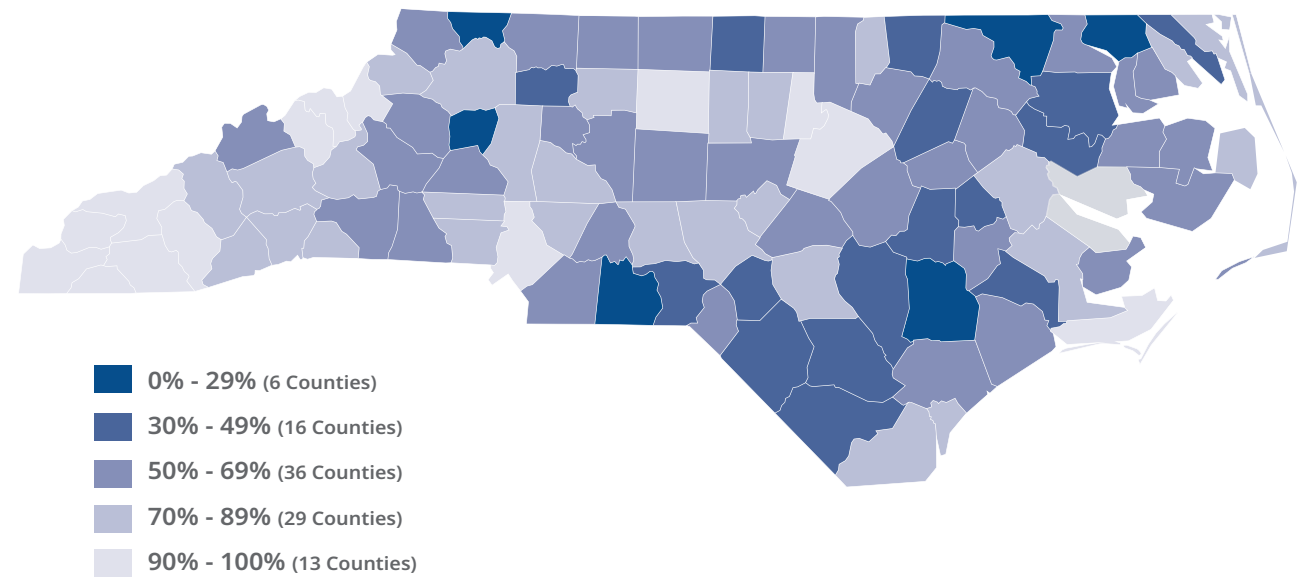
The U.S. Department of Health and Human Services recognizes physical activity as a means of improving health and preventing negative health outcomes.⁵⁷ However, in order to exercise, people must have access to safe places to be physically active. Such spaces include crime-free neighborhoods with sidewalks and bike lanes, well-maintained parks and recreation facilities, playgrounds, senior centers, sports fields, and other designated spaces to exercise.⁵⁷ Studies have shown that those who live in communities that facilitate easy access to exercise opportunities are better able to engage in physical activity.⁵⁸

Disparities

Income level, race/ethnicity, and geography all have an impact on one's access to exercise opportunities. Low-income communities may not have as many parks or as many recreational facilities as their more affluent counterparts.⁵⁹ People of color are less likely to live in areas with accessible parks or development of recreational facility systems.⁵⁸ Rural areas face more barriers to exercise access than their metropolitan counterparts.⁶⁰ Additionally, persons with physical disabilities may face difficulties accessing parks and recreational facilities that have necessary accommodations.⁶¹

FIGURE 15

Percent of People with Access to Exercise Opportunities in North Carolina Counties, 2018



Source: County Health Rankings & Roadmaps; <https://www.countyhealthrankings.org/app/north-carolina/2019/measure/factors/132/data>

2030 Target and Potential for Change

The HNC 2030 group reviewed data across several years and projected a future level to develop a target for exercise access. The group chose 92% of the population having access to exercise opportunities as the target for 2030. This would reflect an acceleration in the current slow positive trend and signal a substantive step toward improving the physical health and well-being of North Carolina communities.

Levers for Change

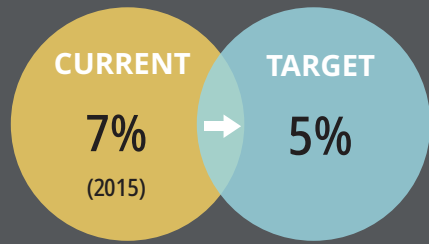
(CDC, 2017; County Health Rankings, 2019)

- Increase number of community parks, particularly in rural areas
- Expand transit options to include places for physical recreation
- Maintain safe and well-lit sidewalks
- Increase number of biking, walking trails, and greenways
- Support community walking clubs and public fitness classes
- Increase access to evidenced-based and informed interventions that support physical activity in childcare, schools, churches, workplaces and other community-based settings
- Increase the number of joint use agreements for school playground facilities
- Provide public access to municipal recreation facilities (NC DHHS, 2018)

¹ This measure does not account for sidewalks or other non-parkland spaces that can be used for exercise (CHR, 2019). Additionally, it measures access on distance alone, without taking into account physical barriers that might complicate access, such as busy roads or limited entryways to the park (CHR, 2019). Finally, it has no cost measure, and includes recreation facilities that may have financial barriers for the residents of the census block (CHR, 2019).

HEALTH INDICATOR 8: LIMITED ACCESS TO HEALTHY FOODS

DESIRED RESULT: IMPROVE ACCESS TO HEALTHY FOODS



DEFINITION

Percent of people who are low-income that are not in close proximity to a grocery store

DETAILS

For metropolitan communities, living close to a grocery store is defined as being less than a mile from a store; in rural areas, the threshold proximity is 10 miles from a grocery store

NC LIMITED ACCESS TO HEALTHY FOOD (2015)

7% of population

2030 TARGET

5% of population

RANGE AMONG NC COUNTIES

0 - 35%

RANK AMONG STATES

Tied for 26th*

DATA SOURCE

County Health Rankings and Roadmaps - United States Department of Agriculture (USDA)

STATE PLANS WITH SIMILAR INDICATORS

Not Applicable

*Rank of 1st for state with least limitations in access to healthy foods

Rationale for Selection:

Food is a basic building block of health that affects weight, blood pressure, and countless other health outcomes. Access to healthy foods is strongly influenced by where someone lives. People in rural or underserved areas of North Carolina are particularly affected by lack of access to stores where they can purchase ingredients for healthy meals.

Context

Good nutrition is an essential factor in individuals' mental and physical health. However, in many communities, affordable and nutritious food is not easily accessible. In some areas, fast food and convenience stores abound yet access to supermarkets is limited.⁶² While individuals' food choices are important, food choices are constrained by what is available.⁶³ Limited access to healthy foods has been linked to obesity, cardiovascular conditions, nutritional deficiencies, diabetes, and chronic kidney disease.^{64,65} Obesity and obesity-related conditions are now the second leading preventable cause of disease and death in the United States.⁶⁶

"Limited access to healthy foods has been linked to obesity, cardiovascular conditions, nutritional deficiencies, diabetes, and chronic kidney disease."

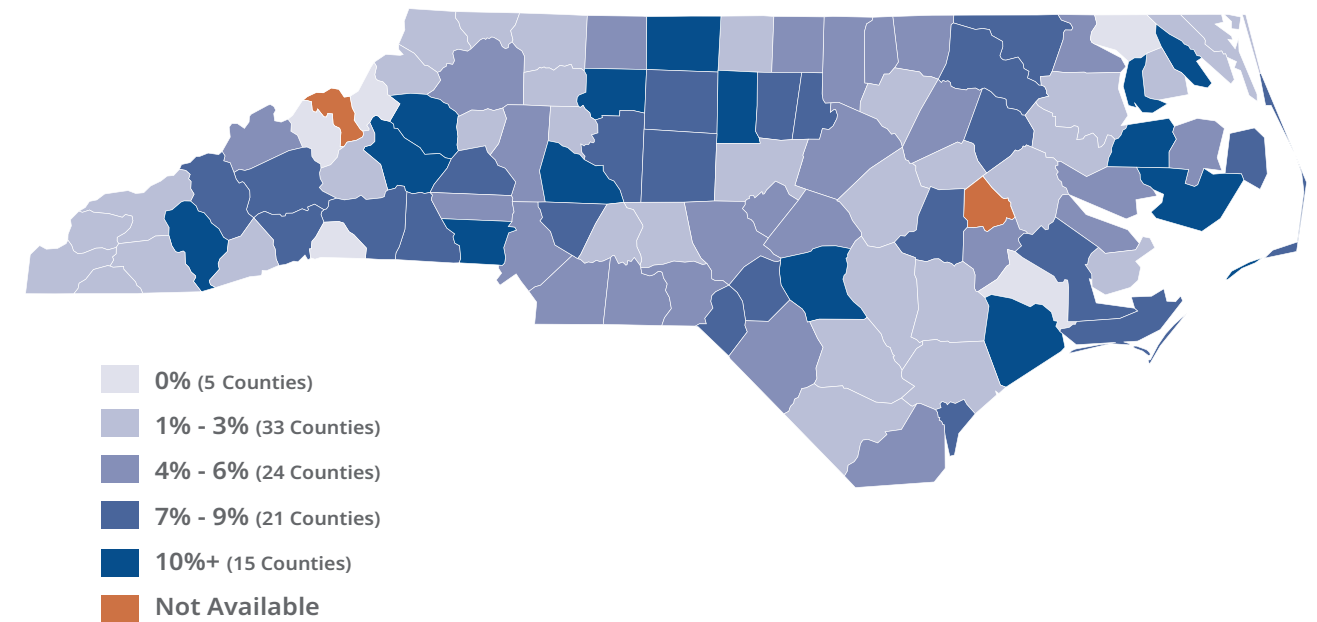
Areas with populations of individuals who have limited access to healthy foods are considered to be "food deserts." In North Carolina, there are more than 340 food deserts, affecting more than half a million residents in the state.⁶⁷ Although persons living in food deserts may still have access to small food retailers such as corner or convenience stores, the food sold by these stores rarely meets nutritional needs.⁶⁸ Additionally, farmers' markets or other farm stands may be helpful supplementary sources of healthy food, but their limited offerings, higher prices, and short operating hours may limit benefits to low-income communities.⁶⁵ As such, this measure only includes proximity to grocery stores and supermarkets, which has been linked to increasing access to healthy foods.⁶⁹

Disparities

Race and income influence access to healthy food and likelihood of living in a food desert. Low-income neighborhoods and those with large minority populations are less likely to have supermarkets or other grocery stores, and the available stores often have more limited healthy options and may have higher prices than their counterparts in wealthier communities.^{70,71}

FIGURE 16

Percent of People with Limited Access to Healthy Foods in North Carolina Counties, 2015



County Health Rankings & Roadmaps; <https://www.countyhealthrankings.org/app/north-carolina/2019/measure/factors/83/data>

2030 Target and Potential for Change

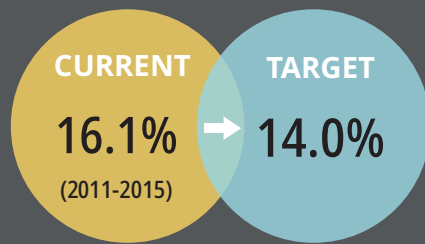
The HNC 2030 group reviewed data across several years and projected a future level to develop a target for access to affordable food. The HNC 2030 group chose 5% as the target for the percent of the population that is low-income who are not in close proximity to a grocery store. The percent of the low-income population facing lack of access to grocery stores has remained static at 7% for the last 5 years after decreasing from 10% from 2006 to 2010. This target would bend the curve and be a meaningful step toward ensuring that all North Carolinians have access to healthy foods, regardless of income level.

Levers for Change

- Increase technological support for SNAP/ EBT payments at food retailers
- Expand transit options in rural and low-income communities
- Support tax-incentive programs designed to encourage grocery stores and farmers markets to move into food deserts
- Support nonprofit grocery stores working to meet the needs of residents of food deserts
- Support school-based meal programs
- Increase access to healthy foods in childcare, schools, churches, workplaces and other community-based settings

HEALTH INDICATOR 9: SEVERE HOUSING PROBLEMS

DESIRED RESULT: IMPROVE HOUSING QUALITY



DEFINITION

Percent of households with at least 1 of 4 housing problems

DETAILS

Housing problems included are overcrowding, high housing costs, or lack of kitchen or plumbing facilities

NC SEVERE HOUSING PROBLEMS (2011-2015)

16.1% of population

2030 TARGET

14.0% of population

RANGE AMONG NC COUNTIES

10 - 26%

RANK AMONG STATES

28th*

DATA SOURCE

County Health Rankings and Roadmaps - Comprehensive Housing Affordability Strategy (CHAS) data

STATE PLANS WITH SIMILAR INDICATORS

Early Childhood Action Plan^U includes indicators of safe and secure housing

*Rank of 1st for state with least severe housing problems

Rationale for Selection:

People who live in homes that cost a large portion of their income, or where there is overcrowding or poor maintenance, are exposed to a variety of health risk factors. In many areas of North Carolina, there are insufficient affordable, quality housing options for low-income people and their families.^U

Context

Housing quality is an important determinant of overall health and well-being. Studies show that there is a direct link between housing quality and physical and mental health.⁷² In North Carolina, 1 in 6 households across the state face severe housing problems, which means that at least one of the following problems is present: overcrowding,^V high housing costs,^W or lack of kitchen and/or plumbing facilities.^{X,67} In North Carolina, utilizing best-available data, approximately 14,000 households are overcrowded, 18,000 households lack complete plumbing, 24,000 households lack sufficient kitchen facilities, and half a million households face severe cost burden.^{67,26}

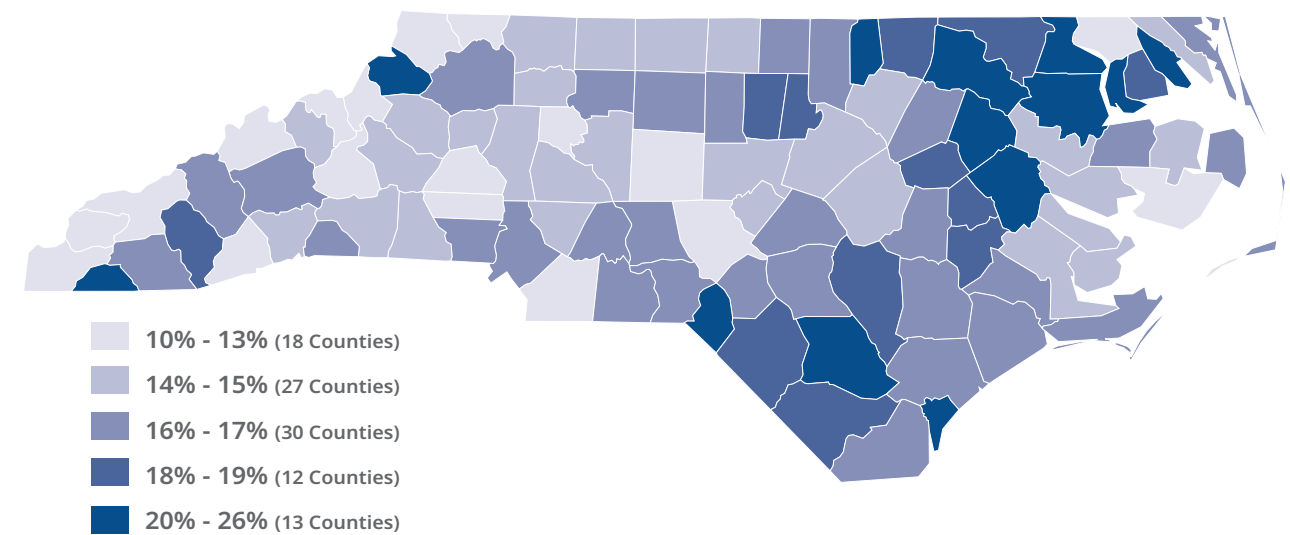
Severe housing problems can exacerbate other housing quality issues such as environmental contaminant and repair issues. Environmental triggers, such as exposure to mold, pests (cockroaches, mice, dust mites), chemicals, dust, pet dander, secondhand smoke and thirdhand smoke - which lingers in carpets, drapes and other surfaces and can re-aerate - can exacerbate asthma and may be worsened by overcrowding, which increases risk of respiratory infections and psychological stressors that impact chronic conditions.⁷³

OVERCROWDING: Overcrowding can lead to many negative health consequences—particularly respiratory conditions such as asthma and tuberculosis, and mental health conditions that may be exacerbated by chronic stress produced by space-sharing conflicts.^{74,75}

HIGH HOUSING COSTS: High housing costs^Z have an interactive effect on the other housing problems—increasing the likelihood that individuals are forced to reduce spending on food, health care, and other necessities in order to pay housing expenses.^{76,74} Individuals facing high housing costs are also less likely to have established health care providers, are less likely to get sufficient care for chronic conditions, and are more likely to seek care from emergency departments.⁷⁷ Severe cost burden forces families to choose between disproportionately allocating income for housing at the expense of other necessities, or alternatively, choosing poor quality housing options that are more affordable. This choice is particularly acute for renters, who face severe housing problems at higher rates than homeowners. Faced with severe cost burden, renters may be forced to choose housing options in unsafe neighborhoods that are poorly maintained, lack sufficient facilities, and are plagued by environmental issues such as lead paint and mold. These hazards produce additional mental stress, are linked to negative health outcomes, and compound preexisting chronic conditions.^{76,74}

FIGURE 17

Percent of People with Severe Housing Problems in North Carolina Counties, 2018



Source: Source: County Health Rankings & Roadmaps; <https://www.countyhealthrankings.org/app/north-carolina/2019/measure/factors/136/data>

LACK OF KITCHEN AND/OR PLUMBING FACILITIES: Lack of sufficient plumbing can pose sanitation risks that put inhabitants' and others' health at risk.⁷⁵ Untreated wastewater (effluent) surfacing outdoors or backing up into a home is a pathogen exposure concern and may also contaminate drinking water wells and nearby surface water. In addition, surfacing effluent provides breeding areas for mosquitoes and flies. Lack of kitchen facilities and inability to cook within the home has been connected to food insecurity and poor nutrition, both of which contribute to negative health outcomes such as diabetes and obesity.⁷⁸

Disparities

Severe housing problems do not affect the population uniformly, and distribution tracks with high rates of poverty and historic segregation that have confined people of color to under-resourced residential areas.⁷⁹ Therefore, disparities primarily arise along geographic, racial, educational, and income lines. Metropolitan residents and racial and ethnic minorities are more likely than their rural and white counterparts, respectively, to face all components of severe housing problems. Severe housing problems are also most prevalent among the poorest residents of North Carolina and affect renters at higher rates than homeowners.⁷⁶ Illustrating this fact, approximately 65% of residents own their homes, but homeowners are disproportionately white.⁸⁰ Among white residents living in the state, 71.2% live in a

Levers for Change (RWJF, How home affects health)

- Increase living wage employment opportunities
- Enforce fair housing laws
- Improve access to social services and resources for affordable housing
- Increase involvement of community members in decision-making
- Support programs designed to increase home ownership for people of color

^U North Carolina Department of Health and Human Services. North Carolina Early Childhood Action Plan. February 2019. <https://files.nc.gov/ncdhhs/ECAP-Report-FINAL-WEB-f.pdf>

^V Overcrowding is defined as having more than 1 person per room of a residence, not inclusive of bathrooms.

^W High housing costs are assessed according to a cost burden analysis. An individual is severely cost burdened if his or her monthly housing costs exceed 50% of his or her monthly income. "Housing costs" are defined by the U.S. Department of Housing and Urban Development as mortgage payments, rent payments, insurance payments, property taxes, and utility bills.

^X The Census Bureau evaluates household facilities according to the presence of six features: hot and cold running water, a flushing toilet, a bathtub or shower, a sink with a faucet, a stove, and a refrigerator. If a home does not have one of these factors, the census recognizes it as lacking in critical facilities (County Health Rankings, Severe Housing Problems).

^Y These additional environmental contaminants are not included in the measure of severe housing problems.

^Z A contributing factor to cost burden is increasing energy costs. Across North Carolina, many homeowners spend 3-8% of their incomes on energy while renters may face energy costs in excess of 8% of their incomes. Although there is no conventional measure for energy costs disaggregated from housing cost burden, the Federal Department of Health and Human Services considers costs in excess of 6% of one's income to be "unaffordable" (NC Housing Coalition, Mapping Housing Affordability in North Carolina).

PHYSICAL ENVIRONMENT: DEVELOPMENTAL MEASURES

home they own, compared with only 43.9% of African American residents, and 43% of Hispanic residents.³ Renters often do not have the ability to make changes to their residences to improve plumbing and kitchen facilities and face high housing costs/severe cost burden at higher rates than homeowners.

In addition, the multidimensional impacts of major natural disasters like Hurricanes Matthew (October 2016), Florence (September 2018), and Dorian (September 2019) illuminate the lack of safe and affordable housing in North Carolina in general, and expose interconnected layers of social vulnerability that have existed for decades in the housing sector throughout the state. Hurricane Matthew damaged or destroyed nearly 100,000 homes and displaced thousands of people. In some communities Matthew destroyed a significant amount of previously available rental housing stock - including low-income housing options.⁸¹ Before Hurricane Florence made landfall, North Carolina had a shortage of 190,000 affordable housing units, in its wake there's a shortage of 300,000 units.⁸² As a result, developing strategies to help facilitate access to safe and affordable housing has quickly emerged as a short- and long-term recovery priority for the state.

2030 Target and Potential for Change

The HNC 2030 group reviewed data across several years and projected a future level to develop a target for severe housing problems. The group chose 14% as the target percent of households affected by one or more of the four severe housing problems as the target for 2030. The current measure of 16.1% is a slightly lower percentage than was seen in the state from 2012-2014, but the percentage is expected to trend upwards again over the next decade. Achieving the 14% target would reflect a meaningful reversal in the projected trend.

Below are physical environment measures that the HNC 2030 group feels are important to population health, but do not have reliable or robust data available at this time. A description of the data needed for these measures is listed as “developmental data needs.” State and local public health or other entities should consider identifying methods for collecting this data.

Air and Water Quality

The public is frequently exposed to environmental contaminants. Some environmental contaminants may not yet be identified and still others are not yet regulated. A better understanding of health effects of these contaminants and the risk of combined exposures is essential to better policies around environmental exposures.^{AA}

Developmental data needs:

- **Advancements in analytical, research, and health sciences are needed to identify and quantify specific chemicals and classes of chemicals present in the environment to which people are exposed and at what exposure concentrations adverse health effects are a concern to the exposed generation and subsequent generations. This work would be followed by measures to reduce potentially harmful exposures.**

Access to Food

The Physical Environment Work Group chose the measure “Limited access to healthy foods” to draw attention to the needs of populations that are low income and do not have close access to foods. This measure is slightly limited in its scope, specifically measuring proximity to grocery stores and supermarkets. While this is an important measure, it may not fully represent a population’s access to foods.

Developmental data needs:

- **In addition to data on limited access to healthy foods, as measured for the HNC 2030 indicator, attention should be given to other potential approaches to provide access to food. Communities across the state have implemented healthy corner store initiatives, SNAP/ EBT support, payment incentive programs for farmers’ markets, and other methods to bring people closer to healthier options. Additionally, nonprofit organizations like the Inter-Faith Food Shuttle have worked to bring farmers’ market goods directly to low-income communities. To better capture these strategies and the effect that they have on North Carolinians, surveys such as the BRFSS and other county-level survey systems could be used to collect data on people’s access to healthy foods and evaluate remaining barriers.**

Access to Exercise Opportunities

The chosen HNC 2030 indicator of access to exercise opportunities is also limited in scope. The measure is calculated using Census data on the location of parks and recreational facilities using standard industry classification codes. It does not include access to sidewalks, malls, schools, and other locations that may provide opportunities for recreation. It also does not measure whether the recreational facilities are meaningfully accessible for community members as it does not capture cost barriers, time restrictions that may limit access to public spaces, and physical restrictions such as busy streets. However, it is an important and reliable data source to identify communities where there may be fewer places for physical activity.

Developmental data needs:

- **Communities across the state have used additional methods to increase access to physical activity, such as building sidewalks and implementing shared use agreements designed to increase public access to school fields and playgrounds. While communities monitor the HNC 2030 indicator of access to exercise opportunities, they should also evaluate other ways their population can increase access that work best for them.**

Transportation and Access to Needed Destinations

A consistent concern shared by community members who provided input was access to reliable public transportation. Transportation is vital to sustained employment, maintaining social connections, and accessing food, medical care, and other resources. Despite the importance of this driver of health, there are few robust and reliable measures of public transportation availability and the ability of individuals to reach a desired location.

Developmental data needs:

- **Comprehensive measures of transportation needs, availability, and transit system effectiveness would help local and state health and transportation policymakers and planners to target the areas with the most need. North Carolina’s varying geography, from coastal areas to the mountains, provides different challenges to transportation access. These varying challenges must be accounted for when considering best measures for transportation needs.**

^{AA} Based on perspective shared by North Carolina Department of Environmental Quality participant in HNC 2030 process.

Climate Change and Disaster Preparedness

According to the CDC, climate change has led to precipitation extremes, with heavy precipitation and drought events across the country that are projected to increase in all U.S. regions.⁸³ Heavy precipitation that causes flooding has immediate dangers to life and long-term ramifications on housing (discussed on [Page 60](#)), mental health, and stress. Globally, warming temperatures are contributing to sea level rise. In North Carolina, estimates show that sea levels will rise one to four feet over the next century, drastically impacting people living in coastal areas.⁸⁴ Increased temperatures may impact crop yields and reduce livestock productivity.⁸⁴ An increasing number of days with high heat will impact populations vulnerable to heat-related illnesses like heat stroke and dehydration, such as children, older adults, and people who live in poverty.⁸⁴ High heat also creates more ground-level ozone, which can lead to increased asthma and risk of death from heart or lung disease.⁸⁴

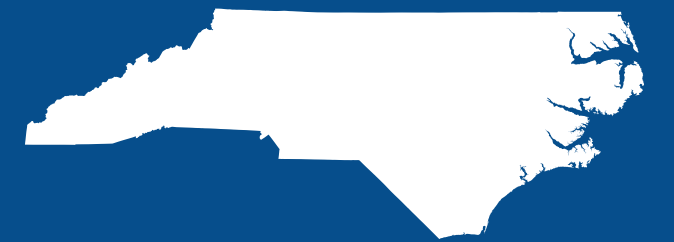
North Carolina is beginning state-level efforts to decrease the amount of greenhouse gases, such as carbon dioxide, produced in the state that contribute to global climate change. Governor Roy Cooper signed Executive Order Number 80 in October 2018, supporting the 2015 Paris Agreement and calling on state agencies to collaborate on the reduction of energy use and development of climate adaption and resiliency planning.⁸⁵ Regardless of actions taken now, projections show that coastal communities will continue to experience impacts of heavy precipitation events and rising sea levels. Disaster preparedness and resiliency planning is vital to ensuring the health, safety, and economy of the eastern half of North Carolina.

Developmental data needs:

- Ongoing monitoring of county-level and regional greenhouse gas production and climate change resiliency planning will be important in coming years. Resiliency planning will vary by region of the state and should account for the needs of various populations, such as individuals living in poverty. A variety of measures can be used to evaluate the impacts of climate change on populations, from number of days schools close for adverse weather events and number of extreme heat days, to the percent of the population in counties impacted by extreme weather who live in poverty.

CHAPTER 5

HEALTH BEHAVIORS



INTRODUCTION

The things we put into and do with our bodies affect our health. What we eat, whether we exercise, wear seat belts, use substances like tobacco and alcohol, and our sexual health all directly promote or inhibit healthy living. A healthy diet and frequent exercise can help our bodies work as well as possible, while excessive eating, drinking, and substance use can lead to serious health conditions. These are called health behaviors.

Our health behaviors are not always determined by a choice to be healthy or unhealthy. In particular, the places we live, learn, work, and play, as well as our social and economic circumstances and exposure to trauma often dictate our opportunities to make healthy choices.

- **SOCIAL AND ECONOMIC FACTORS** – Individuals with low incomes and long work hours may have less time to prepare meals at home and less time to participate in physical activities. Their stress levels or history of trauma may make them more likely to use substances like alcohol or tobacco. Advertisers of unhealthy foods or products target low-income communities and people of color. People with higher levels of education may have more knowledge and access to information about safe sexual practices, healthy eating, and the dangers of tobacco use.
- **PHYSICAL ENVIRONMENT** – People in rural areas and low-income communities may be far from a grocery store that sells healthy foods. Their communities may lack formal facilities for exercise, or the roads and public spaces may not be safe to move around in.

The HNC 2030 health indicators chosen for the health behaviors topic area represent a range of issues and impact a variety of communities. Multiple indicators – drug overdose deaths and HIV diagnosis rates - highlight some issues, like injection drug use. Some indicators are not health behaviors themselves but are representative of a behavior. Most notable in this category are the teen birth and HIV diagnosis rates. Both are related to safe sexual practices, which we lack high quality data to evaluate at the population level. For each health indicator, this report also includes recommended evidence-informed policies and practices to address that indicator of interest. We recommend community coalitions use multi-sector partnerships to pursue all the strategies recommended.

Read an example below of how the opportunities to make healthy choices can impact an individual's ability to achieve health and well-being.^{BB}

Opportunities to Make Healthy Choices - Chris's Experience

Chris grew up in an urban area with two loving parents. They had to work long hours to support Chris and his three brothers and sisters. When the family bought groceries, they tried to get the most for their dollar, but always picked out the kids' favorite sugary drinks because it was an inexpensive way to provide them with something they enjoyed. With both his parents' long hours, the family didn't prepare fresh meals at home, preferring fast food. Their neighborhood wasn't very safe, so Chris's parents encouraged the kids to stay indoors when they came home from school and they didn't get much physical activity. Chris and his siblings are all overweight. The school Chris attended didn't provide robust sex education, so when he became sexually active with his girlfriend, they didn't understand the risks for pregnancy. Chris and his girlfriend became parents at the age of 17. Chris now supports his small family working long hours at multiple minimum wage jobs without benefits. The baby's health care is covered by Medicaid but Chris and his girlfriend go without health insurance because they cannot afford it. He feels his smoking and drinking habits help him relax and relieve stress.

HEALTH INDICATORS:

10 DRUG OVERDOSE DEATHS

Decrease Drug Overdose Deaths

11 TOBACCO USE

Decrease Tobacco Use

12 EXCESSIVE DRINKING

Decrease Excessive Drinking

13 SUGAR-SWEETENED BEVERAGE CONSUMPTION

Reduce Overweight and Obesity

14 HIV DIAGNOSIS RATE

Improved Sexual Health

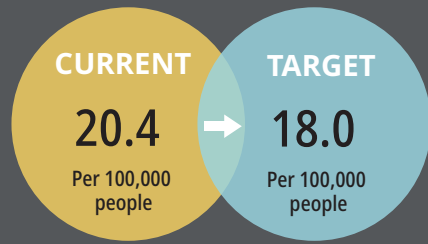
15 TEEN BIRTH RATE

Improved Sexual Health

^{BB} Examples are of hypothetical scenarios commonly faced by individuals with health-related social needs.

HEALTH INDICATOR 10: DRUG OVERDOSE DEATHS

DESIRED RESULT: DECREASE DRUG OVERDOSE DEATHS



DEFINITION

Number of persons who die as a result of drug poisoning per 100,000 population

DETAILS

Age-adjusted; Includes deaths of any intent: unintentional, suicide, homicide, and undetermined; Includes medications and drugs like heroin, natural opioid analgesics and semisynthetic opioids, methadone, other synthetic opioid analgesics, benzodiazepines, cocaine, and psychostimulants with abuse potential

NC OVERDOSE DEATH RATE (2018)

20.4 per 100,000 people

2030 TARGET

18.0 per 100,000 people

RANGE AMONG NC COUNTIES (AVERAGE 2014-18)

6.2 – 40.9 per 100,000 people

RANK AMONG STATES

32nd*

DATA SOURCE

NC State Center for Health Statistics, Vital Statistics

STATE PLANS WITH SIMILAR INDICATORS

North Carolina Opioid Action Plan^{CC}

*Rank of 1st for state with lowest drug overdose death rate

Rationale for Selection:

As in other states, North Carolina has experienced a sharp increase in the number of drug overdose deaths over the last decade, largely due to the opioid epidemic. Substance Use Disorder has devastating impacts on the life of the people who experience it, their families, and their communities.^{CC}

Context

Substance use disorders (SUDs) are chronic or recurrent conditions that, like other chronic illnesses, require ongoing care and treatment for individuals to regain health and maintain recovery. As with any chronic disease, prevention, identification, treatment, and recovery services and supports are essential to ensuring positive health outcomes. Effective treatments for SUDs and underlying mental and physical health problems exist; however, access to services and supports for SUDs varies greatly across the state.

Having a SUD affects an individual's relationships with family and friends, ability to attend school or work, their overall physical and mental health, and may lead to problems with the legal system. In addition to increases in drug overdoses, the opioid epidemic has had devastating consequences including the spread of HIV and hepatitis B and C and increased rates of child maltreatment and entry into foster care as more and more parents and other relatives develop and struggle with SUDs.^{86,87}

There are a number of reasons the opioid epidemic has garnered so much attention. Across the nation, drug overdose deaths have skyrocketed, making it a leading cause of death due to injury in the United States, accounting for more than 70,000 deaths in 2017, surpassing the number of traffic fatalities.^{88,89}

In addition, many people who suffer a fatal opioid overdose initially received prescription opioids from a health care provider to treat pain, and their use progressed to opioid use disorder.⁹⁰ Heavy marketing of these drugs to physicians by pharmaceutical companies, as well as emphasis on the use of pain scales, led to overprescribing. Those trends, as well as the increasing availability of cheap heroin and fentanyl, led to a rapid explosion in drug overdose deaths.

In North Carolina, the drug overdose death rate in 2018 was 20.4 per 100,000 people.^{DD,EE} While prescription opioids drove the increase in overdose deaths originally and they are still a significant contributor to this epidemic, in North Carolina heroin and other synthetic narcotics (like illicitly manufactured fentanyl and its analogues) are now involved in over 70% of opioid overdose deaths.⁹¹

The skyrocketing rates over the past two decades highlight the immense need for better prevention and identification of SUDs and access to effective treatment and recovery services and supports. In 2018, North Carolina saw its first decline in opioid overdose deaths. Whether that trend continues will depend on several factors (see Levers for Change on next page).

Disparities

Drug overdose death rates have increased across all segments of the population. Overall, men die from drug overdoses at much higher rates than women, and adults aged 25-55 years suffer fatal overdose at higher rates than younger and older adults.⁸⁸ White and American Indian populations had the highest drug overdose death rates in 2018 at 26.4 and 32.6 per 100,000, respectively, followed by African Americans at 12.9 per 100,000 (Figure 19).^{FF}

FIGURE 18

Drug overdose death rates across populations in North Carolina and distance to 2030 target

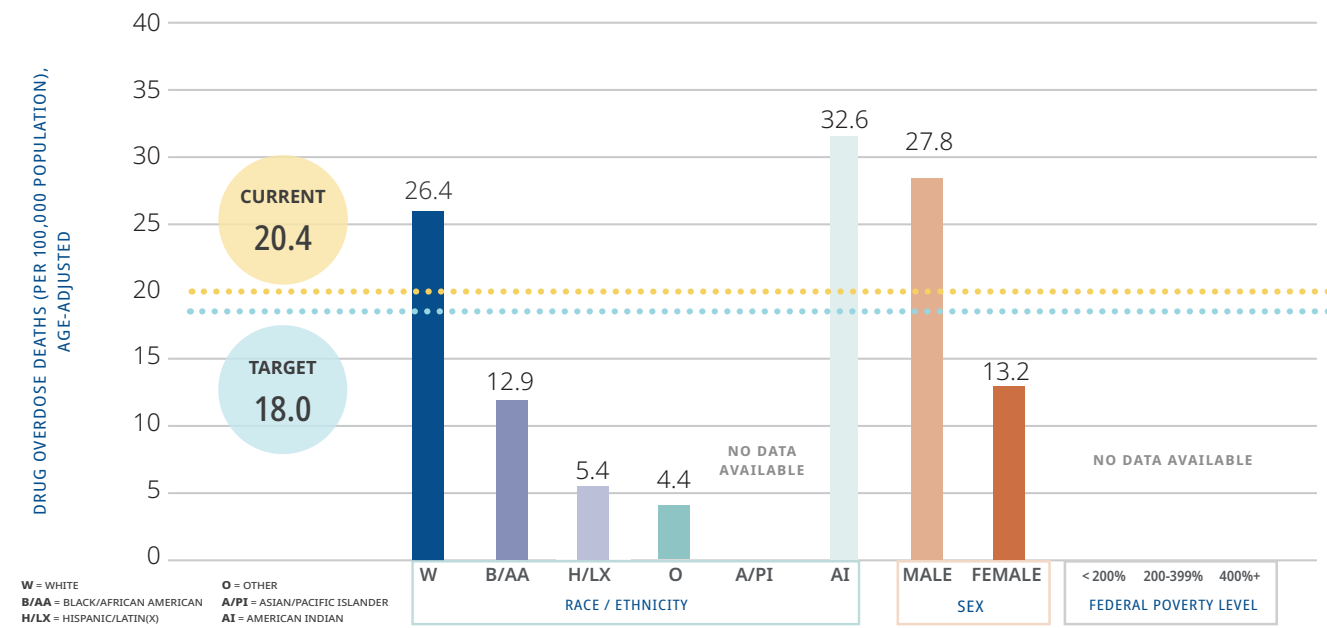
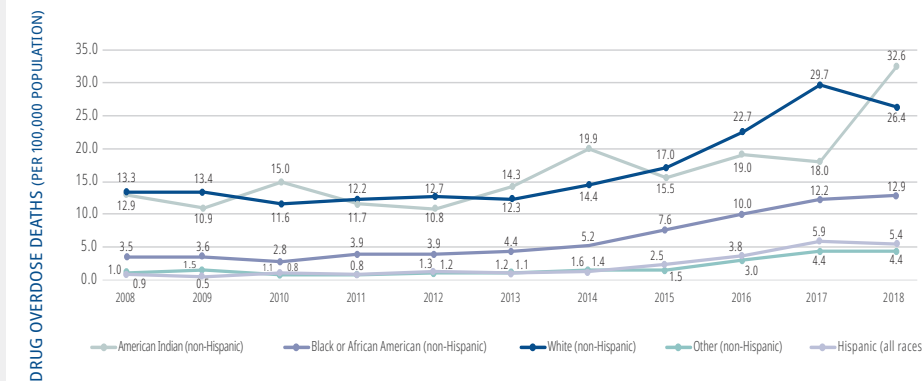


FIGURE 19

Drug Overdose Death Rate in North Carolina from 2008-2018, by Race/Ethnicity



Source: North Carolina State Center for Health Statistics analysis of Vital Statistics.

2030 Target and Potential for Change

The HNC 2030 group reviewed data across several years and a forecasted value for North Carolina based on historical data to develop a target for drug overdose deaths. The group chose 18.0 deaths per 100,000 people as the target for 2030. This would reflect a reversal of the increasing death rate and a return to a rate similar to that of 2016 (17.6 per 100,000). Although this would still reflect a much higher rate than the low of the previous decade (8.5 per 100,000 in 2010), it would signal an important shift in the struggle to end a growing epidemic.

Levers for Change

(NC Opioid Action Plan 2.0, 2019; America's Health Rankings, Drug Deaths, 2018)

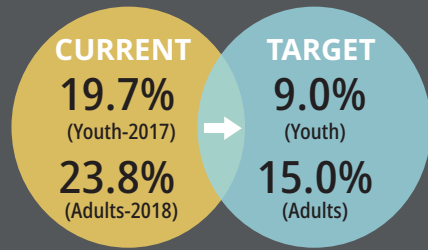
- Reduce the supply of prescription and illicit opioids
- Avert future opioid addiction by supporting youth and families
- Address the needs of justice-involved populations
- Increase distribution of naloxone
- Implement needle exchange programs
- Improve access to drug treatment programs, including medication-assisted treatment
- Implement broader use of NC Controlled Substance Reporting System by health care providers and pharmacies
- Increase training for health care providers on safe prescribing practices
- Adopt and support payment of evidenced-based interventions that prevent opioid prescribing
- Support policies that decriminalize and promote treatment of substance use disorder

^{CC}North Carolina Department of Health and Human Services. North Carolina Opioid Action Plan 2.0. June 2019. <https://www.ncdhhs.gov/about/departments-initiatives/opioid-epidemic/north-carolina-opioid-action-plan>
^{DD}The most recent national data available for comparison is from 2017, when the national average for drug overdose deaths was 21.7 per 100,000 people compared to 22.2 per 100,000 people in North Carolina (CDC, Drug Poisoning Mortality in the United States, 1999-2017, <https://www.cdc.gov/nchs/data-visualization/drug-poisoning-mortality/index.htm>).
^{EE}Analysis of Vital Statistics records by the North Carolina State Center for Health Statistics

^{FF}Analysis of Vital Statistics records by the North Carolina State Center for Health Statistics.

HEALTH INDICATOR 11: TOBACCO USE

DESIRED RESULT: DECREASE TOBACCO USE



DEFINITION

Percent of youth and adults reporting current use of e-cigarettes, cigarettes, cigars, smokeless tobacco, pipes, and/or hookah

DETAILS

Youth (middle and high school students) and adults measured separately

NC TOBACCO USE

19.7% of Youth (2017)
23.8% of Adults (2018)

2030 TARGET

9.0% of Youth
15.0% of Adults

RANGE AMONG NC COUNTIES

Not available

RANK AMONG STATES

Not available

DATA SOURCE

Youth: NC Department of Public Health, Tobacco Prevention and Control Branch, NC Youth Tobacco Survey

Adult: NC State Center for Health Statistics, Behavioral Risk Factor Surveillance System (BRFSS)

STATE PLANS WITH SIMILAR INDICATORS

Not Applicable

Rationale for Selection:

Tobacco use remains the leading preventable cause of early death and disease in North Carolina and the nation. Tobacco use and secondhand smoke exposure are responsible for multiple causes of preventable morbidity and mortality in North Carolina. While combustible cigarette use has decreased among North Carolina's youth, prevalence among adults has declined only slightly, and there are major disparities of tobacco-attributable disease and death among population groups. E-cigarette use among young people has become epidemic in North Carolina and the nation and poses a public health threat.

Context

Cigarette smoking is responsible for 14,200 North Carolina deaths per year – that is 1 of every 5 deaths in our state.⁹² For each death, 30 more people are sick or live with a disability because of tobacco use.⁹³ North Carolina's direct medical costs from smoking are \$3.81 billion each year, including \$931 million in Medicaid costs⁹², and the estimated annual health care costs from secondhand smoke are \$293 million.⁹⁴ In addition, smoking costs North Carolina \$4.2 billion in productivity losses each year.⁹²

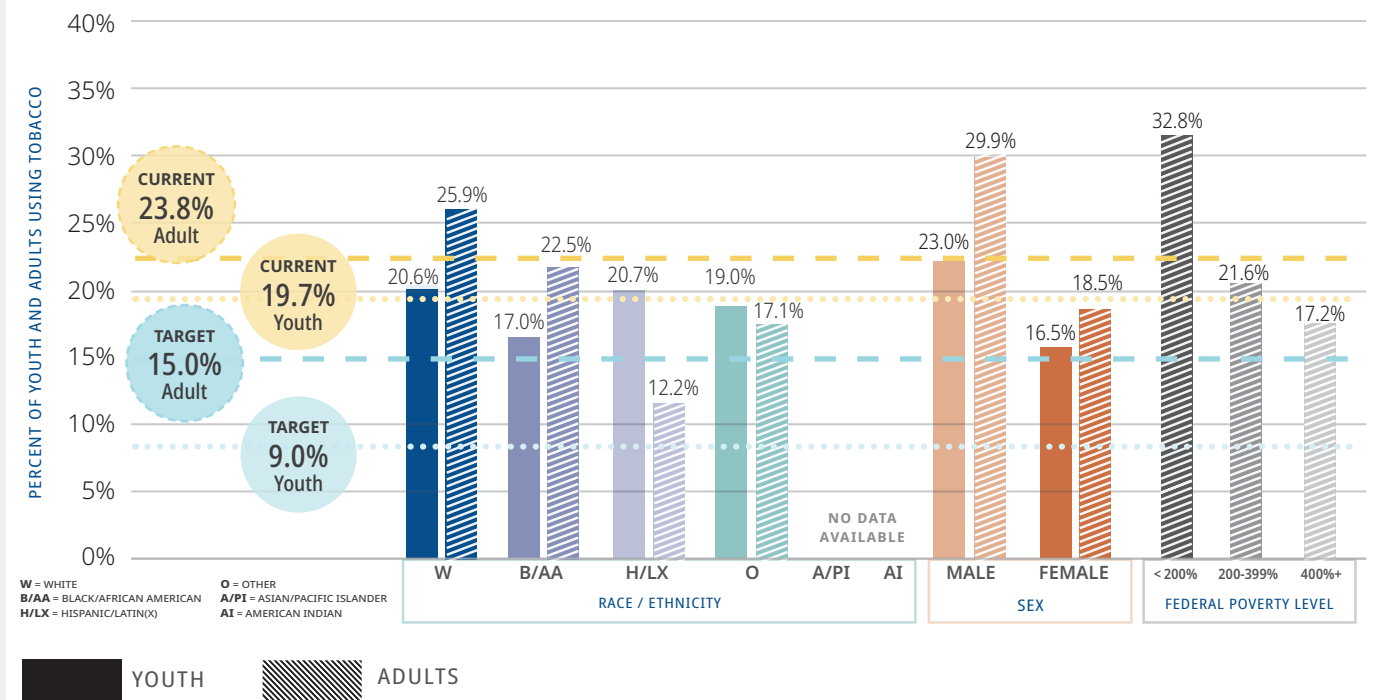
“Cigarette smoking is responsible for 14,200 North Carolina deaths per year – that is 1 of every 5 deaths in our state.⁹² For each death, 30 more people are sick or live with a disability because of tobacco use.”

The combined tobacco use prevalence among high school and middle school students is 19.7%. While cigarette smoking has declined among North Carolina's young people, there has been an increase in tobacco use overall, particularly among high schoolers. Cigarette smoking among high school students has decreased from 15.5% in 2011 to 8.9% in 2017, yet use of any tobacco products among high school students increased from 25.8% in 2011 to 28.8% in 2017. This increase reflects the rising use of emerging tobacco products, including electronic cigarettes. Between 2011 and 2017, electronic cigarette use among high school students increased 893%, from 1.7% to 16.9%. In 2018, 23.8% of adults in North Carolina used at least one type of tobacco product every day or some days. While cigarette smoking had been declining among adults in North Carolina from 21.8% in 2011 to 17.5% in 2018, the recent trends are concerning, with 24.0% using a single tobacco product and an additional 3.9% reporting the use of multiple tobacco products. In 2018, 4.3% of adults smoked cigars or cigarillos (little cigars) during the past 30 days, 5.1% of adults used electronic cigarettes every day or some days, and 4.7% used chewing tobacco or snuff every day or some days.⁹⁵

Secondhand smoke is an independent risk factor for lung cancer, coronary heart disease, and stroke, as well as an increased risk for low birth weight babies, sudden infant death syndrome, and lower respiratory illness in children. In 2018, 9.6% of North Carolinians were exposed to secondhand smoke in the workplace, which makes young people more likely to start using tobacco and makes it more difficult for people of all ages to quit using tobacco.

FIGURE 20

Tobacco use across populations in North Carolina and distance to 2030 target



Disparities

Tobacco use varies among racial, income, geographic, and other demographic groups.⁹⁶ Low-income persons, those with lower levels of educational attainment, persons with mental illness and substance use disorders, and those who are unemployed smoke at higher rates than other groups.⁹⁶ American Indians have a higher prevalence of smoking than any other racial or ethnic group, yet African American tobacco users die from tobacco-related causes at higher rates than any other racial or ethnic group.⁹⁶ LGBTQ individuals are more likely to be smokers than their heterosexual counterparts.⁹⁶ Tobacco use is more common in rural areas than urban areas.⁹⁶

2030 Target and Potential for Change

The HNC 2030 group reviewed data across several years and populations, targets for the national Healthy People 2030 efforts, and a forecasted value for North Carolina based on historical data. The group chose to mirror the Healthy People 2030 targets with an HNC 2030 target of 9.0% for youth and 15.0% for adults reporting tobacco use. Public knowledge and concern over e-cigarettes are growing. Public attention paired with past lessons from successfully reducing cigarette smoking, are encouraging signs of the potential for reducing overall tobacco use.

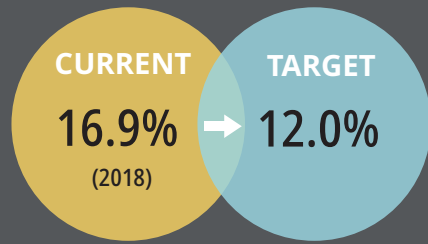
Lever for Change

(CDC, Tobacco Control Interventions, 2017, US Surgeon General 2018)

- Fund comprehensive state tobacco control programs to the levels recommended by the CDC
- Implement high-impact media campaigns that warn people about the dangers of tobacco use
- Implement strategies to curb tobacco product advertising and marketing that are appealing to young people
- Raise the price of tobacco products through a tobacco tax
- License tobacco retailers
- Implement state and local tobacco-free and smoke-free air policies that include e-cigarettes
- Remove state preemption of local government regulations on the sale, promotion, distribution and display of tobacco products
- Restrict the sales of flavored tobacco products
- Increase access to standard-of-care tobacco use treatment

HEALTH INDICATOR 12: EXCESSIVE DRINKING

DESIRED RESULT: DECREASE EXCESSIVE DRINKING



DEFINITION

Percent of adults reporting binge or heavy drinking

DETAILS

Binge drinking = having 4+ (women all ages/men age 65+) or 5+ (men under age 65) drinks on one occasion in the past 30 days;

Heavy drinking = having 8+ (women all ages/men age 65+) or 15+ (men under age 65) drinks per week in the past 30 days

NC EXCESSIVE DRINKING (2018)

16.9% of adults

2030 TARGET

12.0% of adults

RANGE AMONG NC COUNTIES

Not available

RANK AMONG STATES

14th*

DATA SOURCE

NC State Center for Health Statistics, Behavioral Risk Factor Surveillance System (BRFSS)

STATE PLANS WITH SIMILAR INDICATORS

Not Applicable

*Rank of 1st for state with lowest levels of excessive drinking

Rationale for Selection:

Excessive drinking, a major cause of morbidity and mortality across the United States, has significant impacts on individuals, families, communities, and state and local economies. Alcohol is the third leading cause of preventable deaths in North Carolina.

Context

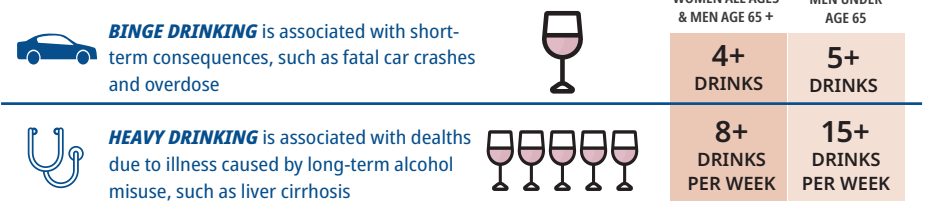
Alcoholic beverages, while legal for those over the age of 21, can have serious health impacts and can lead to premature death if not consumed in moderation.⁹⁷ In North Carolina, 16.9% of adults use alcohol in an unsafe way, either by binge drinking or exceeding recommended low risk levels.⁹⁸ Alcohol-related death ranked third among preventable deaths in the state, accounting for an estimated 4,000 deaths in 2017.⁹⁹ Survey data from the last few years show a rise in excessive drinking from 14.1% in 2014 to 16.0% in 2018.⁹⁸ Excessive alcohol use places a significant burden on individuals, families, communities, health systems, and the state itself in the form of poor health outcomes, lost productivity, and increased risk of violent and criminal behavior. All told, excessive drinking costs North Carolina more than \$7 billion per year— primarily in lost productivity.^{99,100}

“Alcohol-related death ranked third among preventable deaths in the state, accounting for an estimated 4,000 deaths in 2017.”

Excessive alcohol consumption¹¹ is linked to health conditions such as liver disease, hypertension, cardiopulmonary disease, cancers, mental health conditions, alcohol poisoning, and sexually transmitted infections.^{97,101} It is also connected with suicide, unintended pregnancy, pregnancy complications, fetal alcohol spectrum disorder, and sudden infant death syndrome.¹⁰¹ Additionally, excessive drinking contributes to increased rates of domestic violence and child maltreatment, increased risk of motor vehicle accidents, and negatively impacts employment and educational attainment and income potential.¹⁰⁰

FIGURE 21

Definition and Impacts of Binge and Heavy Drinking



Source: NC DHHS Alcohol Data Dashboard

Disparities

Excessive drinking rates vary across subpopulations. Almost two times as many men report excessive drinking compared to women, and most binge drinking is found in persons aged 18-44 (Figure 22).^{97,95} Across racial groups, whites, Hispanics, and persons who identify as multiracial are more likely to drink excessively than African Americans.^{95,97} Individuals with higher incomes report higher rates of excessive drinking than those with lower incomes, with individuals making \$75,000 or more reporting excessive drinking at 23.5% compared to 17.7% for individuals making \$25-\$49,999.⁹⁸

FIGURE 22

Excessive drinking across populations in North Carolina and distance to 2030 target

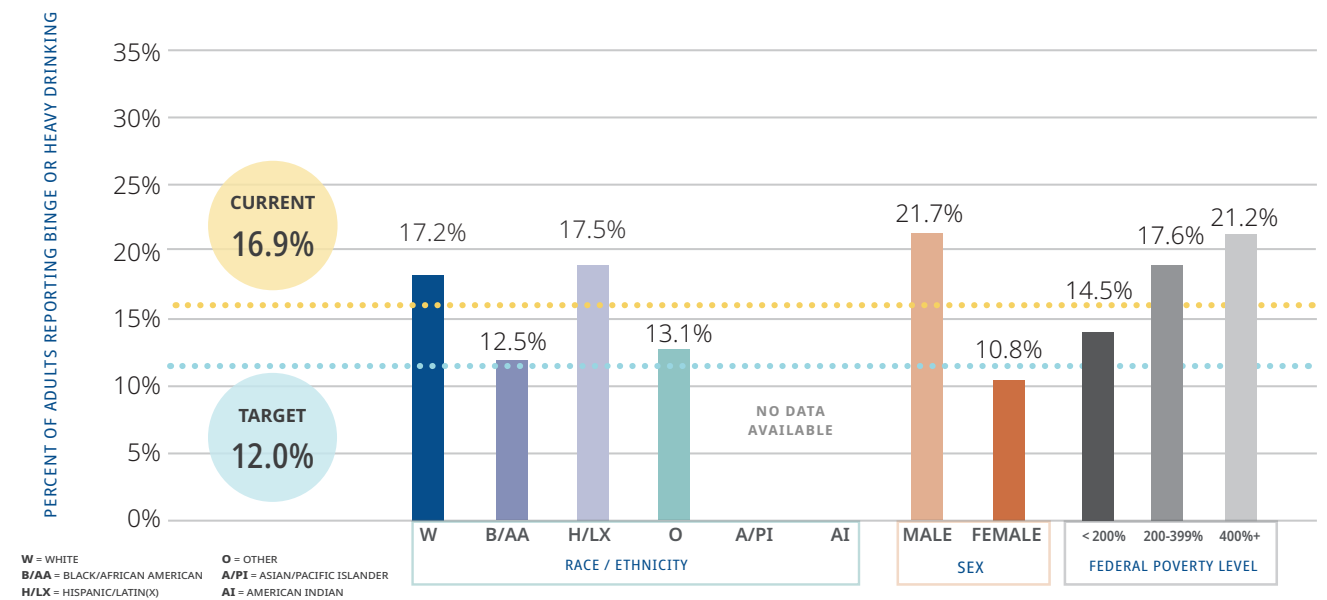
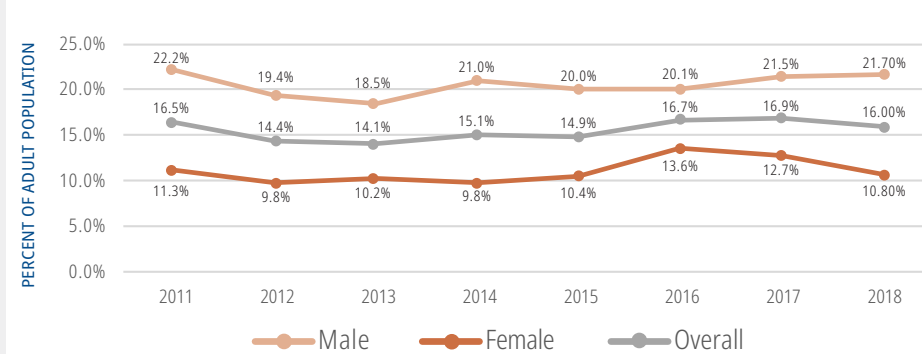


FIGURE 23

Excessive Drinking in North Carolina, by Sex, 2012-2018



Source: North Carolina State Center for Health Statistics analysis of Behavioral Risk Factor Surveillance System

2030 Target and Potential for Change

The HNC 2030 group reviewed data across several years and a forecasted value for North Carolina based on historical data to develop a target for excessive drinking. The group chose to set a target for 2030 of 12.0% of adults reporting binge or heavy drinking. This would reflect a reversal of the increasing trend over the past several years, with a low in 2014 of 14.1%. Focused decreases for men will facilitate achieving this goal.

Levers for Change

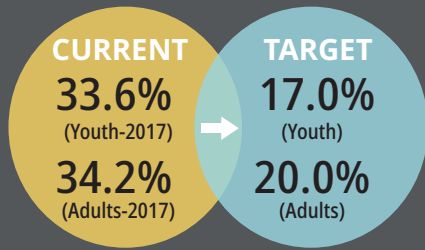
(America's Health Rankings, Excessive Drinking, 2018; CDC, The Community Guide)

- Support and maintain state-controlled alcohol sales
- Increase alcohol excise taxes
- Reduce density of alcohol retailers
- Reduce the days and hours of alcohol sales
- Screen adults for excessive drinking and conduct brief intervention for those that screen positive
- Hold alcohol retailers liable for intoxicated or underage customers who cause injury to others
- Integrate Screening, Brief Intervention, and Referral to Treatment (SBIRT) into medical settings

¹¹Excessive drinking habits and alcohol dependence may coexist but can also be independent of one another; 9 in 10 adults who drink excessively are not alcohol-dependent. (NCDHHS, Alcohol & the Public's Health in NC).

HEALTH INDICATOR 13: SUGAR-SWEETENED BEVERAGE CONSUMPTION

DESIRED RESULT: REDUCE OVERWEIGHT AND OBESITY



DEFINITION

Percent of youth and adults reporting consumption of one or more sugar-sweetened beverages (SSBs) per day

DETAILS

Youth (high school students) and adults measured separately; SSBs include non-diet soda, fruit drinks (such as Kool-aid and lemonade), sweet tea, and sports or energy drinks (such as Gatorade and Red Bull)

NC SSB CONSUMPTION (2017)

33.6% of Youth
34.2% of Adults

2030 TARGET

17.0% of Youth
20.0% of Adults

RANGE AMONG NC COUNTIES

Not available

RANK AMONG STATES

Not available

DATA SOURCE

Youth: NC Department of Public Instruction, Youth Risk Behavior Survey (YRBS)

Adult: NC State Center for Health Statistics, Behavioral Risk Factor Surveillance System (BRFSS)

STATE PLANS WITH SIMILAR INDICATORS

Not Applicable

Rationale for Selection:

Obesity continues to be a concern in North Carolina. Sugar-sweetened beverages (SSB) are the leading source of calories and added sugars in the American diet.

Context

Obesity is one of the largest contributors to morbidity and mortality in the United States, for both youth and adults.¹⁰² Across all ages, the rates of obesity continue to rise. For years, efforts to reduce overweight and obesity have largely been focused on physical activity and healthy eating (e.g., fruit and vegetable intake). New efforts are also targeting sugar-sweetened beverage consumption, which is directly linked to obesity, type 2 diabetes, heart disease, and dental problems.¹⁰³ Sugar-sweetened beverages (SSBs) are the leading dietary source of added sugar for Americans.¹⁰³ Many popular drinks often contain large amounts of added sugar that may not be appreciated by consumers.

In North Carolina, more than a third of high school students reported daily consumption of more than one SSB.^{KK} For this population, it is estimated that beverages make up a fifth of daily caloric intake.¹⁰⁴ In addition to the connections with chronic nutrition-related conditions and dental problems, studies also show links between excess sugar consumption and attention difficulties.¹⁰⁵

The CDC's National Center for Chronic Disease Prevention and Health Promotion recommends that adults limit consumption of added sugars to no more than 10% of daily caloric intake.¹⁰⁶ Studies indicate that average sugar intake for adults far outpaces that figure, and that SSBs account for the largest source of added sugar consumption. Approximately 34% of adults consume one or more SSBs a day.^{LL}

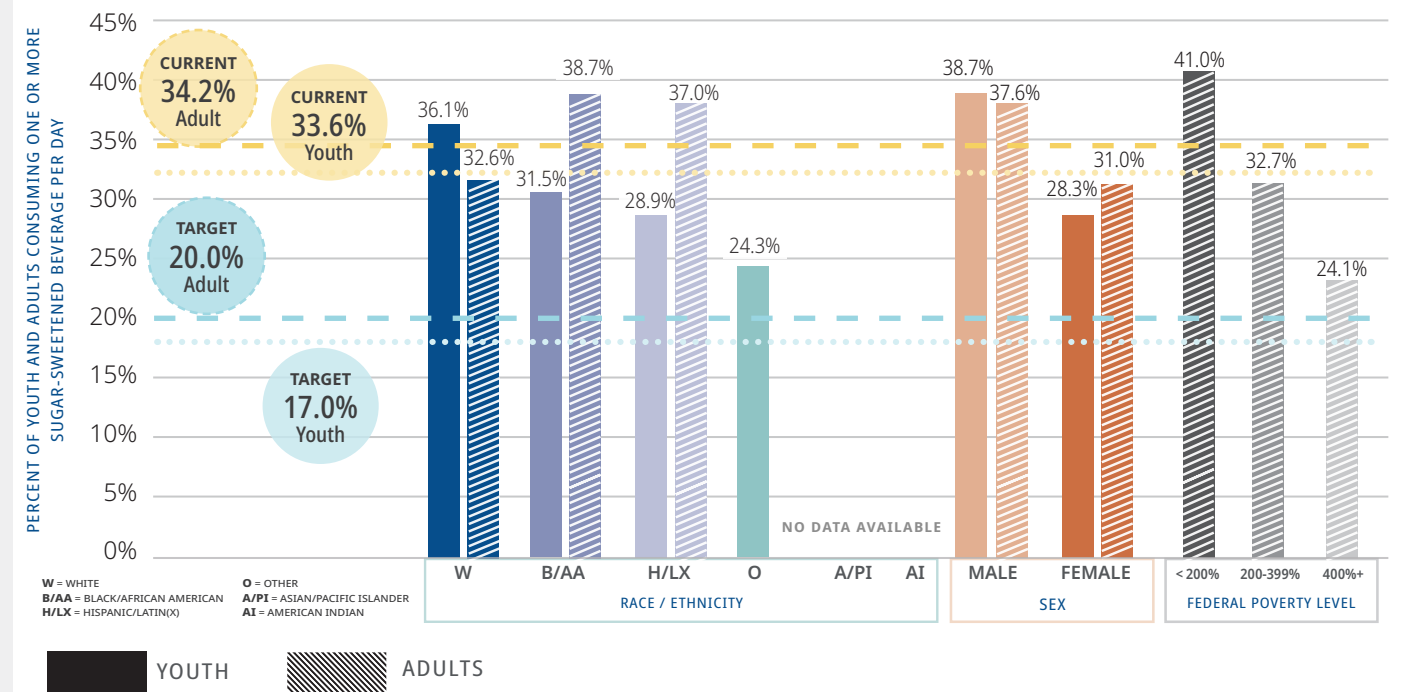
Disparities

Members of certain populations are more likely to consume SSBs than others. Persons in low-income households, and those with low levels of educational attainment, or whose parents have low levels of educational attainment, have higher odds of consuming multiple SSBs a day.^{LL} Additionally, men are more likely to consume more SSBs than women. Across racial groups different factors are associated with likelihood of SSB consumption, including perceptions of tap water safety¹⁰⁷ and marketing of products (particularly to youth of color, as well as low-income populations).^{108,109}

“Sugar-sweetened beverages (SSBs) are the leading dietary source of added sugar for Americans.¹⁰³ Many popular drinks often contain large amounts of added sugar that may not be appreciated by consumers.”

FIGURE 24

Sugar-sweetened beverage consumption across populations in North Carolina and distance to 2030 target



2030 Target and Potential for Change

The HNC 2030 group reviewed current data and discussed the growing attention to SSBs to develop a target for SSB consumption. Due to differences in youth and adult consumption (according to data), the group chose different targets for these age groups, with 17% reporting consumption of one or more SSB per day for youth and 20% for adults as the target for 2030.

Levers for Change

(ChangeLabSolutions, 2018)

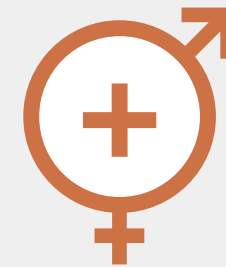
- Tax sugary drinks
- Launch public awareness campaigns
- Work with retailers to improve offerings and create healthier store environments
- Limit sugary drinks through government and private sector procurement policies
- Partner with schools and youth-oriented settings to remove or limit SSBs and their marketing
- Create community coalitions to identify additional community strategies to reduce consumption

^{KK} Analysis of Youth Risk Behavior Surveillance System by the North Carolina Department of Public Instruction.

^{LL} Analysis of the Behavioral Risk Factor Surveillance System by the North Carolina Department of Health and Human Services State Center for Health Statistics.

IMPROVE SEXUAL HEALTH

Good sexual health practices are important for family planning and prevention of sexually transmitted infections (STIs), both of which affect short- and long-term health and socioeconomic conditions. Diagnosis and treatment of STIs, as well as use of barrier protection during sex, protect against STI transmission. Family planning helps people to plan the timing of pregnancy and the size of their family. In 2017, 43.8% of pregnancies in North Carolina were not intended.^{MM,110} Unintended pregnancy is associated with delayed prenatal care, higher incidence of postpartum depression, higher risk of physical abuse, and lower rates of breastfeeding.^{111,112} Babies who are born from unintended pregnancy have higher rates of birth defects, low birth weight, and poor mental and physical health during childhood.^{113,114} The health and social consequences of unintended pregnancy are greater for teenage mothers and their children.



STIs refer to the range of infectious diseases that are transmitted primarily through unprotected sexual activity with an infected person. Most STIs are largely preventable with proper protection such as condoms or vaccination. STIs are widespread, with 42.5% of adults ages 18-59 having human papillomavirus (HPV), the most common STI in the United States.^{NN,00} Some STIs can impact reproductive health, particularly for women; some cause cancers (i.e., HPV), and some cannot be cured (e.g., HIV and herpes).^{115,116} North Carolina requires six sexually transmitted STIs to be reported;^{PP} the most common include HIV, syphilis, gonorrhea, chlamydia and hepatitis B.^{QQ} As for all reportable diseases, cases must be reported to the local health

department for surveillance and disease prevention. Some STIs, such as genital herpes and HPV, are not required to be reported to local health departments; for these, data on prevalence come from studies. Rates of infection for some STIs have been increasing, with infections most common among young people and gay and bisexual men. STIs impact different populations at varying rates. Syphilis is most common among men who have sex with men and among younger African American men; however, it is also increasing among women, leading to increases in congenital syphilis infections.¹¹⁷ Gonorrhea rates are particularly high for young men and women aged 20-24 years and African American and American Indian populations. Gonorrhea and chlamydia rates are highest among people under 29 years of age.¹¹⁸ The largest race/ethnicity disparity is seen in HIV diagnosis rates, which are nearly ten times higher for African Americans compared to whites due to a variety of socioeconomic and health care access issues.¹¹⁹

There are no direct measures available for healthy sexual behaviors, such as contraception or condom use. HNC 2030 members selected two outcome measures to serve as indicators of healthy sexuality: HIV diagnosis rate and teen birth rate.

^{MM} "Not intended" is a combination of "unintended" and "was not sure" responses on the North Carolina Pregnancy Risk Assessment Monitoring System Survey.

^{NN} <https://www.cdc.gov/std/hpv/stdfact-hpv.htm>

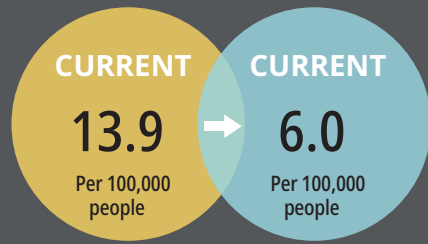
⁰⁰ HPV vaccination became available in the U.S. in 2006, therefore most adults have not been vaccinated. <https://www.kff.org/womens-health-policy/fact-sheet/the-hpv-vaccine-access-and-use-in-the-u-s/>

^{PP} 10A NCAC 41A .0101

^{QQ} Rates of hepatitis C transmission are also collected, however sexual contact is not the primary means of hepatitis C transmission.

HEALTH INDICATOR 14: HIV DIAGNOSIS RATE

DESIRED RESULT: IMPROVE SEXUAL HEALTH



DEFINITION

Number of new HIV diagnoses per 100,000 population

DETAILS

Not Applicable

NC HIV DIAGNOSIS RATE (2018)

13.9 per 100,000 people

2030 TARGET

6.0 per 100,000 people

RANGE AMONG NC COUNTIES

0 - 29.6 per 100,000 people

RANK AMONG STATES

40th*

DATA SOURCE

NC Division of Public Health, Epidemiology Section

STATE PLANS WITH SIMILAR INDICATORS

Not Applicable

*Rank of 1st for state with lowest HIV diagnosis rate

Rationale for Selection:

Human Immunodeficiency Virus (HIV) remains a deadly disease if left untreated. Newly diagnosed HIV infection rates manifest extremely high disparities among men who have sex with men and African Americans. These disparities identify opportunities to improve access to prevention, care and treatment, which can end HIV transmission and associated deaths.^{RR}

Context

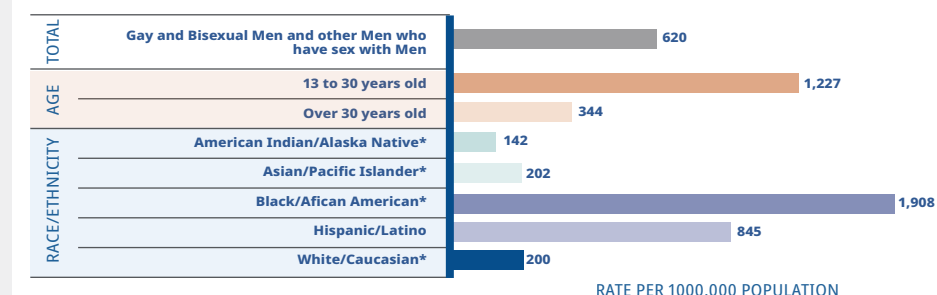
HIV is a virus that affects the immune system's ability to defend itself, with deadly consequences if left untreated. North Carolina's HIV diagnosis rate has been decreasing, and in 2018 the rate was 13.9 per 100,000 people, which is slightly lower than the national rate of 14.6 per 100,000 people.¹²⁰ The primary mechanisms through which the virus is spread are sexual contact and injection drug use.¹²¹ Once contracted, the virus can have lifelong physical and psychological impacts, and increases the risk of negative health outcomes such as AIDS, cancer, tuberculosis, and other infectious diseases.¹²² Pregnant women living with HIV who are not suppressed on antiretroviral therapy are at risk of passing it to their babies during delivery or breastfeeding.^{122,123}

While no cure exists at this time, advances in HIV antiretroviral medications make it possible for persons living with HIV to live largely normal lives and prevent transmission of the virus to others.¹²² However, treatment remains expensive, costing an estimated \$478,000 for lifelong care.¹²⁰ Recent advances have led to the development of pre-exposure prophylaxis (PrEP), a daily medication that reduces the risk of HIV transmission by 99% through sexual contact or 74% through injecting drug use if taken as directed.¹²⁴ Expanded access to and use of treatment and prevention medications can control the spread of HIV and drastically reduce diagnosis rates.

Individuals may be fearful of being tested or of disclosing their status to friends, family members, and current or future sexual partners due to social stigma surrounding the disease or the exposure risk and the level of social stigma varies by cultural and religious background.¹²⁵ People may also be unaware that they have been exposed to or are living with HIV, since individuals can remain asymptomatic for months to years after initial infection.¹²⁶

FIGURE 25

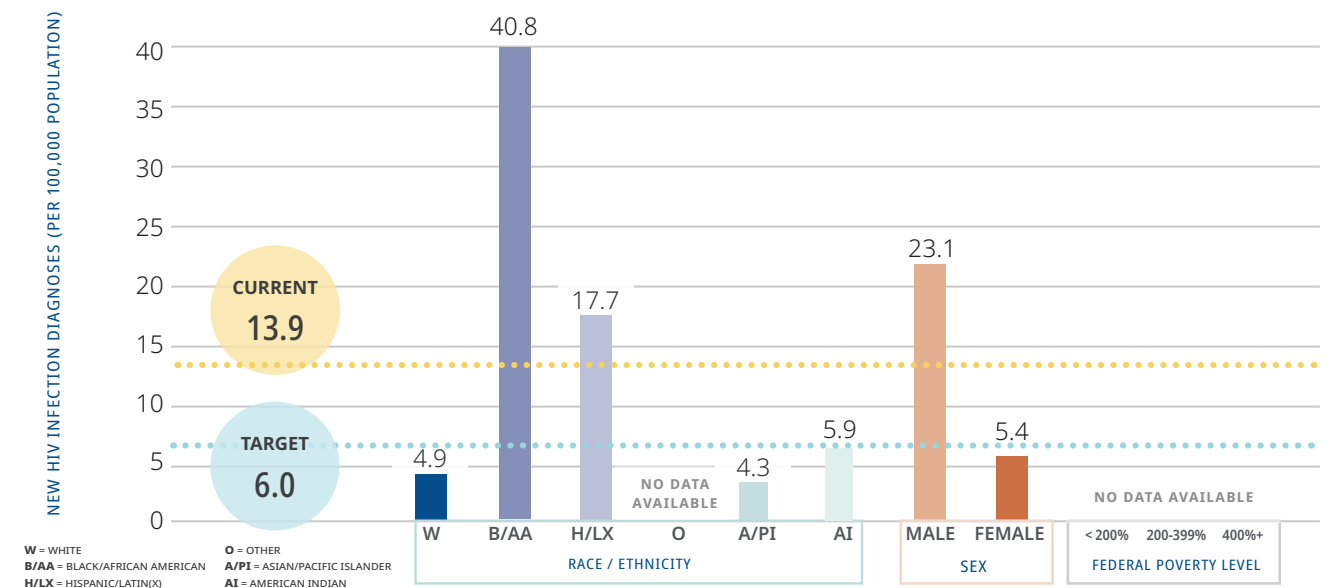
Estimated HIV Infection Rates among Newly Diagnosed Adult and Adolescent (13 years and older) Gay and Bisexual Men and Other Men who have Sex with Men in North Carolina, 2018



*Non-Hispanic
Source: 2018 North Carolina HIV/STD/Hepatitis Surveillance Report. North Carolina Department of Health and Human Services, Division of Public Health, HIV/STD/Hepatitis Surveillance Unit. https://epi.dph.ncdhhs.gov/cd/stds/figures/factsheet_HIV_2018.pdf

FIGURE 26

HIV rate across populations in North Carolina and distance to 2030 target



Disparities

Despite the overall decrease in HIV diagnosis rate, significant racial/ethnic disparities in HIV diagnosis rates remain, with persons of color making up a disproportionate share of the population diagnosed with HIV annually. In 2018, the HIV diagnosis rates for African American men (68.7 cases per 100,000) and women (15.9 cases per 100,000) far exceeded that of their white counterparts (8.0 and 2.0 cases per 100,000, respectively).¹²⁷ Persons of Hispanic ethnicity also have disparate HIV diagnosis rates (17.7 cases per 100,000) compared to whites (4.9 cases per 100,000).¹²⁷ The HIV diagnosis rate among men who have sex with men (MSM) is 155 times that of heterosexual men (MSM: 621.0 per 100,000 in 2018; heterosexual men: 4.0 per 100,000).¹²⁷ These two levels of disparity compound for African American MSM, who have estimated diagnosis rates of 1,908.2 per 100,000 compared to 199.7 per 100,000 for white MSM.¹²⁷

HIV disproportionately affects lower-income communities and people without insurance, as well as people with vulnerable or chaotic life situations such as sex workers and incarcerated populations.¹²⁸ People living in impoverished areas often have fewer health care and prevention resources, including access to HIV treatment and PrEP, which can increase the potential for HIV transmission.¹²³

2030 Target and Potential for Change

The HNC 2030 group reviewed data across several years and populations and a forecasted value for North Carolina based on historical data to develop a target for HIV diagnosis rate. The group chose 6.0 diagnoses per 100,000 people as the target for 2030. Effective HIV treatment and PrEP have the potential to drastically reduce transmission rates into the future. With this fact and the national efforts to end HIV transmission, the group set an aggressive goal. To meet this goal, it is critical that NC reduces disparities in infection rates for African Americans.

Levers for Change

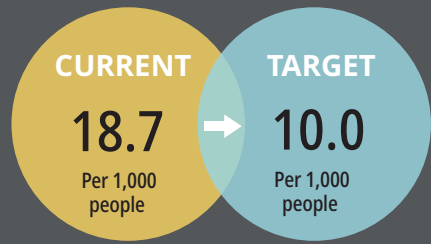
(CDC, HIV Prevention in the United States, 2015)

- Increase access to PrEP for individuals at high risk for HIV transmission
- Implement interventions that improve access to HIV treatment
- Make testing easy, accessible, and routine
- Ensure people who are diagnosed are linked with appropriate care and receive behavioral interventions and other supports to decrease risk of transmission
- Ensure availability of condoms at health departments and community-based organizations
- Increase Medicaid eligibility

^{RR}It is important to note that the HIV diagnosis rate would decrease with decreased testing, yet that is not an acceptable means to decrease diagnoses. Healthy sexual behaviors, increased testing, and proper treatment are important methods for decreasing transmission of the virus.

HEALTH INDICATOR 15: **TEEN BIRTH RATE**

DESIRED RESULT: **IMPROVE SEXUAL HEALTH**



DEFINITION
Number of births to girls aged 15-19 per 1,000 population

DETAILS
Not Applicable

NC TEEN BIRTH RATE (2018)
18.7 per 1,000

2030 TARGET
10.0 per 1,000

RANGE AMONG NC COUNTIES
3.2 - 41.5 per 1,000

RANK AMONG STATES
23rd* (2017)

DATA SOURCE
NC State Center for Health Statistics, Vital Statistics

STATE PLANS WITH SIMILAR INDICATORS
Not Applicable

*Rank of 1st for state with lowest teen birth rate

Rationale for Selection:

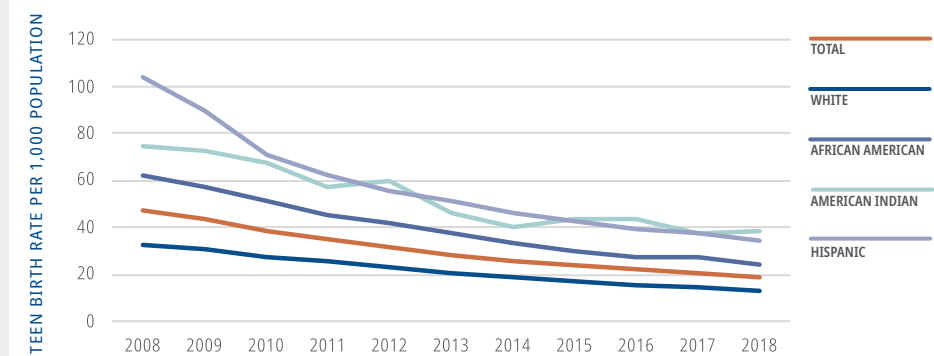
Having a child during one's teenage years is associated with social, health, and financial burdens to the teen parents, their families, and their communities. Teenage mothers are less likely to complete high school and more likely to live in poverty. Children born to teenage parents are less likely to succeed in school, and more likely to drop out of school and be involved in the criminal justice system. Although the teen birth rate in North Carolina has decreased significantly, teen births remain high among American Indian, African American, and Hispanic populations.

Context

Young mothers and their babies face a host of negative health and economic outcomes. In North Carolina, the teen birth rate in 2018 was 18.7 per 1,000, a figure that exceeds the national rate of 17.4 per 1,000.^{110,127} Despite reductions in the rate over the last decade, more than 8,800 mothers under the age of 19 gave birth in 2017.¹²⁹ Teenage girls may have underdeveloped reproductive systems and may face higher rates of pregnancy-related morbidity.¹³⁰ They are also less likely to receive early prenatal care.¹³¹ From a mental health perspective, teenage mothers are more likely to suffer from psychological trauma associated with pregnancy and may be at higher risk for postpartum depression.^{132,131} Babies born to teenage mothers are more likely to have low birth weight, pre-term delivery, and other complications.¹³¹

Teenage mothers are more likely to drop out of school and may not attain the same level of education as their childless peers.¹³¹ Thus, they are more likely to work lower-wage jobs and have lower lifetime earning potentials. They are also more susceptible to intimate partner violence and mistreatment by family members, which can compound psychological distress, and negatively impact both their children's lives and their own.¹³² Psychological distress associated with birth and interpersonal violence increases the likelihood that teenage mothers will use substances, have repeat pregnancies, and that the children of teenage mothers will suffer depression and other psychological barriers.¹³²

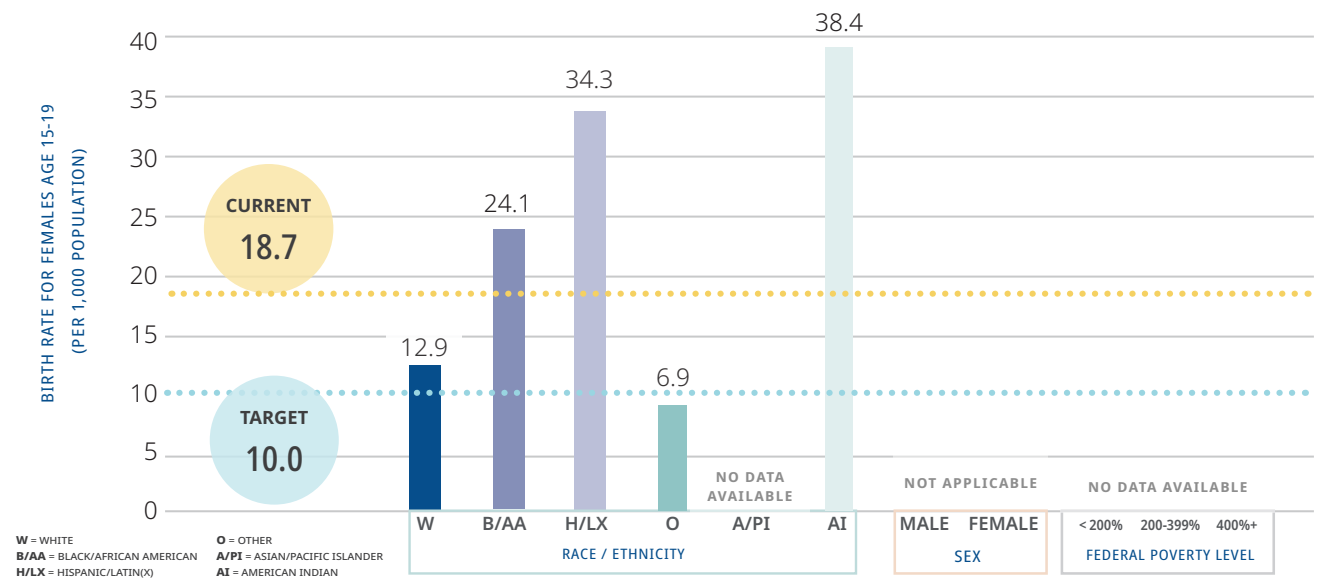
FIGURE 27
Teen Birth Rate in North Carolina, by Race/Ethnicity, 2008-2018



Source: North Carolina State Center for Health Statistics. Decline in Teen Births in North Carolina, 1996-2015. July 2017. https://schs.dph.ncdhhs.gov/schs/pdf/SB_47_20170726.pdf; Vital Statistics - Pregnancies, Fertility

FIGURE 28

Teen birth rate across populations in North Carolina and distance to 2030 target



Disparities

Income level, childhood trauma, racial identity, and geography all affect the teen birth rate. Girls from low-income families and those in the child welfare system are at higher risk of giving birth as a teenager than their more affluent peers.¹³³ History of adverse childhood experiences (ACEs) correlates with likelihood of teenage pregnancy and birth, as almost half of teenage mothers have a history of childhood sexual abuse or trauma.¹³²

Despite the recent downward trend in the teen birth rate, large disparities remain between racial and ethnic groups. African American, Hispanic, and American Indian girls give birth at rates that are more than two to three times that of white girls (Figure 28).¹¹⁰ These disparities can be traced to persistent racial segregation of neighborhoods that contributes to sharp income inequality, poor economic development, and under-resourced schools associated with lower educational attainment and the number of safe recreational and social opportunities for teens.¹³⁴

Also, rural areas tend to face higher teen birth rates than their metropolitan counterparts. This disparity is particularly acute as the recent improvements in teen birth rates have largely only occurred in metropolitan areas.¹³⁴

2030 Target and Potential for Change

The HNC 2030 group reviewed data across several years, populations, and states and a forecasted value for North Carolina based on historical data to determine a target for 2030. Recent trends show an increasing use of long-acting reversible contraceptives (LARCs), such as intrauterine devices (IUDs) and implants, which are more effective than other forms of birth control, as well as decreases in high school age girls having sexual intercourse (41.4% in 2015, compared to 57.6% in 1995).¹³⁵ With the strong downward trends and continued work to decrease rates further, the group chose 10.0 teen births per 1,000 population as the target for 2030. To meet this target, it will be critical to focus on reducing the disparities we see in teen birth rates for American Indians, Hispanics, and African Americans.

Levers for Change

(National Conference of State Legislatures, 2018)

- Increase access to long-acting reversible contraceptives, such as IUDs and implants, as well as condoms
- Ensure access to information and services for youth sexual health
- Examine school sex education policies to ensure they include information on how to avoid teen pregnancy and sexually transmitted infections

DEVELOPMENTAL MEASURES

Below are health behavior measures that the HNC 2030 group feels are important to population health, but do not have reliable or robust data available at this time. A description of the data needed for these measures is listed as “developmental data needs.” State and local public health or other entities should consider identifying methods for collecting this data.

Sexual Health

HIV diagnosis was chosen for HNC 2030 as an important indicator of sexual health practices and for the disparities seen in the diagnosis rates of African Americans above other racial groups (see Page 77). Yet, this indicator is not the ultimate predictor of safe sex practices across populations and it is not the only sexually transmitted disease with large health impacts.

Both the work group and communities expressed a desire to be able to more comprehensively measure the impact of STIs. A composite measure of STIs is unavailable at this time.

Developmental data needs:

- There is no existing data source for the contraceptive or condom practices of the population. This data would be relevant to contextualize the Teen Birth Rate and HIV Diagnosis indicators chosen for HNC 2030 and would be important in contextualizing issues such as unintended pregnancy and other STI diagnosis rates.
- A composite measure of all reportable STIs would provide a broader picture of the spectrum of sexual health issues across the state of North Carolina. The North Carolina HIV/STD Prevention and Care program within the North Carolina Division of Public Health created a draft composite measure. The measure would evaluate average time to treat across STIs with the reasoning that achieving fast treatment is an effective way to cure and prevent the spread of disease. This composite measure will need peer review and testing in the coming years to prepare for potential future use, however it could be considered for work related to STIs in the coming decades.

Overweight/Obesity

Obesity rates have continued to grow over the past several decades. The state-level data currently available uses self-reported survey data on height and weight, such as the Behavioral Risk Factor Surveillance System (BRFSS) data, to calculate the prevalence of overweight and obesity. While this data may provide an idea of the challenges a population faces with weight, it is not accurate. One study showed that BRFSS underestimates prevalence of obesity by 9.5 percentage points, with even higher inaccuracies among women at a 13.1 percentage point underestimate.¹⁰⁵

Developmental data needs:

- Weight and height data are routinely collected as part of clinical visits for children. This data provides a much more accurate picture of the obesity rate within the population. The now widespread use of electronic health records could facilitate the collection of this data for the population. The state’s NC HealthConnex Health Information Exchange is designed to collect clinical data from all health systems and providers, although all may not currently be connected. State-level population health data is not currently available from NC HealthConnex but should be in the future, which will provide more accurate data across all populations in the state.

CHAPTER 6

CLINICAL CARE



INTRODUCTION

While the non-clinical drivers of health – social and economic factors, physical environment, and health behaviors – provide the context for how we live and how likely we are to be healthy, our access to affordable and quality health care can help to prevent disease or detect it as soon as possible.¹³⁶ Access to care typically begins with affordable and comprehensive health insurance. Beyond that, geographic proximity to health care providers is key to ensuring that people can physically access the care they need. Within the health care system, quality care means the provision of safe, effective treatment in a timely manner.¹³⁶

In many ways, income, employment, race, and geographic location affect where and how we receive health care.

- **Social and Economic Factors – Employment is a key mechanism for health insurance coverage in the United States, although low-income workers are less likely to receive this benefit from their employers. Individuals with less education are more likely to be employed without health insurance benefits. People of color face limitations in health care quality and access due to mistrust of the health care system, lack of representation in the health care workforce, and implicit bias in the treatment they receive.**
- **Physical Environment – People who live in rural areas are more likely to be farther from health care providers and hospitals. This impacts their ability to receive regular health check-ups and care for health conditions like pregnancy, mental health issues, or diabetes. These geographic challenges are compounded for people who lack reliable transportation.**

The HNC 2030 health indicators chosen for the clinical care topic area cover both access and quality, and even still cannot fully capture an individual's ability to access quality care. For example, insurance rates are an important indicator of access, yet even people with insurance may face large financial barriers to care if the coverage is not robust or if the monthly premiums are high.

Read the following example of how the drivers of health interact with clinical care to impact an individual's opportunities to achieve health and well-being.⁵⁵ For each health indicator, this report includes recommended evidence-informed policies and practices to address that indicator of interest. We recommend community coalitions use multi-sector partnerships to pursue all the strategies recommended.

Clinical Care and Health – John's Experience

John is a farmer in rural North Carolina. He has worked hard and loves his home, but his health has been deteriorating. John did not have health insurance until he turned 65 and hasn't been to the doctor in ten years. Although he has not been feeling well, John put off seeing the doctor until he turned 65 and was able to enroll in Medicare for health insurance. Once insured, he made an appointment with the closest primary care doctor on the other side of the county, about 40 minutes away. By the time of his appointment, his health had deteriorated so much that he didn't feel comfortable driving himself. John's niece volunteered to drive him to the appointment, but that day she got sick and couldn't take him. The appointment was rescheduled for a month later. The doctor diagnosed John with anemia and scheduled a colonoscopy two counties away. He was ultimately diagnosed with Stage III cancer of the colon. Treatment was only available at the hospital, which was also far from his house. John needs aggressive treatment requiring surgery and then weekly treatment at the hospital for the next couple of months. Although he has a source of payment now, John's prognosis would have been much better had his cancer been caught earlier.

HEALTH INDICATORS:

16 UNINSURED RATE

Decrease the Uninsured Population

17 PRIMARY CARE WORKFORCE

Increase the Primary Care Workforce

18 EARLY PRENATAL CARE

Improve Birth Outcomes

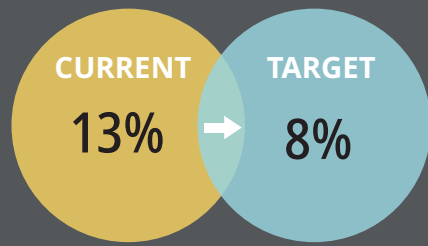
19 SUICIDE RATE

Improve Access and Treatment for Mental Health Needs

⁵⁵ Examples are of hypothetical scenarios commonly faced by individuals with health-related social needs.

HEALTH INDICATOR 16: UNINSURED RATE

DESIRED RESULT: DECREASE THE UNINSURED POPULATION



DEFINITION

Population under age 65 without health insurance

DETAILS

Individuals age 65 years and older are eligible for Medicare

NC UNINSURED RATE (2017)

13%

2030 TARGET

8%

RANGE AMONG NC COUNTIES

9 – 20%

RANK AMONG STATES

44th*

DATA SOURCE

Small Area Health Insurance Estimates

STATE PLANS WITH SIMILAR INDICATORS

Not Applicable

*Rank of 1st for state with lowest uninsured rate

Rationale for Selection:

For most people, access to affordable health care services is dependent upon whether they have health insurance coverage. Although uninsured rates in North Carolina decreased between 2013 and 2016, they have started to rise again. Policy options available to state lawmakers have the potential to greatly reduce the number of people who are uninsured in North Carolina.

Context

Access to comprehensive, quality health care services is critical to achieve and maintain health, prevent and manage disease, and achieve health equity. Health insurance is the most common means used to obtain affordable health care services.¹³⁷ For those without health insurance, care may be inaccessible and unaffordable, resulting in poor health outcomes.¹³⁸ Those without coverage may not receive important preventive care services, may avoid treatment for acute illness and injury, and may also have poorly managed chronic health conditions.^{138,139,140} Lack of health insurance coverage can also lead to financial burdens that further negatively impact one's health. Access to affordable health care positively impacts individuals' health and well-being and overall quality of life.¹⁴¹

In the United States, there are three broad categories of insurance: private, public, and the uninsured. In 2017, slightly more than half of all North Carolina residents had private insurance (53%).¹⁴² The majority of North Carolinians with private insurance were enrolled in employer-based insurance programs that are jointly financed by employers and employees. Approximately 36% of North Carolinians were covered by public health insurance (i.e., Medicaid, Medicare, Tricare, Veterans Health Administration (VA) health care) with eligibility depending on their age, income, and military status.¹⁴² Those who do not receive health care from their employer and do not qualify for public health insurance (11%) can purchase private health insurance through the government-run health insurance marketplace, which provides subsidies based on income, or through the private insurance market. In 2018, the average annual cost of health insurance was \$6,800 for individuals and \$19,600 for family coverage.¹⁴³ Due to the high cost of insurance, both through employers and on the private market, many people cannot afford health insurance and go without.

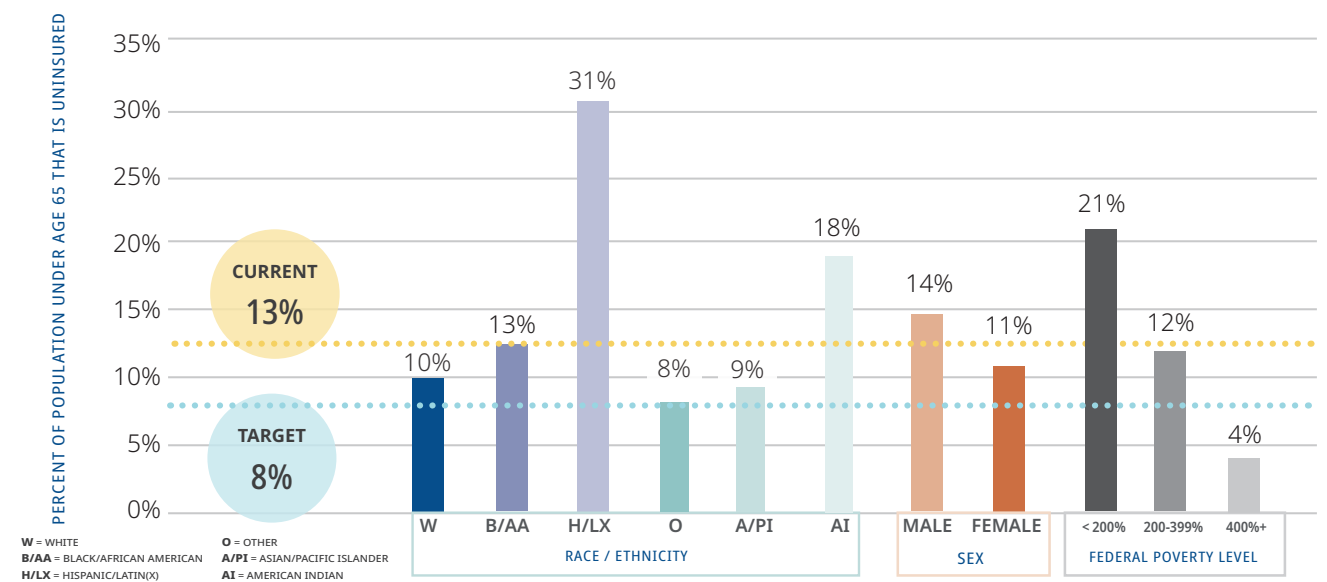
Disparities

Certain types of workers may be less likely to have health insurance.¹⁴⁴ Persons engaged in seasonal, part-time, temporary, or caregiving work or who are self-employed or are small business owners and employees may not receive employer-sponsored insurance and may not qualify for public benefits or tax credits and subsidies to purchase coverage on the marketplace.¹⁴⁵ In North Carolina, those working in the agriculture, forestry, mining, construction, hospitality, and services industries are most likely to lack health insurance.¹⁴⁴ Veteran populations too may fall into the coverage gap, as they may be ineligible for VA health care coverage and may not qualify for TriCare.¹⁴⁵

There are also racial and geographic disparities in who does and does not have insurance coverage. Hispanic North Carolinians are uninsured at higher rates than their white and African American counterparts, as members of that community may be more likely to lack access to job opportunities that provide insurance and may also face citizenship and status documentation barriers to qualifying for Medicaid and Medicare.¹⁴⁵ However, white North Carolinians account for almost half of residents in the state without health insurance.¹⁴⁴ Finally, residents of rural areas are more likely to be uninsured than their metropolitan counterparts and are more likely to be concentrated in the mountains and southern plain of the state.¹⁴⁶

FIGURE 29

Percent uninsured across populations in North Carolina and distance to 2030 target



2030 Target and Potential for Change

The HNC 2030 group reviewed data across several years and a forecasted value for North Carolina based on historical data to determine a target for 2030. They also discussed the policy options and their projected effect on the uninsured population. Estimates show that Medicaid expansion in North Carolina would decrease the uninsured population under the age of 65 from 13% to around 8%, therefore the group chose 8% as the target for uninsured for 2030.¹⁴⁷ Analyses have shown that states where Medicaid eligibility has been expanded have seen improved health outcomes, such as decreased infant mortality, decreased cardiovascular mortality rates, improved self-reported health status, and improved rates of smoking cessation.¹⁴⁰

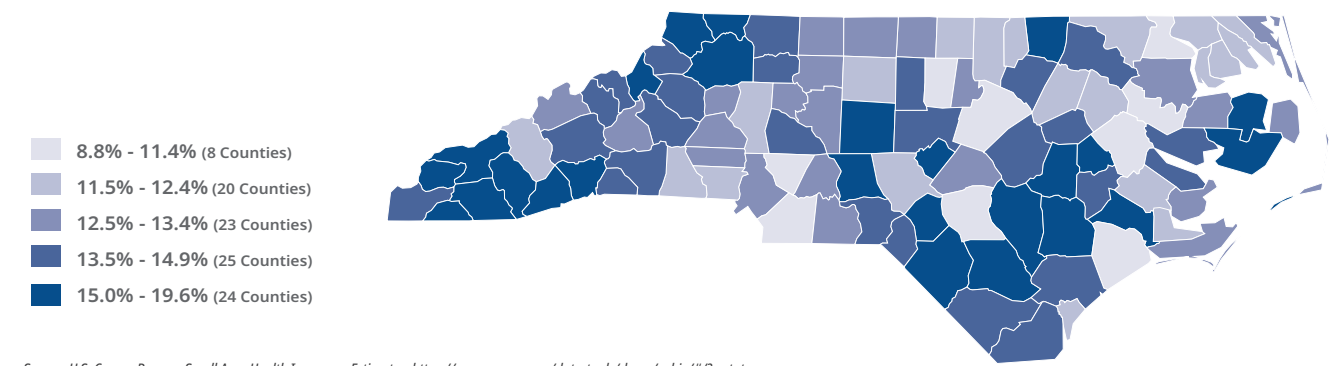
Levers for Change

(Collins, Bhupal, & Doty, 2019)

- Expand Medicaid eligibility criteria
- Support bans or limitations on short-term health plans
- Increase publicity and navigator funding for open enrollment
- Increase public education about insurance options

FIGURE 30

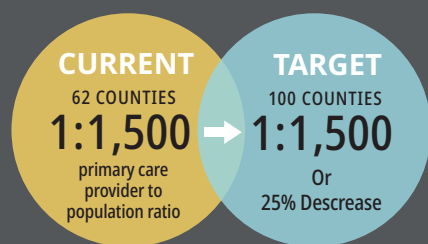
Percent of Population who is Uninsured in North Carolina Counties: Residents Less than 65 years old, 2017



Source: U.S. Census Bureau, Small Area Health Insurance Estimates, https://www.census.gov/data-tools/demo/sahie/#/?s_state

HEALTH INDICATOR 17: PRIMARY CARE WORKFORCE

DESIRED RESULT: INCREASE THE PRIMARY CARE WORKFORCE



DEFINITION

Primary care workforce as a ratio of the number of full-time equivalent primary care clinicians to county population

DETAILS

Includes physicians, nurse practitioners, physician assistants, and certified nurse midwives; provider location defined by primary practice location on licensure information

NC PRIMARY CARE WORKFORCE (2017)

62 counties with a 1:1,500 primary care provider to population ratio

2030 TARGET

100 counties reaching the 1:1,500 ratio or achieving a 25% decrease in the provider to population ratio

RANGE AMONG NC COUNTIES

1:6,278 – 1:365

RANK AMONG STATES

Not Applicable

DATA SOURCE

Cecil G. Sheps Center for Health Services Research analysis of licensure data from North Carolina Medical Board and North Carolina Board of Nursing

STATE PLANS WITH SIMILAR INDICATORS

Not Applicable

Rationale for Selection:

Access to primary care can encourage preventive health care and improve health outcomes. Many rural areas of North Carolina lack adequate access to medical professionals, including those providing primary care.

Context

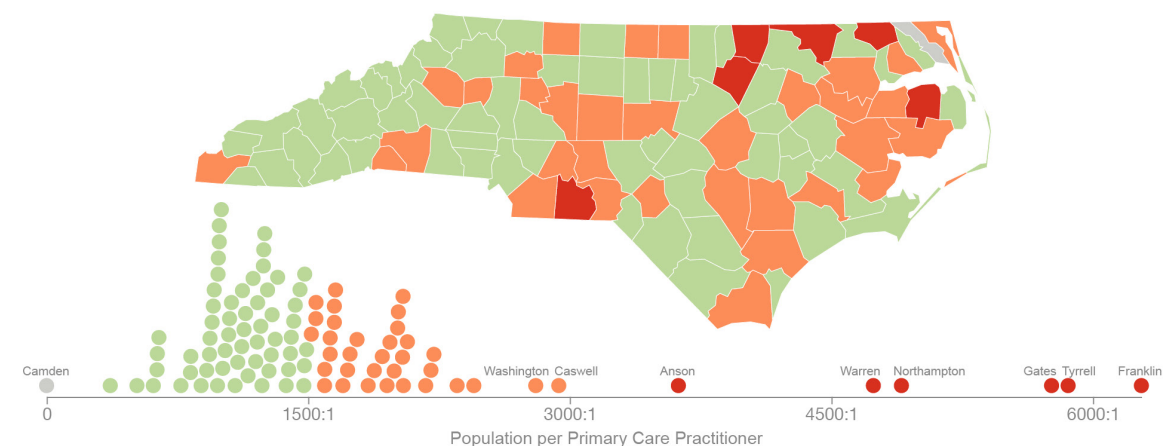
Primary care providers typically serve as the entry point into the health care system and provide a wide array of services including preventive, diagnostic, chronic disease management, and urgent care. As such, primary care providers play an integral role in maintaining and improving the overall health and well-being of communities.¹⁴⁸ Access to primary care is associated with fewer health care disparities and better health outcomes across socioeconomic circumstances.¹⁴⁸

Ideally, people would have access to high quality primary care, dental care, and behavioral health care in their communities. However, 38 counties in North Carolina do not meet the recommended ratio of one primary care provider per 1,500 residents^{VV} (see Figure 31), with many counties also experiencing shortages of dental and/or behavioral health providers. The primary care workforce is experiencing increases in demand due to aging baby boomers requiring more care, overall growth in the population, and increasing numbers of people living with chronic illnesses. Despite overall growth in the primary care workforce in the last 30 years, North Carolina's most underserved and rural areas face persistent primary care shortfalls. Rural communities often struggle to recruit and retain health care professionals due to professional, economic, infrastructure, and cultural challenges. Shortages of health care professionals in rural areas impede residents' ability to get the care they need. To access services, those services must be available, obtainable in a timely manner, and affordable. Barriers to access, including shortages of health professionals, result in unmet health care needs, delays in receiving care, forgoing preventive care, preventable hospitalizations, and death.¹⁴⁹

Nationwide, the number of medical school graduates choosing primary care has been on the decline, arguably due to high costs of medical education and a large disparity between the earnings of primary care physicians and those of most specialists.¹⁵⁰ At the same time, the primary care workforce has been supplemented by increasing numbers of advanced practice nurses (e.g., nurse practitioners) and physician assistants (PAs) entering the work force. Similar to physicians, non-physician clinical providers often pursue medical subspecialties and work in specialty practices, although this is more true for PAs than for advanced practice nurses.^{151,152,153} Also, like physicians, the percent of PAs practicing in rural areas has fallen, although a larger percent of PAs than physicians who practice in primary care are practicing in rural areas.¹⁵⁴ In contrast, there has been national growth in the number of primary care nurse practitioners practicing in rural areas.¹⁵⁵

FIGURE 31

Population per primary care provider in North Carolina



Notes: Primary care physicians, physician assistants, and nurse practitioners are defined as in Spero, J. C., & Galloway, E. M. (2019). Running the Numbers. *North Carolina Medical Journal*, 82(3), 186-190. Physicians with a primary area of practice of obstetrics/gynecology were weighted as 0.25 of a full-time equivalent (FTE) primary care practitioner. All other primary care physicians were weighted as 1 FTE. Primary care physician assistants, nurse practitioners, and certified nurse midwives were weighted as 0.75 FTE. Physician and physician assistant data are derived from licensure data provided by the North Carolina Medical Board. This analysis only includes physicians who are not residents-in-training and are not employed by the Federal government. Nurse practitioner and certified nurse midwife data is derived from licensure data provided by the North Carolina Board of Nursing. Data include active, licensed practitioners in practice in North Carolina as of October 31, 2017. Practitioners are assigned to counties based on primary practice location. County populations were adjusted for age and gender according to primary care use rates described in data from the Medical Expenditure Panel Survey. The raw (unadjusted) population data was from the NC Office of State Budget and Management (<https://www.osbm.nc.gov/demography-projections>).

**SHEPS HEALTH
WORKFORCE NC**

Disparities

Provider distribution is a critical barrier to meeting the primary care needs of the population. For a state where 1 in 5 residents lives in a rural area, this access barrier is particularly acute. Of the state's 100 counties, 40 counties have a primary care ratio that exceeds the recommended access threshold (see Figure 31).^{WW} At present, some incentives exist to encourage providers to relocate to rural communities, such as loan repayment. However, providers with families may be dissuaded by school systems with fewer resources, fewer career opportunities for partners or spouses, and slow economic development in rural areas, and may be concerned about the financial viability of opening practices when faced with low patient volumes.^{156,149}

2030 Target and Potential for Change

Currently, only 62 of North Carolina's 100 counties have a provider to population ratio of 1:1,500 or fewer. To set the target for this indicator, the group reviewed data across counties in North Carolina. Considerations included the fact that county borders do not limit access to health care (i.e., individuals can cross from one county to another to see their provider) and that it may not be possible for all counties in the state to meet the optimal 1:1,500 ratio. The group set the 2030 target of all counties being either at or below the 1:1,500 ratio or see a 25% decrease in provider to population ratio for counties that have not yet met the 1:1,500 ratio.^{XX} The aim toward decreasing, rather than meeting a specific ratio, is a more attainable goal for counties that currently have high population to provider ratios.

Levers for Change

- Support pipeline programs in rural areas to encourage high school and college students to pursue careers in medicine (Abernathy & Byerley, 2019)
- Identify rural provider champions and increase support for physicians in ongoing practice (Fraher & Spero, 2015)
- Increase residency positions in rural areas (Fraher & Spero, 2015)
- Invest in rural economies (Holmes, 2018)
- Increase telehealth primary care initiatives in rural areas (McGranaghan, 2018)
- Increase access and payment for specialist consults
- Support increased funding for provider loan repayment programs that incentivize primary care providers to practice in medically underserved areas

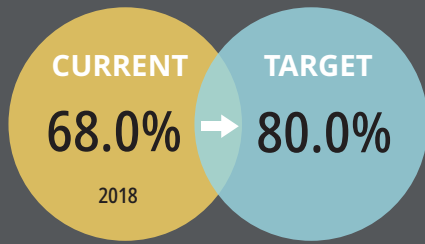
^{VV} Recommended provider to population ratio based on analysis by the Cecil G. Sheps Center for Health Services Research, which concluded that counties with ratios between 1:1,500 and 1:3,000 are likely to have populations that periodically experience delays in access to care or conditions that require them to seek primary care outside their county and counties with ratios of 3,000 or more will have populations with regular difficulties seeing a local practitioner and will require special programs or procedures to overcome the lack of local, in-county primary care access.

^{WW} Analysis and calculations by Spero, JC and Galloway, EM of the Cecil G. Sheps Center for Health Services Research.

^{XX} Achieving this goal by 2030 would mean that 20 of the 30 counties currently above the optimal primary care provider to population ratio would reach a ratio of 1:1,500 or lower by 2030. For those 11 counties that are closer to the 1:1,500 goal, a 25% decrease would bring them to ratios at or below the optimal 1:1,500. The 8 counties with the highest ratios would see meaningful increased access through a 25% decrease in their ratios.

HEALTH INDICATOR 18: **EARLY PRENATAL CARE**

DESIRED RESULT: **IMPROVE BIRTH OUTCOMES**



DEFINITION

Percent of women who receive pregnancy-related health care services during the first trimester of a pregnancy

DETAILS

First trimester is the first three months of pregnancy

NC EARLY PRENATAL CARE RATE (2018)

68.0%

2030 TARGET

80.0%

RANGE AMONG NC COUNTIES

41.4% - 86.9%

RANK AMONG STATES

Tied for 36th*

DATA SOURCE

NC State Center for Health Statistics, Vital Statistics

STATE PLANS WITH SIMILAR INDICATORS

Not Applicable

*Rank of 1st for state with greatest use of prenatal care

Rationale for Selection:

Receipt of early prenatal care is a protective factor for many negative health outcomes for mothers and their babies. In North Carolina, only 68% of pregnant women receive care within the first trimester. Those who do not receive care are disproportionately women of color and teenage mothers.

Context

Women who receive early prenatal care have lower rates of negative pregnancy outcomes such as low birth weight and infant death (see Page 32).¹⁵⁷ Early prenatal care services include screening for substance use, chronic conditions like diabetes and hypertension, and fetal abnormalities.¹⁵⁸ Wellness visits early in a pregnancy can also ensure that women are connected to social support systems and programs that can help them navigate their pregnancy safely and healthily.¹⁵⁸ In North Carolina, only 68% of pregnant women receive necessary early prenatal care services, a figure that falls below the national average of 77%.¹⁵⁹

“In North Carolina, only 68% of pregnant women receive necessary early prenatal care services, a figure that falls below the national average of 77%.”

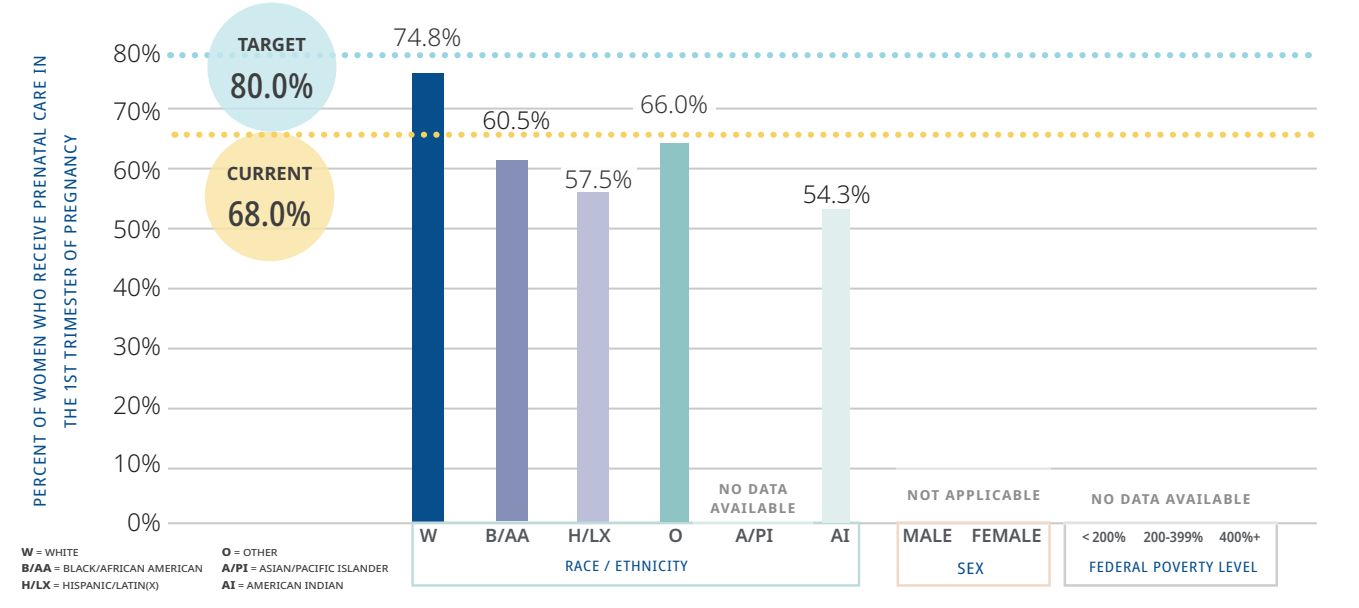
Disparities

There are sharp disparities between those who receive and do not receive early prenatal care in North Carolina. Income is a key indicator of whether a mother will receive early prenatal care, as low-income mothers may be uninsured^{160,159} and unaware of their Medicaid eligibility, or may lack the funds needed to seek care.¹⁵⁷ In North Carolina, Medicaid for Pregnant Women is available for women with incomes up to 200% of the federal poverty level for the duration of the pregnancy and ends 60 days postpartum.¹⁶¹ Medicaid for Pregnant Women covers prenatal care, delivery, postpartum care, childbirth classes, and services to treat conditions that may complicate pregnancy.¹⁶¹ Undocumented immigrant women are ineligible for Medicaid coverage of prenatal care, an option available under the Children’s Health Insurance Program and utilized by 16 states.

The age of the mother is associated with early initiation of prenatal care, with teenage mothers and mothers in their early 20s seeking early prenatal care at lower rates than older mothers.¹⁵⁹ Race and ethnicity are also associated with rates of early prenatal care. African American women, Hispanic women, and American Indian women are less likely to receive early prenatal care than their white counterparts (see Figure 32).^{162,45} In addition, studies show that implicit bias in health care delivery may prevent African American women from receiving sufficient patient education in the prenatal period about risks to maternal and fetal health,¹⁶³ and may also contribute to African American women’s increased risk of life-threatening conditions such as preeclampsia and postpartum hemorrhage.^{164,165,166}

FIGURE 32

Early prenatal care use across populations in North Carolina and distance to 2030 target



2030 Target and Potential for Change

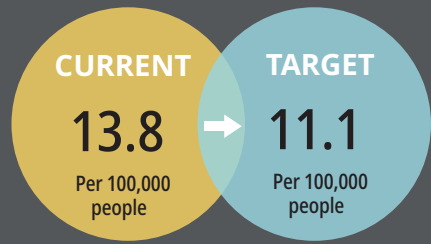
The HNC 2030 work group reviewed data across several years and a forecasted value for North Carolina based on historical data to develop a target for the percentage of women receiving early prenatal care. The group chose 80% of women receiving care in the first trimester as the target for 2030. This would reflect a reversal of a negative trend seen over the past 10 years and represent a substantial move toward ensuring that all pregnant women in the state get care within the first trimester of pregnancy.

Levers for Change

- Ensure group prenatal care, childbirth education, and doula services are covered services by Prepaid Health Plans
- Use community health workers to provide outreach and education to women of childbearing age in underserved communities
- Expand Medicaid eligibility
- Encourage workforce diversity and cultural competence in the delivery of prenatal care services
- Support quality improvement efforts to standardize treatment protocol to minimize provider bias
- Expand safe and reliable public transit options (PRAMS, 2005)
- Take advantage of the Children’s Health Insurance Program option to provide coverage for comprehensive prenatal care to undocumented immigrant women

HEALTH INDICATOR 19: **SUICIDE RATE**

DESIRED RESULT: **IMPROVE ACCESS AND TREATMENT FOR MENTAL HEALTH NEEDS**



DEFINITION

Age-adjusted number of deaths attributable to self-harm per 100,000 population

DETAILS

Not Applicable

NC SUICIDE RATE (2018)

13.8 per 100,000 people

2030 TARGET

11.1 per 100,000 people

RANGE AMONG NC COUNTIES (2014-2018 AVERAGE)

2.2 – 33.6 per 100,000 people

RANK AMONG STATES

16th*

DATA SOURCE

NC State Center for Health Statistics, Vital Statistics

STATE PLANS WITH SIMILAR INDICATORS

Not Applicable

*Rank of 1st for state with lowest suicide rate

Rationale for Selection:

Mental health and access to treatment services are often overlooked in our health care system. One indicator of mental health outcomes – suicide – has been on the rise for years. Some special populations, such as veterans and LGBTQ youth, have seen elevated rates of suicide that will require targeted prevention strategies.

Context

Suicide accounted for 1,499 deaths in North Carolina in 2018.¹⁶⁷ This corresponds with a national trend of rising suicide rates during the last decade.¹⁶⁸ The impact of suicide is felt on both the personal and community level. Family and friends of the deceased bear both emotional and financial burdens.¹⁶⁹ The state also shoulders a financial burden, losing an average of \$1.1 million in “lifetime medical and work loss cost” in 2017.¹⁶⁷

Suicide is inextricably linked to mental health care and well-being. Studies show that many persons who die of suicide either had diagnosed mental illnesses¹⁶⁹ or experienced high-stress traumas such as financial insecurity, housing instability, or physical illness.¹⁷⁰ Suicide is also connected with insurance status, as people who are uninsured or underinsured are less likely to seek mental health care and treatment for health conditions that may contribute to mental and financial strains.¹⁷¹ However, for those who are able to access care, one study has shown that suicide prevention strategies are not a large focus of mental health provider training.¹⁶⁹ Rather, strategies to treat underlying mental health conditions are emphasized, without specific attention to suicidal ideation or patient safety planning.¹⁶⁹ The suicide rate can be used as a downstream indicator of access to comprehensive high-quality health care.

Disparities

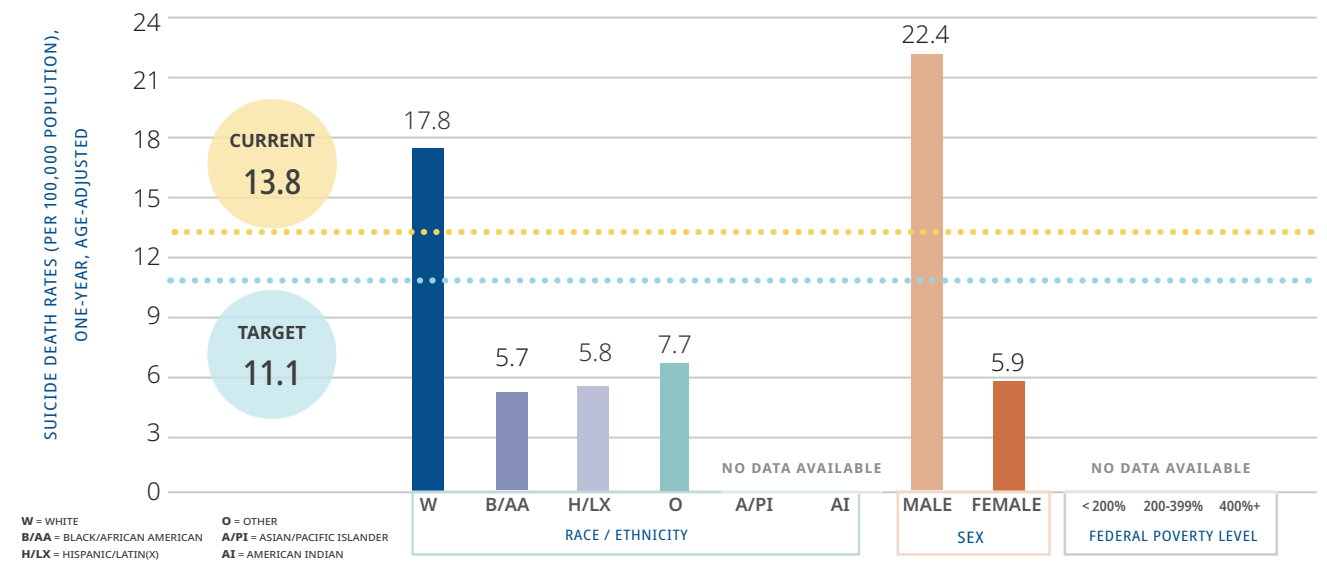
Suicide affects populations disproportionately based on gender, age, racial or ethnic group, and geography. Men, adults over the age of 45,¹⁷² American Indians and whites,¹⁴¹ and rural residents all face higher rates of suicide than their respective demographic counterparts.¹⁷³

The suicide rate among veterans is 1.5 times that of the non-veteran population.^{yy,174} Veterans face unique mental health, financial, and insurance coverage challenges that contribute to the increased rate within the population.¹⁷⁵ Veterans are also more likely to have access to firearms, a factor that increases the likelihood of fatal self-harm.^{176,175}

Elevated suicide rates are also seen in LGBTQ populations. There is no comprehensive data source for the suicide rate amongst LGBTQ persons, as sexual identity is not a component of death records. However, survey data indicates that among LGBTQ youth, the rate of suicidal ideation is 4.5 times higher than their heterosexual peers. Additionally, 40% of transgender adults report a suicide attempt.¹⁷⁷ This disparity is only magnified in the young adult population, and among racial and ethnic minorities.^{178,179} Discrimination, social

FIGURE 33

Suicide rate across populations in North Carolina and distance to 2030 target



ostracism, family rejection, financial barriers, and health care barriers all contribute to an increased mental health burden on this population that corresponds with an increased rate of suicidal behavior.¹⁷⁷

Suicide is also on the rise among children age 10-17 and is now the second leading cause of death among this age group with rates doubling over the past decade.^{180,181} In 2017, 8.2% of high schoolers reported they attempted suicide, with highest levels among African American high schoolers (11.1%), Hispanic high schoolers (9.3%), and high schoolers reporting their race as Other (17.9%).

2030 Target and Potential for Change

The HNC 2030 work group reviewed data across several years and projected the future trend of suicide rate to develop a target. The group chose 11.1 as the number of deaths per 100,000 population by 2030. As the age-adjusted suicide rate has risen steadily over the last decade in North Carolina, and is expected to continue rising, movement toward this target would represent a meaningful reversal in this trend.

Levers for Change

- Expand Medicaid eligibility criteria to increase access to mental health services
- Increase state funding for mental health services provided through local mental health systems
- Implement policies targeted to decrease access to lethal means
- Improve access to social services and other supports
- Increase programs that provide mental health services and support for LGBTQ youth
- Increase programs that provide mental health services and support for veterans
- Continue to support the integration of physical and mental health
- Expand access to tele-mental health services
- Create trauma informed schools with access to mental health providers

^{yy}This figure is adjusted by age and gender.

DEVELOPMENTAL MEASURES

The clinical care measures below are ones that the HNC 2030 group feels is important to population health but does not have data available at this time. A description of the data needed for this measure is listed as “developmental data needs.” State entities should consider identifying methods for collecting this data.

Social Determinants of Health Screening

The NC DHHS seeks to fundamentally change how we think about health and drivers of health. Rather than focusing just on the provision of health care, NC DHHS is highlighting the need to view health as a person’s well-being and to understand their social drivers of health status. One aspect of their work has been the development of a standardized set of questions related to food, housing, transportation, and interpersonal violence.²² This standardized set of questions is mandated for use by Medicaid managed care plans^{AAA} at enrollment of members. However, the NC DHHS is encouraging the adoption of the screening questions across all populations, regardless of insurance status. This data will provide information critical to painting a more accurate picture of the non-clinical health needs of residents. From a clinical perspective, measuring the implementation of the screening (i.e., percentage of patients with a completed social determinants of health screening in the past year) was viewed as a potentially important measure of clinical care.

Developmental data needs:

- With Medicaid managed care implementation beginning in winter 2020, there has been no systematic data collected and reported yet on the social determinants of health screenings for the population enrolled in Medicaid. Data should be collected on the use of the screening by managed care organizations and other insurance and health care providers, potentially through NC HealthConnex.
- De-identified statistics on the non-clinical health needs across populations would be useful to evaluate the drivers of health across the state into the future.

Underinsurance

Health insurance generally encourages people to use preventive health services and is meant to protect people from high medical bills. However, many people covered by health insurance face high deductibles and out-of-pocket spending for health care. These individuals are underinsured. People who are underinsured are less likely to access preventive services and can face challenges paying their medical bills. For example, a 2018 survey of Americans found that 25% of people who are underinsured did not fill a prescription (compared to 11% of people who are insured), 23% skipped recommended tests, treatments or follow-ups (10% insured), 24% did not see a doctor for a medical problem (11% insured), and 17% did not get needed specialty care (7% insured).¹⁸² The same survey found that the number of adults who are underinsured is increasing, with 29% in 2018 up from 23% in 2014.^{BBB,183} The largest growth in underinsurance is in employer-sponsored plans, with 28% of these plans leaving adults underinsured in 2018, compared to 20% in 2014.

Developmental data needs:

- Ongoing monitoring of the underinsured population in North Carolina through surveys would help to identify populations that are facing high out-of-pocket health care spending. This information would be useful for policy-making purposes.

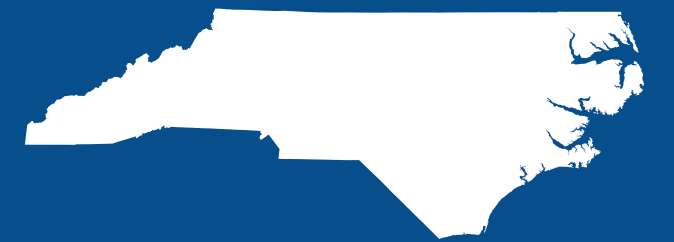
²² Screening for health-related social needs is a sensitive matter that should involve considerations of trust and privacy. To have a successful screening process, individuals being screened need to trust that their information is safe and will be shared in a limited way to improve their health or access to services. Screening should be non-judgmental, performed by trained staff, offered in private settings, and enhance access to services. The NCICOM Task Force on Accountable Care Communities made recommendations about ensuring individuals are informed about personal data collection and sharing. (NCICOM, 2019)

^{AAA} Instead of reimbursing health systems and providers directly, under Medicaid managed care NC DHHS will contract with Prepaid Health Plans (PHPs) to deliver health services to enrollees. PHPs will receive a monthly capitated payment for each enrollee. NC DHHS will provide monitoring and oversight of the PHPs, which will be required to meet quality and outcome metrics and other requirements. All PHPs will be required to use the standardized screening questions to measure beneficiary needs. Results will be used to determine the need for care management and will be shared with primary care providers.

^{BBB} The Commonwealth Fund survey defines underinsured as having yearly out-of-pocket costs, excluding premiums, that are 10% or more of household income, or equal to 5% or more of household income for people living under 200% of the Federal Poverty Level, or deductibles that are 5% or more of household income.

CHAPTER 7

HEALTH OUTCOMES



INTRODUCTION

The drivers of health discussed to this point— Social & Economic Factors, Physical Environment, Health Behaviors, and Clinical Care – along with genetic predispositions of individuals and the policies and programs that lay the context for our society, culminate in the quality and length of the lives we lead. These are our health outcomes, which encompass the physical and mental health and well-being of North Carolinians.

Throughout this report, the disparities discussed within each of the health indicators point to the ways that different populations face inequitable opportunities to achieve the best possible health. Race, ethnicity, geography, sex, age, sexual orientation, veteran status, and poverty level are just some of the qualities that influence the drivers of our health and well-being. The HNC 2030 group chose two health outcome indicators that together provide a bellwether for the state of health of North Carolinians—infant mortality and life expectancy. These indicators highlight the disparate realities we see in health outcomes across the state. By looking at these two indicators, and their changes over time, the impact of efforts to improve health and well-being can be seen for the population as a whole and for subpopulations.

HEALTH INDICATORS:

20 INFANT MORTALITY RATE

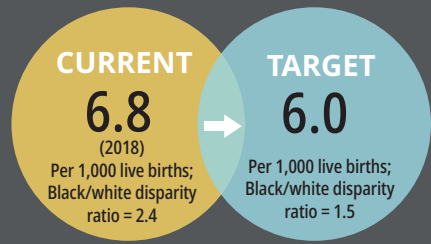
Decrease Infant Mortality

21 LIFE EXPECTANCY

Increase Life Expectancy

HEALTH INDICATOR 20: **INFANT MORTALITY RATE**

DESIRED RESULT: **DECREASE INFANT MORTALITY**



DEFINITION

Rate of infant deaths per 1,000 live births

DETAILS

Deaths are counted if they occur within the first year of life

NC INFANT MORTALITY (2018)

6.8 per 1,000 live births
Black/white disparity ratio = 2.4

2030 TARGET

6.0 per 1,000 live births
Black/white disparity ratio = 1.5

RANGE AMONG NC COUNTIES

0.0 – 22.2 per 1,000 live births

RANK AMONG STATES

Tied for 40th*

DATA SOURCE

NC State Center for Health Statistics, Vital Statistics

STATE PLANS WITH SIMILAR INDICATORS

Early Childhood Action Plan - indicator of infant mortality disparity

*Rank of 1st for state with lowest infant mortality rate

Rationale for Selection:

Infant mortality is a common proxy for overall community health and health disparities and the health of infants reflects the health of the next generation. North Carolina has a higher infant mortality rate than the country as a whole and, in particular, babies born to African American and American Indian women are more likely to die in the first year of life than babies born to white women.

Context

Infant mortality is not only an indicator of maternal and child health, it is often looked to as an indicator of the health of a community.¹⁸⁴ This is because many of the factors that influence rates of infant mortality reflect the health equity of a community. These include maternal health and educational status, prenatal care, and social and economic factors of the child's family.

The primary predictors of infant health are gestational age at birth and birth weight, and there are many contributing factors to these outcomes.¹⁸⁵ Higher rates of low birth weight and infant mortality are associated with:

- Smoking or heavy consumption of alcohol while pregnant^{186,187}
- Maternal age - younger (under 20 years) and older mothers (40-54 years)¹⁸⁵
- Maternal obesity^{188,189}
- Maternal educational status of less than a high school degree¹⁹⁰
- Unmarried parents¹⁸⁵
- Intimate partner violence¹⁵⁵
- Food insecurity¹⁵⁵

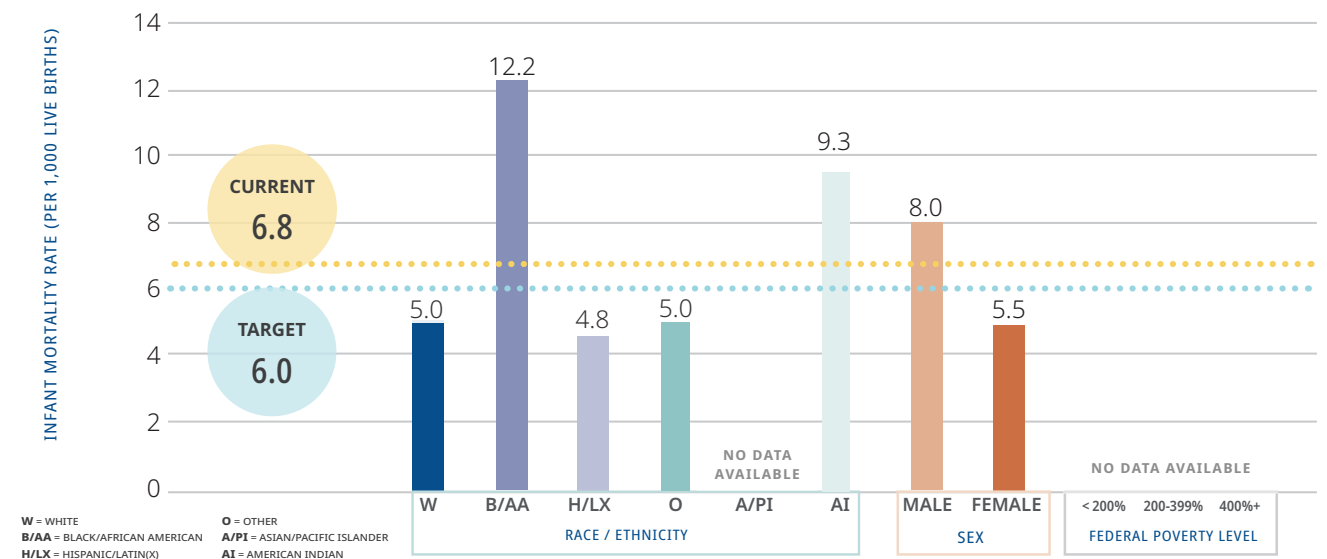
“Even for African American women who attain a higher socioeconomic status, pregnancy-related outcomes are worse than those of white women at lower socioeconomic levels.”

Disparities

The United States, and North Carolina specifically, have struggled to keep pace with the improvements in maternal and infant health that have occurred in other developed countries. One reason for this is the large disparity seen in infant mortality for babies born to African American and American Indian women, who are more likely to die in the first year of life than babies born to white women.⁴⁵ In particular, the disparity between babies born to African American women and those born to white women is persistently high across time. Women of color are more likely to live in communities that have fewer educational resources and employment opportunities due to historical segregation through housing and education policies. Women of color also face accumulated stress of discrimination regardless of socioeconomic status (i.e., “weathering,” see Page 31 in Introduction). These socioeconomic factors are linked to birth outcomes and infant mortality. In addition, research shows that even for African American women who attain a higher socioeconomic status, pregnancy-related outcomes are worse than those of white women at lower socioeconomic levels.¹⁹¹ Inside the medical system, disparate treatment of mothers of color may also play a role in worse birth outcomes. Studies show that implicit bias in health care delivery may prevent women of color from receiving sufficient patient education in the prenatal period about risks to maternal and fetal health.¹⁶³

FIGURE 34

Infant mortality rates across populations in North Carolina and distance to 2030 target



Disparities in infant mortality also exist for babies born to women in poverty and those who are uninsured. Women in poverty experience more challenging life circumstances, have lower educational attainment, are more likely to have limited access to adequate food, transportation, and housing, and are more likely to be uninsured than those not experiencing poverty. These populations are also more likely to have limited access to health care services. Even though Medicaid covers prenatal care and births for low-income uninsured women, birth outcomes and subsequent infant mortality are not fully addressed by the care they receive during pregnancy because of the many social and health factors these women face prior to becoming pregnant.¹⁹² Furthermore, in NC, women who are undocumented immigrants are ineligible for Medicaid during pregnancy, severely restricting their access to care.

2030 Target and Potential for Change

The HNC 2030 group reviewed data across several years, populations, and states, and a forecasted value for North Carolina based on historical data to set a target for 2030. While the overall infant mortality rate has decreased over the past decade, the disparity ratio between whites and African Americans has grown (currently 2.4), meaning that the infant mortality rate has improved much faster for white babies. With this in mind, the group chose an overall infant mortality target of 6.0 per 1,000 live births for 2030, as well as a target to decrease the Black/white disparity ratio to 1.5. Meeting this target will be largely dependent upon drastically reducing the disparities we see in infant mortality rates for African Americans and American Indians.

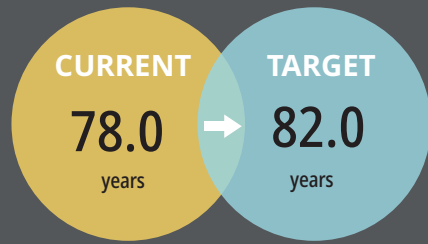
Levers for Change

(America's Health Rankings, Infant Mortality, 2018)

- Increase access to health insurance
- Improve male and female pre-conception routine medical check-ups and family planning counseling with a focus on intimate partner violence, substance use, immunizations, depression, body mass index, blood pressure, and diabetes
- Improve access to, and use of, prenatal care, Centering Pregnancy Programs, and evidence-based home visiting programs
- Reduce maternal obesity
- Reduce maternal tobacco use before, during, and after pregnancy (Ward, 2003)
- Take advantage of the Children's Health Insurance Program option to provide coverage for comprehensive prenatal care to undocumented immigrant women
- Follow the recommendations of the Perinatal Health Strategic Plan

HEALTH INDICATOR 21: LIFE EXPECTANCY

DESIRED RESULT: INCREASE LIFE EXPECTANCY



DEFINITION

Average number of years of life remaining for persons who have attained a given age

DETAILS

Life expectancy listed is for a person born in that year

NC LIFE EXPECTANCY (2016-18)

78.0 years

2030 TARGET

82.0 years

RANGE AMONG NC COUNTIES

73.1 – 82.1 years

RANK AMONG STATES

Not Available

DATA SOURCE

NC State Center for Health Statistics, Vital Statistics

STATE PLANS WITH SIMILAR INDICATORS

Not Applicable

Rationale for Selection:

Life expectancy is a proxy measure for the total health of a population. Disparities in life expectancy between populations point to areas where issues of health equity must be addressed.

Context

The ultimate measure of health that many people consider when thinking of population health is life expectancy. For most of human history, average life expectancy has steadily increased with improvements in health care, sanitary conditions, decreases in disease epidemics, and improved safety measures. Yet, in the past several years, the United States average life expectancy has been slowly creeping down, from 78.9 years in 2014 to 78.6 in 2017.¹⁹³ This is due to an increase in deaths from drug overdose and suicide.¹⁹⁴ The 2016-18 state average life expectancy was 78.0, with similar decreases as the national average (2014 life expectancy: 78.3). The top three causes of years of life lost in North Carolina are ischemic heart disease; trachea, bronchus, and lung cancers; and road injuries. Self-harm and drug use disorders rank sixth and seventh, respectively, in top causes, mirroring the national trends impacting overall life expectancy.

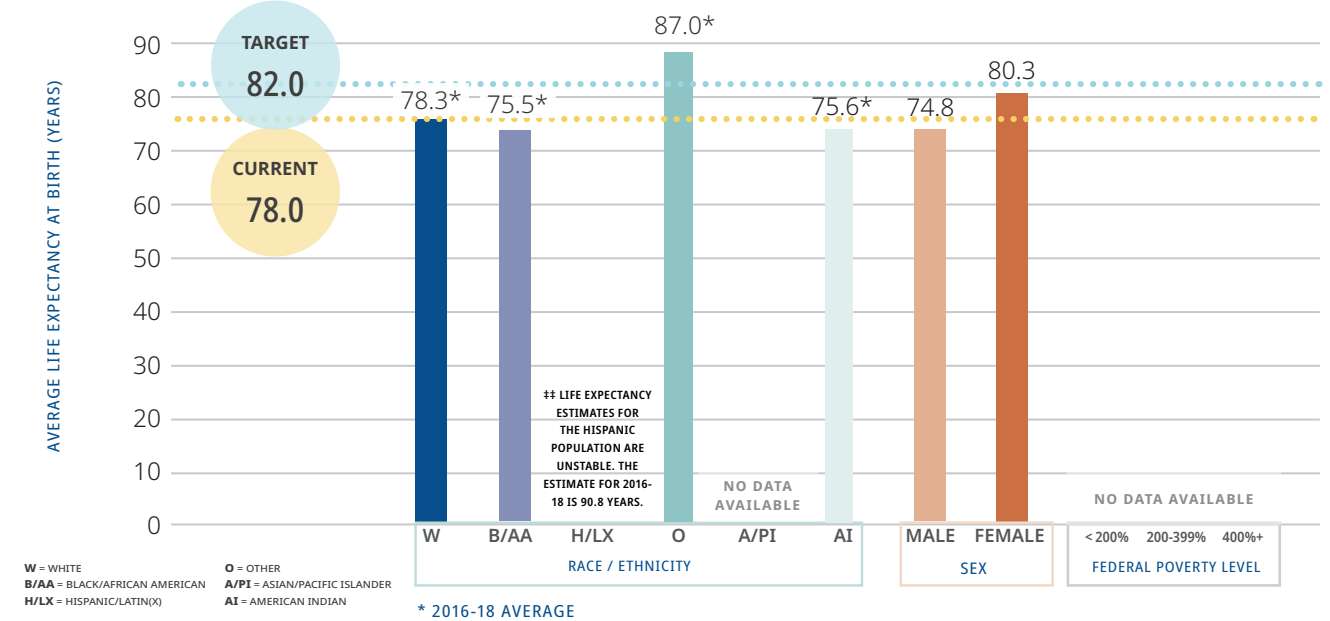
Disparities

There are stark disparities in life expectancy across race, geography, and gender, as well as intersections of these characteristics that show wide gaps between groups. African Americans, American Indians, people in rural areas, and men typically have lower life expectancies than the average. Among African Americans (including those of Hispanic ethnicity), the average life expectancy for women (79.0 years) is slightly above the state average (78.0 years), although lower than the average for white women (including those of Hispanic ethnicity) (81.1 years).¹⁹⁵ For African American men (including those of Hispanic ethnicity) the average is much lower at 72.2 years compared to 76.5 years for white men (including those of Hispanic ethnicity).¹⁹⁵ The disparities for African Americans compared to whites are due in part to issues stemming from limited health care access,¹⁹⁶ lack of trust in medical professionals, social and economic factors like racism (e.g., weathering, see Page 31 in Introduction) and unemployment,¹⁹⁶ and firearm deaths of younger African American men.¹⁹⁷ On the other hand, Hispanic populations see the higher life expectancies despite lower average socioeconomic status. This is largely due to lower rates of smoking, leading to lower cancer and cardiovascular disease mortality in adults, but also lower rates of suicide and accidental poisoning among young Hispanics compared to whites.¹⁹⁸

Geographic disparities are also clear across North Carolina (See Figure 36). People born in Swain County have the lowest life expectancy (average for 2016-18) at 73.1 years, while those in Orange County have the highest at 82.1 years. Factoring race and geography together reveals the multiple levels of disparities. Life expectancy for the white population in Swain is 75.6 years and is 67.5 years for the American Indian population. In Orange County the life expectancy for the white population is 83.1 years compared to 75.2 years for the African American population in the same county.¹⁹⁹

FIGURE 35

Life expectancy across populations in North Carolina and distance to 2030 target



2030 Target and Potential for Change

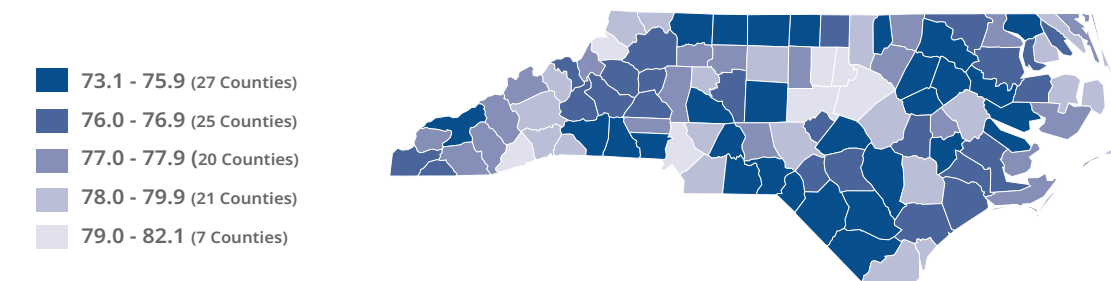
The HNC 2030 group reviewed data across several years, populations, and states, and a forecasted value for North Carolina based on historical data to set a target for 2030. With the best life expectancy (average for 2016-18) in North Carolina currently at 82.1^{fff} years in Orange County the group chose to set an aggressive target of 82.0 years for the population overall for 2030. If improvements are made across the health indicators discussed in this report, overall life expectancy will likely see an increase. Increases toward this target will be seen as success, particularly as they will signal a change in the downward trend seen over the past several years.

Levers for Change

- See Levers for Change throughout this report

FIGURE 36

Average Life Expectancy for People in North Carolina Counties, 2016-2018



Source: North Carolina State Center for Health Statistics; <https://schs.dph.ncdhhs.gov/data/lifexpectancy/2016-2018/2018%20State%20and%202016-2018%20County%20Life%20Expectancies%20at%20birth.html>
 Note: Life expectancy is the average number of additional years that someone at a given age would be expected to live if current mortality conditions remained constant throughout their lifetime.

^{ddd} The life expectancy averages listed here are averaged across three years, 2016 to 2018.

^{eee} Estimated life expectancy for the Hispanic population in North Carolina for 2016 to 2018 is 90.8 years. This estimate has been excluded from the HNC 2030 report data presentation because of concerns that it may be unreliable.

^{fff} North Carolina State Center for Health Statistics, 2016-2018 County Life Expectancy at Birth, North Carolina Counties. <https://schs.dph.ncdhhs.gov/data/lifexpectancy/2016-2018/2018%20State%20and%202016-2018%20County%20Life%20Expectancies%20at%20birth.html>

CONCLUSION

The HNC 2030 objectives and health indicators will help to guide state and local efforts over the next decade to ensure everyone in North Carolina can live the healthiest life possible. The process and framework of the HNC 2030 efforts reflect the desire to gather community input and select health indicators across a wide range of topics that drive health. Decision-makers in the HNC 2030 process sought to highlight key issues of health disparities and health inequities within our state for people across race, ethnicity, geographic location, sex, and poverty level.

Overall, 21 health indicators were chosen across the topics of Social & Economic Factors, Physical Environment, Health Behaviors, Clinical Care, and Health Outcomes. Many of these indicators have not traditionally been considered in the work of public health, including reading proficiency, incarceration rates, housing problems, and employment. Yet, it is clear from growing research that these issues play a very large role in the opportunities people have to make healthy choices for their lives, and in some cases directly impact health outcomes.

Each section of this report included statewide data and “Levers for Change,” yet it is important to remember that many of these issues vary widely on the local level. County-level data provides the best picture of the issues faced within communities, and even still, it is vital to dig deeper into that data to see variances across race, ethnicity, income, and other factors.^{GGG} An overall unemployment rate or teen birth rate does not show the disparities that exist across groups. We encourage counties and communities to look at all available information for their populations to understand where efforts are needed to improve the drivers of health.

Addressing the variety of topics that affect how we live, learn, work, play, and age will require the collaboration of leadership across public health and other sectors. Community-based cross-sector partnerships will be key to addressing the range of HNC 2030 objectives. People who work at the community level understand the specific issues that an area faces and what partners are needed to affect change. Partnerships should include community members impacted by an issue and stakeholders such as public health, health care, business, education, law enforcement, transportation, and housing, to name a few.

As the new decade begins, the NC DHHS and DPH will be developing a population health improvement strategy and resources to be used at the local level. HNC 2030 is intended to be a road map not just for NC DHHS, but for the whole state, including state agencies that may not think of their role as traditionally aligned with health. The broader view of the drivers of health and well-being with attention to health disparities will help make North Carolina a place for everyone to live a healthy life.

REFERENCES

- Centers for Disease Control and Prevention. National Center for Chronic Disease Prevention and Health Promotion. Health Equity. Accessed September 1, 2019. <http://www.cdc.gov/chronicdisease/healthequity/index.htm>
- Glanz K, Rimer BK, Viswanath K. *Health Behavior: Theory, Research, and Practice*. 5th ed. (Jossey-Bass, ed.). San Francisco, California. 2015.
- North Carolina Office of Minority Health and Health Disparities. *Racial and Ethnic Health Disparities in North Carolina: North Carolina Health Equity Report 2018*. 2018. https://schs.dph.ncdhhs.gov/SCHS/pdf/MinorityHealthReport_Web_2018.pdf.
- National Institutes of Health Intramural Research Program. Health Disparities. <https://irp.nih.gov/our-research/scientific-focus-areas/health-disparities>. Accessed October 16, 2018.
- County Health Rankings Model, County Health Rankings & Roadmaps. <https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model>. Accessed October 1, 2019.
- Tilson E. *North Carolina Department of Health and Human Services' Vision for Buying Health. Presentation to the North Carolina Institute of Medicine Task Force on Accountable Care Communities*. 2018. http://nciom.org/wp-content/uploads/2018/03/Tilson_NC-DHHS_Presentation_3.5.2018.pdf.
- DeSalvo KB, Claire WY, Harris A, Auerbach J, Koo D, O'Carroll P. Public Health 3.0: A Call to Action for Public Health to Meet the Challenges of the 21st Century. *Preventing Chronic Disease*. 2017;14(9). doi:10.5888/pcd14.170017.
- Chetty R, Stepner M, Abraham S, Lin S, Scuder B, Turner N, Bergeron A, Cutler D. The Association Between Income and Life Expectancy in the United States, 2001-2014. *Journal of the American Medical Association*. 2016;315(16):1750-1766. doi:10.1001/jama.2016.4226.
- Adler NE, Newman K. Socioeconomic Disparities in Health: Pathways and Policies. *Health Affairs*. 2002;21(2):60-76. doi:10.1377/hlthaff.21.2.60.
- Braveman P, Gottlieb L. The Social Determinants of Health: It's Time to Consider the Causes of the Causes. *Public Health Reports*. 2014;129 Suppl:19-31. doi:10.1177/003335491412915206.
- Gee GC, Ford CL. Structural Racism and Health Inequities: Old Issues, New Directions. *Du Bois Rev*. 2011;8(1):115-132. doi:10.1017/S1742058X11000130.
- Bailey ZD, Krieger N, Agénor M, Graves J, Linos N, Bassett MT. Structural Racism and Health Inequities in the USA: Evidence and Interventions. *Lancet* (London, England). 2017;389(10077):1453-1463. doi:10.1016/S0140-6736(17)30569-X.
- Nordstrom K. *Stymied by Segregation: How Integration Can Transform North Carolina Schools and the Lives of its Students*. 2018. <https://www.ncjustice.org/wp-content/uploads/2018/11/STYMIED-BY-SEGREGATION-Integration-can-Transform-NC-FINAL-web.pdf>.
- Bayer P, Ferreira F, Ross S. *What Drives Racial and Ethnic Differences in High Cost Mortgages? The Role of High Risk Lenders*. NBER Working Paper No. 22004. February 2016. <https://www.nber.org/papers/w22004.pdf>.
- American College of Physicians. *Racial and Ethnic Disparities in Health Care*, Updated 2010. Philadelphia: American College of Physicians' 2010: Policy Paper. (Available from American College of Physicians, 190 N. Independence Mall West, Philadelphia, PA 19106).
- Fiscella K, Sanders MR. Racial and Ethnic Disparities in the Quality of Health Care. *Annual Review of Public Health*. 2016;37(1):375-394. doi:10.1146/annurev-publhealth-032315-021439.

^{GGG} The most recent county-level data for HNC 2030 indicators as of publication can be found on the NCIOM website with the electronic version of this report.

17. Youmans Q, Hastings-Spaine L, Princewill O, Shobayo T, Okwuosa I. Disparities in Cardiovascular Care: Past, present, and Solutions. *Cleveland Clinic Journal of Medicine*. 2019;86(9):621-632. <https://www.mdedge.com/ccjm/article/206853/cardiology/disparities-cardiovascular-care-past-present-and-solutions>.
18. Geronimus AT, Hicken M, Keene D, Bound J. "Weathering" and Age Patterns of Allostatic Load Scores Among Blacks and Whites in the United States. *American Journal of Public Health*. 2006;96(5):826-833. doi:10.2105/AJPH.2004.060749.
19. Ross CE, Chia-Ling Wu. The Links Between Education and Health. *American Sociological Review*. 1995;60(5):719-745. doi:10.2307/2096319.
20. Pager D. The Mark of a Criminal Record. *American Journal of Sociology*. 2003;108(5):937-975.
21. Office of Disease Prevention and Health Promotion. Poverty. <https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-health/interventions-resources/poverty#7>. Accessed August 15, 2019.
22. Dubay L, Simon SM, Zimmerman E, Luk KX, Woolf SH. *How Are Income and Wealth Linked to Health And Longevity?* Urban Institute. Virginia Commonwealth University Center on Society and Health. 2015. <https://www.urban.org/sites/default/files/publication/49116/2000178-How-are-Income-and-Wealth-Linked-to-Health-and-Longevity.pdf>. Accessed September 30, 2019.
23. Cunningham TJ, Croft JB, Liu Y, Lu H, Eke PI, Giles WH. Vital Signs: Racial Disparities in Age-Specific Mortality Among Blacks or African Americans — United States, 1999–2015. *Morbidity and Mortality Weekly Report*. 2017;66(17):444-456. doi:10.15585/mmwr.mm6617e1.
24. Seervai S, Lewis C. *Listening to Low-Income Patients: Mental Health Stigma Is a Barrier to Care*. March 20, 2018. <https://www.commonwealthfund.org/publications/other-publication/2018/mar/listening-low-income-patients-mental-health-stigma-barrier>.
25. Deaton A. *Health, Income, and Inequality*. The National Bureau of Economic Research. <https://www.nber.org/reporter/spring03/health.html>. Accessed September 30, 2019.
26. United States Census Bureau. American Fact Finder. American Community Survey. <https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>. Published 2017. Accessed May 22, 2019.
27. Office of the Assistant Secretary of Planning and Evaluation. 2019 Poverty Guidelines. <https://aspe.hhs.gov/2019-poverty-guidelines>. Accessed November 24, 2019.
28. United States Census Bureau. Income and Poverty in the United States: 2017. <https://www.census.gov/library/publications/2018/demo/p60-263.html>. Accessed September 30, 2019.
29. Henry J. Kaiser Family Foundation. Distribution of the Total Population by Federal Poverty Level (above and below 200% FPL). <https://www.kff.org/other/state-indicator/population-up-to-200-fpl/?currentTimeframe=0&selectedDistributions=under-200percent&sortModel=%7B%22colId%22:%22Under 200%25%22,%22sort%22:%22asc%22%7D>. Accessed November 24, 2019.
30. Rantakeisu U, Starrin B, Hagquist C. Unemployment: A Double Burden and a Public Issue. *Social Justice Research*. 1997;10(2):153-173. doi:10.1007/BF02683310.
31. Paul KI, Moser K. Unemployment Impairs Mental Health: Meta-analyses. *Journal of Vocational Behavior*. 2009;74(3):264-282. doi:10.1016/j.jvb.2009.01.001.
32. County Health Rankings & Roadmaps. Unemployment. <https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model/health-factors/social-and-economic-factors/employment/unemployment>. Accessed September 30, 2019.
33. Crowder JA, Bastien A, Stephens P, Treuhaft S, Scoggins J. *Advancing Employment Equity in Rural North Carolina*. 2018. <http://plcyk.org/2ApazHr>. Accessed September 30, 2019.
34. Couloute L, Kopf D. Out of Prison & Out of Work: Unemployment Among Formerly Incarcerated People. <https://www.prisonpolicy.org/reports/outofwork.html>.
35. Travis J, Western B, Redburn S. *The Growth of Incarceration in the United States: Exploring Causes and Consequences*. National Academies Press. 2014. doi:10.17226/18613.
36. Gordon N. *Disproportionality in Student Discipline: Connecting Policy to Research*. January 18, 2018. <https://www.brookings.edu/research/disproportionality-in-student-discipline-connecting-policy-to-research/>.
37. Egerter S, Braveman P, Sadegh-Nobari T, Grossman-Kahn R, Dekker M. *Education and Health*. April 2, 2011. <https://www.rwjf.org/en/library/research/2011/05/education-matters-for-health.html>.
38. Skiba RJ, Horner RH, Chung C-G, Rausch MK, May SL, Tobin T. Race Is Not Neutral: A National Investigation of African American and Latino Disproportionality in School Discipline. *School Psychology Review*. 2011;40(1):85-107.
39. North Carolina Department of Public Instruction. March 15, 2019. Report to the North Carolina General Assembly. Consolidated Data Report 2017-18. <http://www.ncpublicschools.org/docs/research/discipline/reports/consolidated/2017-18/consolidated-report.pdf>.
40. Kennedy JE, Chance M. *Collateral Damage: How Mass Incarceration Increases Poverty and Crime in North Carolina's Poorest African American Communities*. August 2011. <https://www.yumpu.com/en/document/view/4484815/collateral-damage-how-mass-incarceration-increases-poverty-and->.
41. Thomas JC, Torrone E. Incarceration as Forced Migration: Effects on Selected Community Health Outcomes. *American Journal of Public Health*. 2006;96(10):1762-1765. doi:10.2105/AJPH.2005.081760.
42. Dumont DM, Brockmann B, Dickman S, Alexander N, Rich JD. Public Health and the Epidemic of Incarceration. *Annual Review of Public Health*. 2012;33(1):325-339. doi:10.1146/annurev-publhealth-031811-124614.
43. Committee on Causes and Consequences of High Rates of Incarceration; Committee on Law and Justice; Division of Behavioral and Social Sciences and Education; National Research Council; Board on the Health of Select Populations; Institute of Medicine. 2013. *Health and Incarceration: A Workshop Summary*. Washington, D.C. <https://www.nap.edu/read/18372/chapter/2>.
44. Department of Public Safety Division of Adult Correction and Juvenile Justice Task Force on Sentencing Reforms for Opioid Drug Convictions. Presentation to Task Force on Sentencing Reforms for Opioid Drug Convictions. March 6, 2018. [https://www.ncleg.gov/documents/sites/committees/BCCI-6684//March 6, 2018/Powerpoint 02 - DPS_Snapshot of Current Incarceration Statistics_030618 \(002\).pdf](https://www.ncleg.gov/documents/sites/committees/BCCI-6684//March 6, 2018/Powerpoint 02 - DPS_Snapshot of Current Incarceration Statistics_030618 (002).pdf). Accessed September 30, 2019.
45. North Carolina State Center for Health Statistics. Vital Statistics. <https://schs.dph.ncdhhs.gov/data/provisional/Birth/2017/CY2017 PB17 Resident Births by PNC.html>. Published 2017. Accessed August 15, 2019.
46. The Sentencing Project. State-by-State Data. <https://www.sentencingproject.org/the-facts/#map?dataset-option=SIR>. Accessed September 30, 2019.

47. McGuire H. North Carolina Prison Population Figures and Demographics - Infogram. <https://infogram.com/north-carolina-prison-population-figures-and-demographics-1g6qo2q93o1wm78>. Accessed September 30, 2019.
48. Centers for Disease Control and Prevention. About Adverse Childhood Experiences. April 9, 2019. <https://www.cdc.gov/violenceprevention/childabuseandneglect/acestudy/aboutace.html>. Accessed October 1, 2019.
49. Merrick MT, Ford DC, Ports KA, et al. Vital Signs: Estimated Proportion of Adult Health Problems Attributable to Adverse Childhood Experiences and Implications for Prevention — 25 States, 2015–2017. *Morbidity and Mortality Weekly Report*. 2019;68(44). doi:10.15585/mmwr.mm6844e1.
50. Child and Adolescent Health Measurement Initiative. 2016-2017 National Survey of Children's Health (NSCH) Data Query. Data Resource Center for Child and Adolescent Health Supported by Cooperative Agreement U59MC27866 from the U.S. Department of Health and Human Services, Health Resources and Services Administration's Maternal and Child Health Bureau (HRSA MCHB). www.cahmi.org. Accessed July 23, 2019.
51. Annie E. Casey Foundation. Reading by Third Grade. January 1, 2010. <https://www.aecf.org/resources/early-warning-why-reading-by-the-end-of-third-grade-matters/>. Accessed September 30, 2019.
52. Rumberger RW. Poverty and High School Dropouts. May 2013. <https://www.apa.org/pi/ses/resources/indicator/2013/05/poverty-dropouts>. Accessed October 1, 2019.
53. DeWalt DA, Berkman ND, Sheridan S, Lohr KN, Pignone MP. Literacy and Health Outcomes: A Systematic Review of the Literature. *Journal of General Internal Medicine*. 2004;19(12):1228-1239. doi:10.1111/j.1525-1497.2004.40153.x.
54. Berkman N, Dewalt D, Pignone M, et al. Literacy and Health Outcomes: Summary. 2004. <https://www.ncbi.nlm.nih.gov/books/NBK11942/>.
55. K-3 North Carolina Assessment Think Tank. Assessment for Learning and Development in K-3. 2013. <http://www.ncpublicschools.org/docs/earlylearning/k3assessment/oel-think-tank.pdf>.
56. North Carolina Department of Public Instruction. North Carolina School Report Cards. <https://ncreportcards.ondemand.sas.com/src>. Accessed August 30, 2019.
57. United States Department of Health and Human Services. Physical Activity Guidelines for Americans 2nd Edition. 2018. https://health.gov/paguidelines/second-edition/pdf/Physical_Activity_Guidelines_2nd_edition.pdf.
58. Angraal S, Gupta A, Khera R, Nasir K, Desai NR. Association of Access to Exercise Opportunities and Cardiovascular Mortality. *American Heart Journal*. 2019;212:152-156. doi:10.1016/j.ahj.2019.02.010.
59. Keith NC, Mi D, Alexander K, Kaiser S, de Groot M. PARCS: A Safety Net Community-based Fitness Center for Low-income Adults. *Progress in Community Health Partnerships: Research, Education, and Action*. 2016;10(2):185-195. doi:10.1353/cpr.2016.0038.
60. Park T, Eyler AA, Tabak RG, Valko C, Brownson RC. Opportunities for Promoting Physical Activity in Rural Communities by Understanding the Interests and Values of Community Members. *Journal of Environmental and Public Health*. 2017. doi:10.1155/2017/8608432.
61. North Carolina Office on Disability and Health. Removing Barriers to Health Clubs and Fitness Facilities A Guide for Accommodating All Members, Including People with Disabilities and Older Adults. 2008. https://fpg.unc.edu/sites/fpg.unc.edu/files/resources/other-resources/NCODH_RemovingBarriersToHealthClubs.pdf. Accessed September 30, 2019.
62. Farrigan T, Hamrick K, Hopkins D, et al. Access to Affordable and Nutritious Food Measuring and Understanding Food Deserts and Their Consequences. June 2009. https://www.ers.usda.gov/webdocs/publications/42711/12716_ap036_1_.pdf.
63. Bleich SN, Jones-Smith J, Wolfson JA, Zhu X, Story M. The Complex Relationship Between Diet and Health. *Health Affairs*. 2015;34(11):1813-1820. doi:10.1377/hlthaff.2015.0606.
64. Seligman HK, Berkowitz SA. Aligning Programs and Policies to Support Food Security and Public Health Goals in the United States. *Annual Review of Public Health*. 2019;40(1):319-337. doi:10.1146/annurev-publhealth-040218-044132.
65. Evans A, Banks K, Jennings R, et al. Increasing Access to Healthful Foods: A Qualitative Study With Residents of Low-income Communities. *International Journal of Behavioral Nutrition and Physical Activity*. 2015;12(1). doi:10.1186/1479-5868-12-S1-S5.
66. Centers for Disease Control and Prevention. CDC National Health Report Highlights. <https://www.cdc.gov/healthreport/publications/compendium.pdf>. Accessed September 30, 2019.
67. County Health Rankings & Roadmaps. 2019 County Health Rankings Report: North Carolina. 2019. https://www.countyhealthrankings.org/sites/default/files/state/downloads/CHR2019_NC.pdf.
68. Food Research & Action Center. Why Low-income and Food-insecure People Are Vulnerable to Poor Nutrition and Obesity. https://www.opportunityhome.org/wp-content/uploads/2018/04/frac_org.pdf. Published 2019. Accessed July 2, 2019.
69. County Health Rankings & Roadmaps. Food environment index. <https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model/health-factors/health-behaviors/diet-exercise/food-environment-index>. Accessed September 30, 2019.
70. The Food Trust. The Grocery Gap, Who Has Access to Healthy Food and Why It Matters. 2010. http://thefoodtrust.org/uploads/media_items/grocerygap.original.pdf.
71. Caspi CE, Pelletier JE, Harnack LJ, Erickson DJ, Lenk K, Laska MN. Pricing of Staple Foods at Supermarkets Versus Small Food Stores. *International Journal of Environmental Research and Public Health*. 2017;14(8). doi:10.3390/ijerph14080915.
72. Taylor L. Housing and Health: An Overview of the Literature. *Health Affairs*. June 7, 2018. <https://www.healthaffairs.org/doi/10.1377/hpb20180313.396577/full/>.
73. Ganesh B, Scally CP, Skopec L, Zhu J. *The Relationship Between Housing and Asthma Among School-Age Children*. October 16, 2017. <https://www.urban.org/research/publication/relationship-between-housing-and-asthma-among-school-age-children>
74. Braveman P, Dekker M, Egerter S, Sadegh-Nobari T PC. *How Does Housing Affect Health?* <https://www.rwjf.org/en/library/research/2011/05/housing-and-health.html>. Accessed July 1, 2019.
75. Centers for Disease Control and Prevention. Chapter 2: Basic Principles of Healthy Housing. Healthy Housing Reference Manual. October 1, 2009. <https://www.cdc.gov/nceh/publications/books/housing/cha02.htm>.
76. Rohe W, Owen T, Kerns S. Extreme Housing Conditions In North Carolina. February 2017. <https://curs.unc.edu/files/2017/02/Extreme-Housing-Conditions-in-North-Carolina.pdf>.
77. Maqbool N, Viveiros J, Ault M. The Impacts of Affordable Housing on Health: A Research Summary. 2015. www.greenandhealthyhomes.org. Accessed September 30, 2019.
78. Miewald C, Ostry A. A Warm Meal and a Bed: Intersections of Housing and Food Security in Vancouver's Downtown Eastside. *Housing Studies*. 2014;29(6):709-729. doi:10.1080/02673037.2014.920769.

79. University of North Carolina Center for Civil Rights. *The State of Exclusion: An Empirical Analysis of the Legacy of Segregated Communities in North Carolina*. 2013. <http://www.uncinclusionproject.org/documents/stateofexclusion.pdf>.
80. County Health Rankings & Roadmaps. Severe Housing Problems in North Carolina. <https://www.countyhealthrankings.org/app/north-carolina/2019/measure/factors/136/datasource>. Accessed September 30, 2019.
81. North Carolina Office of the Governor. NC Gov. Cooper: One Year Later: North Carolina Continues Recovering From Hurricane Matthew. <https://governor.nc.gov/news/one-year-later-north-carolina-continues-recovering-hurricane-matthew>. Accessed October 29, 2019.
82. Wiltz T. Climate Change Is Making the Affordable Housing Crunch Worse. *Pew Stateline*. August 30, 2019. <https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2019/08/30/climate-change-is-making-the-affordable-housing-crunch-worse>. Accessed October 29, 2019.
83. Centers for Disease Control and Prevention. Climate Change and Public Health - Health Effects - Precipitation Extremes. September 9, 2019. https://www.cdc.gov/climateandhealth/effects/precipitation_extremes.htm. Accessed October 31, 2019.
84. Epa U. What Climate Change Means for North Carolina. www.epa.gov/climatechange. Accessed November 18, 2019.
85. Governor Roy Cooper. Executive Order No. 80 - North Carolina's Commitment to Address Climate Change and Transition to a Clean Energy Economy. [https://files.nc.gov/governor/documents/files/EO80-NC%27s Commitment to Address Climate Change %26 Transition to a Clean Energy Economy.pdf](https://files.nc.gov/governor/documents/files/EO80-NC%27s%20Commitment%20to%20Address%20Climate%20Change%26%20Transition%20to%20a%20Clean%20Energy%20Economy.pdf).
86. Radel L, Baldwin M, Crouse G, Waters A. ASPE Research Brief Substance Use, the Opioid Epidemic, and the Child Welfare System: Key Findings from a Mixed Methods Study. 2018. <https://aspe.hhs.gov/child-welfare-and-substance-use>. Accessed October 1, 2019.
87. National Institute on Drug Abuse. Opioid Overdose Crisis. <https://www.drugabuse.gov/drugs-abuse/opioids/opioid-overdose-crisis>. Accessed August 1, 2019.
88. America's Health Rankings. Explore Drug Deaths in North Carolina: 2018 Annual Report. <https://www.americashealthrankings.org/explore/annual/measure/Drugdeaths/state/NC>. Accessed October 2, 2019.
89. Ruhm CJ. Nonopioid Overdose Death Rates Rose Almost as Fast as Those Involving Opioids, 1999–2016. *Health Affairs*. 2019;38(7):1216-1224. doi:10.1377/hlthaff.2018.05522.
90. Centers for Disease Control and Prevention. Prescription Opioids. <https://www.cdc.gov/drugoverdose/opioids/prescribed.html>. Accessed October 25, 2019.
91. North Carolina Department of Health and Human Services, Division of Public Health. NC Overdose Data: Trends and Surveillance, January 2019. https://www.youtube.com/watch?v=eE_HL3YL9Q&feature=youtu.be. Accessed October 2, 2019.
92. Centers for Disease Control and Prevention. Best Practices for Comprehensive Tobacco Control Programs—2014. 2014. https://www.cdc.gov/tobacco/stateandcommunity/best_practices/index.htm.
93. National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health. Reports of the Surgeon General. The Health Consequences of Smoking-50 Years of Progress: A Report of the Surgeon General. 2014.
94. Plescia M, Wansink D, Waters HR, Herndon S. Medical Costs of Secondhand-smoke Exposure in North Carolina. *North Carolina Medical Journal*. 72(1):7-12. <http://www.ncbi.nlm.nih.gov/pubmed/21678683>. Accessed October 2, 2019.
95. North Carolina State Center for Health Statistics. Statistics and Reports: BRFSS: Survey Results 2017. <https://schs.dph.ncdhhs.gov/data/brfss/2017/>. Accessed October 2, 2019.
96. Centers for Disease Control and Prevention. Tobacco-Related Disparities. Smoking & Tobacco Use. <https://www.cdc.gov/tobacco/disparities/index.htm>. Published 2018. Accessed August 15, 2019.
97. County Health Rankings & Roadmaps. Excessive Drinking in North Carolina. <https://www.countyhealthrankings.org/app/north-carolina/2019/measure/factors/49/datasource>. Accessed September 30, 2019.
98. America's Health Rankings. *Explore Excessive Drinking in North Carolina: 2018 Annual Report*. <https://www.americashealthrankings.org/explore/annual/measure/ExcessDrink/state/NC>. Accessed October 25, 2019.
99. North Carolina Department of Health and Human Services. North Carolina Alcohol Data Dashboard. <https://public.tableau.com/profile/nc.injury.and.violence.prevention.branch#!/vizhome/NCAAlcoholDataDashboard/Story>. Accessed October 25, 2019.
100. North Carolina Department of Health and Human Services. New Data Dashboard Illustrates State, County Impacts of Excessive Alcohol Use in North Carolina. April 12, 2019. <https://www.ncdhhs.gov/news/press-releases/new-data-dashboard-illustrates-state-county-impacts-excessive-alcohol-use-north>.
101. County Health Rankings & Roadmaps. Excessive drinking. <https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model/health-factors/health-behaviors/alcohol-drug-use/excessive-drinking>. Accessed October 2, 2019.
102. Eat Smart, Move More North Carolina. 2020. North Carolina's Plan to Address Overweight and Obesity. Eat Smart, Move More North Carolina, Raleigh, NC. Available at: www.eatsmartmovemorenc.com.
103. Centers for Disease Control and Prevention. Get the Facts: Sugar-sweetened Beverages and Consumption. <https://www.cdc.gov/nutrition/data-statistics/sugar-sweetened-beverages-intake.html>. Accessed August 30, 2019.
104. Miller G, Merlo C, Demissie Z, Sliwa S, Park S. Trends in Beverage Consumption Among High School Students — United States, 2007–2015. *Morbidity and Mortality Weekly Report*. 2017;66(4):112-116. doi:10.15585/mmwr.mm6604a5.
105. Yun S, Zhu B-P, Black W, Brownson RC. A Comparison of National Estimates of Obesity Prevalence From the Behavioral Risk Factor Surveillance System and the National Health and Nutrition Examination Survey. *International Journal of Obesity (London)*. 2006;30(1):164-170. doi:10.1038/sj.jjo.0803125.
106. Office of Disease Prevention and Health Promotion. 2015-2020 Dietary Guidelines. <https://health.gov/dietaryguidelines/2015/guidelines/>. Accessed October 2, 2019.
107. Onufrak SJ, Park S, Sharkey JR, Sherry B. The Relationship of Perceptions of Tap Water Safety With Intake of Sugar-sweetened Beverages and Plain Water Among US Adults. *Public Health Nutrition*. 2014;17(1):179-185. doi:10.1017/S1368980012004600.
108. Powell LM, Wada R, Kumanyika SK. Racial/Ethnic and Income Disparities in Child and Adolescent Exposure to Food and Beverage Television Ads Across the U.S. Media Markets. *Health Place*. 2014;29:124-131. doi:10.1016/j.healthplace.2014.06.006.
109. Harris JL, Schwartz MA, LoDolce M, Munsell C, Fleming-Milici F, Elsej J, Liu S, Hyary M, Gross R, Hazen C, Dembek C. *Sugary Drink FACTS 2014, Sugary Drink Marketing to Youth: Some Progress but Much Room to Improve*. Rudd Center for Food Policy & Obesity. 2014. http://www.sugarydrinkfacts.org/resources/SugaryDrinkFACTS_Report.pdf.

110. North Carolina Department of Health and Human Services State Center for Health Statistics. 2018 NC Resident Fertility Rates: Females Ages 15-19 by Race/Ethnicity, Perinatal Care Regions, and County of Residence. <https://schs.dph.ncdhhs.gov/data/vital/pregnancies/2018/fert1519.pdf>. Published 2018. Accessed September 30, 2019.
111. Cheng D, Schwarz EB, Douglas E, Horon I. Unintended Pregnancy and Associated Maternal Preconception, Prenatal and Postpartum Behaviors. *Contraception*. 2009;79(3):194-198. doi:10.1016/j.contraception.2008.09.009.
112. D'Angelo D V, Gilbert BC, Rochat RW, Santelli JS, Herold JM. Differences Between Mistimed and Unwanted Pregnancies Among Women Who Have Live Births. *Perspectives on Sexual and Reproductive Health*. 36(5):192-197. doi:10.1363/psrh.36.192.04.
113. Centers for Disease Control and Prevention. Morbidity and Mortality Weekly Report Preconception and Interconception Health Status of Women Who Recently Gave Birth to a Live-Born Infant--Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 Reporting Areas, 2004. <https://www.cdc.gov/mmwr/preview/mmwrhtml/ss5610a1.htm>. Accessed October 3, 2019.
114. Logan C, Holcombe Jennifer E, Manlove J, Ryan S. *The Consequences of Unintended Childbearing*. May 1, 2007. <https://www.childtrends.org/publications/the-consequences-of-unintended-childbearing-a-white-paper>.
115. National Cancer Institute. HPV and Cancer. <https://www.cancer.gov/about-cancer/causes-prevention/risk/infectious-agents/hpv-and-cancer>. Accessed October 3, 2019.
116. Centers for Disease Control and Prevention. CDC Fact Sheet: Reported STDs in the United States, 2017. www.cdc.gov/std/stats. Accessed October 3, 2019.
117. North Carolina Department of Health and Human Services, Division of Public Health, Communicable Disease Branch. Early Syphilis Infections in North Carolina, 2017. 2017. https://epi.dph.ncdhhs.gov/cd/stds/figures/factsheet_syphilis_2017.pdf.
118. North Carolina Department of Health and Human Services, Division of Public Health, Communicable Disease Branch. *2018 North Carolina STD Surveillance Report*. 2019. <https://www.ncdhhs.gov/>. Accessed October 25, 2019.
119. North Carolina Department of Health and Human Services, Division of Public Health, Communicable Disease Branch. *2018 North Carolina HIV Surveillance Report*. 2019. <https://www.ncdhhs.gov/>. Accessed October 25, 2019.
120. Centers for Disease Control and Prevention. HIV Prevention: North Carolina. <https://www.cdc.gov/hiv/pdf/policies/profiles/cdc-hiv-north-carolina-PrEP.pdf>. Accessed September 30, 2019.
121. North Carolina - AIDSvu. <https://aidsvu.org/local-data/united-states/south/north-carolina/>. Accessed September 30, 2019.
122. World Health Organization. HIV/AIDS. November 15, 2019. <https://www.who.int/news-room/fact-sheets/detail/hiv-aids>.
123. Centers for Disease Control and Prevention. HIV and Women in North Carolina, 2017. February 2016. Newly Diagnosed HIV Infection Rates. <https://www.cdc.gov/nchstp/newsroom/docs/factsheets/new-hiv-infections-508.pdf>.
124. Centers for Disease Control and Prevention. PrEP. HIV Basics. 18 July 2019. <https://www.cdc.gov/hiv/basics/prep.html>. Accessed August 30, 2019.
125. Barnes J. It's Not Time to Celebrate Yet: How the Rise in HIV Funding Tells a Deeper Story. *HealthAffairs*. February 22, 2018. <https://www.healthaffairs.org/doi/10.1377/hblog20180220.638968/full/>. Accessed August 30, 2019.
126. Centers for Disease Control and Prevention. About HIV/AIDS. <https://www.cdc.gov/hiv/basics/whatshiv.html>. Accessed September 20, 2019.
127. North Carolina Department of Health and Human Services, Division of Public Health, Communicable Disease Branch. *2018 North Carolina HIV Surveillance Report*. 2019. <https://www.ncdhhs.gov/>. Accessed October 28, 2019.
128. Hecht R, Flanagan K, Huffstetler H, Yamey G. Donor Transitions From HIV Programs: What Is the Impact on Vulnerable Populations. *HealthAffairs*. December 14, 2018. <https://www.healthaffairs.org/doi/10.1377/hblog20181213.623294/full/>. Accessed August 30, 2019.
129. North Carolina Division of Public Health. NC Resident Pregnancy Rates. 2017. <https://schs.dph.ncdhhs.gov/data/vital/pregnancies/2017/preg1519.pdf>.
130. Meade CS, Ickovics JR. Systematic Review of Sexual Risk Among Pregnant and Mothering Teens in the USA: Pregnancy as an Opportunity for Integrated Prevention of STD and Repeat Pregnancy. *Social Science & Medicine*. 2005;60(4):661-678. doi:10.1016/j.socscimed.2004.06.015.
131. County Health Rankings & Roadmaps. Teen birth. <https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model/health-factors/health-behaviors/sexual-activity/teen-births>. Accessed September 30, 2019.
132. Battle LS, Freed P. Teen Mothers' Mental Health. *MCN: The American Journal of maternal/Child Nursing*. 2016;41(1):31-36. doi:10.1097/NMC.0000000000000198.
133. Centers for Disease Control and Prevention. About Teen Pregnancy. Reproductive Health: Teen Pregnancy. <https://www.cdc.gov/teenpregnancy/about/index.htm>. Published 2019. Accessed August 15, 2019.
134. Centers for Disease Control and Prevention. Social Determinants and Eliminating Disparities in Teen Pregnancy. Reproductive Health: Teen Pregnancy. October 15, 2019. <https://www.cdc.gov/teenpregnancy/about/social-determinants-disparities-teen-pregnancy.htm>. Accessed November 1, 2019.
135. Avery M. Decline in Teen Births in North Carolina, 1996-2015. https://schs.dph.ncdhhs.gov/schs/pdf/SB_47_20170726.pdf.
136. County Health Rankings & Roadmaps. Access to Care. <https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model/health-factors/clinical-care/access-to-care>. Accessed October 1, 2019.
137. Institute of Medicine. Coverage Matters: Insurance and Health Care. Shaping the Future for Health. [http://www.nationalacademies.org/hmd/~media/Files/Report Files/2003/Coverage-Matters-Insurance-and-Health-Care/Uninsurance8pagerFinal.pdf](http://www.nationalacademies.org/hmd/~media/Files/Report%20Files/2003/Coverage-Matters-Insurance-and-Health-Care/Uninsurance8pagerFinal.pdf).
138. McWilliams MJ. Health Consequences of Uninsurance among Adults in the United States: Recent Evidence and Implications. *The Milbank Quarterly*. 2009;87(2):443-494. doi:10.1111/j.1468-0009.2009.00564.x.
139. Henry J. Kaiser Family Foundation. *Key Facts About the Uninsured Population*. December 7, 2018. <https://www.kff.org/uninsured/fact-sheet/key-facts-about-the-uninsured-population/>.
140. Zhou RA, Baicker K, Taubman S, Finkelstein AN. The Uninsured Do Not Use the Emergency Department More- They Use Other Care Less. *HealthAffairs*. 2017;36(12):2115-2122. doi:10.1377/hlthaff.2017.0218.
141. Office of Disease Prevention and Health Promotion. Access to Health Services. <https://www.healthypeople.gov/2020/topics-objectives/topic/Access-to-Health-Services>. Accessed August 1, 2019.

142. Henry J. Kaiser Family Foundation. Health Insurance Coverage of the Total Population. <https://www.kff.org/other/state-indicator/total-population/?currentTimeframe=0&selectedRows=%7B%22states%22:%7B%22north-carolina%22:%7B%7D%7D%7D&sortModel=%7B%22colId%22:%22Non-Group%22,%22sort%22:%22desc%22%7D>. Accessed October 28, 2019.
143. National Conference of State Legislatures. *Health Insurance: Premiums and Increases*. December 4, 2018. <http://www.ncsl.org/research/health/health-insurance-premiums.aspx>.
144. North Carolina Institute of Medicine. *Characteristics of Uninsured North Carolinians: 2015 Data Snapshot*. <http://nciom.org/wp-content/uploads/2017/07/2017-Data-Snapshot-.pdf>. Accessed August 1, 2019.
145. Riley B. *Profiling North Carolina's Uninsured: How Expanding Medicaid Can Make a Difference*. North Carolina Justice Center. <https://www.ncjustice.org/publications/profiling-north-carolinas-uninsured-how-expanding-medicaid-can-make-a-difference/>. Accessed September 30, 2019.
146. Randolph R, Holmes M. Running the Numbers: Health Insurance Coverage in North Carolina: The Rural-Urban Uninsured Gap. *North Carolina Medical Journal*. 2018;79(6):397-401. doi:10.18043/ncm.79.6.397.
147. Buettgens M, White KG. *What if More States Expanded Medicaid in 2017? Changes in Eligibility, Enrollment, and the Uninsured*. July 2016. <http://www.urban.org/sites/default/files/publication/82786/2000866-What-if-More-States-Expanded-Medicaid-in-2017-Changes-in-Eligibility-Enrollment-and-the-Uninsured.pdf>.
148. Pohl JM, Thomas A, Bigley MB, Kopanos T. Primary Care Workforce Data and the Need for Nurse Practitioner Full Practice Authority. *HealthAffairs*. December 13, 2018. <https://www.healthaffairs.org/doi/10.1377/hblog20181211.872778/full/>.
149. Ries M, Yorkery B, Zolotor A. *Recruitment and Retention of the Rural Health Workforce*. http://nciom.org/wp-content/uploads/2018/06/Issue-brief_FINALv2.pdf.
150. National Resident Matching Program, Results and Data: 2018 Main Residency Match®. Washington, D.C. 2018. <https://mk0nrmp3oyqui6wqfm.kinstacdn.com/wp-content/uploads/2018/04/Main-Match-Result-and-Data-2018.pdf>.
151. Coplan B, Smith N, Cawley JF. PAs in Primary Care: Current Status and Workforce Implications. *Journal of the American Academy of Physician Assistants*. 2017;30(9):35-42. doi:10.1097/01.JAA.0000522136.76069.15.
152. Morgan P, Johnson A, Fraher E. *Comparison of Specialty Distribution of Nurse Practitioners and Physician Assistants in North Carolina, 1997-2013 (2013-14)*. <https://www.shepscenter.unc.edu/project/comparison-of-specialty-distribution-of-nurse-practitioners-and-physician-assistants-in-north-carolina-1997-2013/>. Accessed October 28, 2019.
153. American Association of Nurse Practitioners. NP Fact Sheet. <https://www.aanp.org/about/all-about-nps/np-fact-sheet>. Accessed October 28, 2019.
154. Cawley JF, Lane S, Smith N, Bush E. Physician Assistants in Rural Communities. *Journal of the American Academy of Physician Assistants*. 2016;29(1):42-45. doi:10.1097/01.JAA.0000475463.23218.c9.
155. Xue Y, Smith JA, Spetz J. Primary Care Nurse Practitioners and Physicians in Low-Income and Rural Areas, 2010-2016. *Journal of the American Medical Association*. 2019;321(1):102-105. doi:10.1001/jama.2018.17944.
156. Holmes M. The Sufficiency of Health Care Professional Supply in Rural North Carolina. *North Carolina Medical Journal*. 2018;79(6):372-377. doi:10.18043/ncm.79.6.372.
157. Tucker W, Beatty L. *Giving Birth in North Carolina Is Still a Risky Business Promoting Women's Health to Improve Birth Outcomes*. February 2018. <http://www.ncchild.org/wp-content/uploads/2018/02/FINAL-Birth-Outcomes-Brief.pdf>.
158. Lockwood CJ, Magriples U. Prenatal Care: Initial Assessment. UpToDate. 2019. <https://www.uptodate.com/contents/prenatal-care-initial-assessment>.
159. Osterman MJK, Martin JA. Timing and Adequacy of Prenatal Care in the United States, 2016. *National Vital Statistics Reports*. 2018 May;67(3):1-14.
160. Garro N, Hernandez B, Pellegrini C. HHS Must Remove Barriers to Coverage for Pregnant Women. February 19, 2016. *HealthAffairs*. <https://www.healthaffairs.org/doi/10.1377/hblog20160219.053241/full/>.
161. North Carolina Department of Health and Human Services. Medicaid Income and Resource Requirements. <https://medicaid.ncdhhs.gov/medicaid/get-started/learn-if-you-are-eligible-medicaid-or-health-choice/medicaid-income-and>. Accessed October 1, 2019.
162. U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau. Child Health USA 2014. <http://mchb.hrsa.gov/chusa14/>. Published 2015. Accessed August 30, 2019.
163. Lu MC, Kotelchuck M, Hogan V, Jones L, Wright K, Halfon N. Closing the Black-White Gap in Birth Outcomes: A Life-course Approach. *Ethnicity & Disease*. 2010;20(1 Suppl 2):S2-62-76. <http://www.ncbi.nlm.nih.gov/pubmed/20629248>. Accessed September 30, 2019.
164. American College of Obstetricians and Gynecologists. Racial Disparities in Maternal Mortality in the United States: The Postpartum Period Is a Missed Opportunity for Action Background.; 2018. https://s3.amazonaws.com/cdn.smfm.org/media/1107/Leadership_-_January_2017. Accessed September 30, 2019.
165. Howell EA, Brown H, Brumley J, et al. Reduction of Peripartum Racial and Ethnic Disparities: A Conceptual Framework and Maternal Safety Consensus Bundle. *Journal of Midwifery & Women's Health*. 2018;63(3):366-376. doi:10.1111/jmwh.12756.
166. Gyamfi-Bannerman C, Srinivas SK, Wright JD, et al. Postpartum Hemorrhage Outcomes and Race. *American Journal of Obstetrics and Gynecology*. 2018;219(2):185.e1-185.e10. doi:10.1016/j.ajog.2018.04.052.
167. American Foundation for Suicide Prevention. Suicide Facts & Figured: North Carolina 2019. State Fact Sheets. <https://afsp.org/about-suicide/state-fact-sheets/#North-Carolina>. Published 2019. Accessed September 30, 2019.
168. Office of Disease Prevention and Health Promotion. Mental Health. n.d. <https://www.healthypeople.gov/2020/leading-health-indicators/2020-lhi-topics/Mental-Health/data>. Accessed August 15, 2019.
169. Hogan MF, Grumet JG. Suicide Prevention: An Emerging Priority for Health Care. *HealthAffairs*. 2016;35(6):1084-1090. doi:10.1377/hlthaff.2015.1672.
170. Centers for Disease Control and Prevention. Suicide Rising Across the US, More than a Mental Health Concern. June 7, 2018. <https://www.cdc.gov/vitalsigns/suicide/index.html>. Accessed October 1, 2019.
171. RAND. The Relationship Between Mental Health Care Access and Suicide. March 2, 2018. <https://www.rand.org/research/gun-policy/analysis/essays/mental-health-access-and-suicide.html>. Accessed September 30, 2019.
172. American Foundation for Suicide Prevention. Suicide Statistics. About Suicide. <https://afsp.org/about-suicide/suicide-statistics/>. Published 2017. Accessed September 30, 2019.
173. Rubin R. Suicide Rates Higher in Rural Areas for Most Demographic Groups. *Journal of the American Medical Association*. 2017;318(20):1969. doi:10.1001/jama.2017.17273.

174. U.S. Department of Veterans Affairs Office of Mental Health and Suicide Prevention. 2019 *National Veteran Suicide Prevention Annual Report*. September 2019. https://www.mentalhealth.va.gov/docs/data-sheets/2019/2019_National_Veteran_Suicide_Prevention_Annual_Report_508.pdf.
175. Hester RD. Lack of Access to Mental Health Services Contributing to the High Suicide Rates Among Veterans. *International Journal of Mental Health Systems*. 2017;11(1). doi:10.1186/s13033-017-0154-2.
176. Speer M, Phillips MA, Winkel T, Wright W, Winkel N RS. Serving Those Who Serve: Upstream Intervention and the Uphill Battle of Veteran Suicide Prevention in the US. July 11, 2019. *HealthAffairs*. <https://www.healthaffairs.org/doi/10.1377/hblog20190709.197658/full/>.
177. The Trevor Project. Facts about suicide. Preventing Suicide. <https://www.thetrevorproject.org/resources/preventing-suicide/facts-about-suicide/>. Accessed August 1, 2019.
178. National LGBT Health Education Center. *Suicide Risk and Prevention for LGBTQ People*. September 2018. <https://www.lgbthealtheducation.org/wp-content/uploads/2018/10/Suicide-Risk-and-Prevention-for-LGBTQ-Patients-Brief.pdf>.
179. O'Donnell S, Meyer IH, Schwartz S. Increased Risk of Suicide Attempts Among Black and Latino Lesbians, Gay Men, and Bisexuals. *American Journal of Public Health*. 2011;101(6):1055-1059. doi:10.2105/AJPH.2010.300032.
180. North Carolina Institute of Medicine and NC Child. *North Carolina Child Health Report Card, 2019*. 2019. <http://nciom.org/wp-content/uploads/2019/02/2019-NCreportcard-FINAL.pdf>. Accessed October 2, 2019.
181. North Carolina State Center for Health Statistics. *Vital Statistics: 2017 Child Death Fact Sheet*. 2017. https://schs.dph.ncdhhs.gov/data/vital/cd/2017/CFinNC2017_v3.pdf.
182. The Commonwealth Fund. *Health Insurance Coverage Eight Years After the ACA — 2018 Biennial*. <https://www.commonwealthfund.org/publications/issue-briefs/2019/feb/health-insurance-coverage-eight-years-after-aca>. Published 2019. Accessed November 18, 2019.
183. The Commonwealth Fund. *Underinsured Rate Rose From 2014-2018, With Greatest Growth Among People in Employer Health Plans*. <https://www.commonwealthfund.org/press-release/2019/underinsured-rate-rose-2014-2018-greatest-growth-among-people-employer-health>. Published 2019. Accessed November 18, 2019.
184. Centers for Disease Control and Prevention National center for Health Statistics. Infant Mortality Rates by State. 2017. https://www.cdc.gov/nchs/pressroom/sosmap/infant_mortality_rates/infant_mortality.htm.
185. Mathews TJ, Macdorman MF, Thoma ME. Infant Mortality Statistics From the 2013 Period Linked Birth/Infant Death Data Set Non-Hispanic Black Total Non-Hispanic White Hispanic. *National Vital Statistics Reports*. 2013;64(9):1-30.
186. Metzger MJ, Halperin AC, Manhart LE, Hawes SE. Association of Maternal Smoking During Pregnancy with Infant Hospitalization and Mortality due to Infectious Diseases. *The Pediatric Infectious Disease Journal*. 2013;32(1). doi:10.1097/INF.0b013e3182704bb5.
187. O'Leary CM, Jacoby PJ, Bartu A, D'Antoine H, Bower C. Maternal Alcohol Use and Sudden Infant Death Syndrome and Infant Mortality Excluding SIDS. *Pediatrics*. 2013;131(3). doi:10.1542/peds.2012-1907.
188. Meehan S, Beck CR, Mair-Jenkins J, Leonardi-Bee J, Puleston R. Maternal Obesity and Infant Mortality: A Meta-Analysis. *Pediatrics*. 2014;133(5):863-871. doi:10.1542/peds.2013-1480.
189. Chen A, Feresu SA, Fernandez C, Rogan WJ. Maternal Obesity and the Risk of Infant Death in the United States. *Epidemiology*. 2009;20(1):74-81. doi:10.1097/EDE.0b013e3181878645.
190. U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau. *Child Health USA 2014*. Rockville, Maryland: U.S. Department of Health and Human Services, 2014.
191. Harper MA, Espeland MA, Dugan E, Meyer R, Lane K, Williams S. Racial Disparity in Pregnancy-Related Mortality Following a Live Birth Outcome. *Annals of Epidemiology*. 2004;14(4):274-279. doi:10.1016/S1047-2797(03)00128-5.
192. Medicaid and CHIP Payment and Access Commission. *Access in Brief: Pregnant Women and Medicaid*. November 2018. <https://www.macpac.gov/publication/access-in-brief-pregnant-women-and-medicaid/>.
193. Murphy SL, Xu J, Kochanek KD, Arias E. Mortality in the United States, 2017 Key Findings Data from the National Vital Statistics System. 2017. https://www.cdc.gov/nchs/data/databriefs/db328_tables-508.pdf#1. Accessed September 30, 2019.
194. Redfield R. CDC Director's Media Statement on U.S. Life Expectancy, Media Statement. November 29, 2018. <https://www.cdc.gov/media/releases/2018/s1129-US-life-expectancy.html>.
195. North Carolina State Center for Health Statistics. 2015-2017 State-Level Life Expectancies by Age, Sex, Race and Race by Sex. [https://schs.dph.ncdhhs.gov/data/lifexpectancy/2015-2017/North Carolina 2015-2017 Life Expectancies.html](https://schs.dph.ncdhhs.gov/data/lifexpectancy/2015-2017/North%20Carolina%202015-2017%20Life%20Expectancies.html). Accessed October 28, 2019.
196. Cunningham P. *Why Even Healthy Low-Income People Have Greater Health Risks Than Higher-Income People*. September 27, 2018. <https://www.commonwealthfund.org/blog/2018/healthy-low-income-people-greater-health-risks>.
197. Kalesan B, Vyliparambil MA, Zuo Y, et al. Cross-sectional Study of Loss of Life Expectancy at Different Ages Related to Firearm Deaths Among Black and White Americans. *BMJ Evidence-Based Medicine*. 2019;24(2):55-58. doi:10.1136/bmjebm-2018-111103.
198. Lariscy JT, Nau C, Firebaugh G, Hummer RA. Hispanic-White Differences in Lifespan Variability in the United States. *Demography*. 2016;53(1):215-239. doi:10.1007/s13524-015-0450-x.
199. North Carolina State Center for Health Statistics. *Statistics and Reports: Life Expectancy*. <https://schs.dph.ncdhhs.gov/data/lifexpectancy/>. Accessed September 30, 2019.

APPENDIX A

HEALTHY NORTH CAROLINA 2030
INDICATORS AND DATA



TABLE 1

HEALTH INDICATORS AND DATA

(TOTAL NC POPULATION, 2030 TARGET, AND DATA BY RACE/ETHNICITY, SEX, AND POVERTY LEVEL)

W = WHITE
 B/AA = BLACK/AFRICAN AMERICAN
 H/LX = HISPANIC/LATIN(X)
 A/PI = ASIAN/PACIFIC ISLANDER
 AI = AMERICAN INDIAN
 FPL = FEDERAL POVERTY LEVEL
 ‡ NOT AVAILABLE OR NOT APPLICABLE

* 2016-18 AVERAGE
 ^ INCLUDES HISPANIC ETHNICITY
 # DATA FROM 2015
 A - ASIAN ONLY
 B - PACIFIC ISLANDER
 C - ECONOMICALLY DISADVANTAGED STUDENTS, AS DEFINED BY NC DEPARTMENT OF PUBLIC INSTRUCTION

D - 50%-100% FEDERAL POVERTY LEVEL
 E - 101%-150% FEDERAL POVERTY LEVEL
 F - 151%-200% FEDERAL POVERTY LEVEL
 G - TWO OR MORE RACES
 H - STUDENTS WHO ARE NOT ECONOMICALLY DISADVANTAGED, AS DEFINED BY NC DEPARTMENT OF PUBLIC INSTRUCTION

| HEALTH INDICATOR | DESIRED RESULT | TOTAL POPULATION | |
|--|--|-----------------------------------|---|
| | | CURRENT (YEAR) | 2030 TARGET |
| INDIVIDUALS BELOW 200% FPL | Decrease the number of people living in poverty | 36.8% (2013-17) | 27.0% |
| UNEMPLOYMENT | Increase economic security | 7.2% (2013-17) | Reduce unemployment disparity ratio between white and other populations to 1.7 or lower |
| SHORT-TERM SUSPENSIONS (PER 10 STUDENTS) | Dismantle structural racism | 1.39 (2017-18) | 0.80 |
| INCARCERATION RATE (PER 100,000 POPULATION) | | 341 (2017) | 150 |
| ADVERSE CHILDHOOD EXPERIENCES | Improve child well-being | 23.6% (2016-17) | 18.0% |
| THIRD GRADE READING PROFICIENCY | Improve third grade reading proficiency | 56.8% (2018-19) | 80.0% |
| ACCESS TO EXERCISE OPPORTUNITIES | Increase physical activity | 73% (2010/18) | 92% |
| LIMITED ACCESS TO HEALTHY FOOD | Improve access to healthy food | 7% (2015) | 5% |
| SEVERE HOUSING PROBLEMS | Improve housing quality | 16.1% (2011-15) | 14.0% |
| DRUG OVERDOSE DEATHS (PER 100,000 POPULATION) | Decrease drug overdose deaths | 20.4 (2018) | 18.0 |
| TOBACCO USE | Decrease tobacco use | YOUTH 19.8% (2017) | 9.0% |
| | | ADULT 23.8% (2018) | 15.0% |
| EXCESSIVE DRINKING | Decrease excessive drinking | 16.0% (2018) | 12.0% |
| SUGAR-SWEETENED BEVERAGE CONSUMPTION | Reduce overweight and obesity | YOUTH 33.6% (2017) | 17.0% |
| | | ADULT 34.2% (2017) | 20.0% |
| HIV DIAGNOSIS (PER 100,000 POPULATION) | Improve sexual health | 13.9 (2018) | 6.0 |
| TEEN BIRTH RATE (PER 1,000 POPULATION) | | 18.7 (2018) | 10.0 |
| UNINSURED | Decrease the uninsured population | 13% (2017) | 8% |
| PRIMARY CARE CLINICIANS (COUNTIES AT OR BELOW 1:1,500 PROVIDERS TO POPULATION) | Increase the primary care workforce | 62 (2017) | 25% decrease for counties above 1:1,500 providers to population |
| EARLY PRENATAL CARE | Improve birth outcomes | 68.0% (2018) | 80.0% |
| SUICIDE RATE (PER 100,000 POPULATION) | Improve access and treatment for mental health needs | 13.8 (2018) | 11.1 |
| INFANT MORTALITY (PER 1,000 BIRTHS) | Decrease infant mortality | 6.8 (2018) | 6.0 |
| | | Black/white disparity ratio = 2.4 | Black/white disparity ratio = 1.5 |
| LIFE EXPECTANCY (YEARS) | Increase life expectancy | 77.6 (2018) | 82.0 |

| RACE / ETHNICITY | | | | | | SEX | | FEDERAL POVERTY LEVEL | | |
|---------------------------|--------------------|-------------------|--|--------------------|--------------------|-------|--------|-----------------------|--------------------|-------|
| W | B/AA | H/LX | O | A/PI | AI | MALE | FEMALE | <200% | 200-399% | 400%+ |
| 30.7% | 51.1% | 63.6% | 46.1% ^G | 30.6% | 51.5% | 34.8% | 38.7% | ‡ | ‡ | ‡ |
| 5.7% [^] | 11.7% [^] | 7.1% [^] | 7.3% [^] 11.0% ^{^G} | 5.2% [^] | 10.3% [^] | 6.4% | 6.7% | ‡ | ‡ | ‡ |
| 0.73 | 3.00 | 0.88 | 1.69 | 0.18 ^A | 2.46 | 1.98 | 0.74 | 2.09 ^C | ‡ | ‡ |
| 203 [#] | 915 [#] | 209 [#] | ‡ | ‡ | 488 [#] | 649 | 50 | ‡ | ‡ | ‡ |
| 17.5% | 36.0% | 23.2% | 37.2% | 11.1% | ‡ | 23.8% | 23.5% | 47.9% | 19.9% | 8.3% |
| 70.1% | 40.8% | 42.6% | 59.5% ^G | 75.6% ^A | 44.5% | 54.0% | 59.8% | 42.6% ^C | 70.6% ^H | ‡ |
| DATA NOT AVAILABLE | | | | | | | | | | |
| 26.4 | 12.9 | 5.4 | 4.4 | ‡ | 32.6 | 27.8 | 13.2 | ‡ | ‡ | ‡ |
| 20.6% | 17.0% | 20.7% | 19.0% | ‡ | ‡ | 23.0% | 16.5% | ‡ | ‡ | ‡ |
| 25.9% | 22.5% | 12.2% | 17.1% | ‡ | ‡ | 29.9% | 18.5% | 32.8% | 21.6% | 17.2% |
| 17.2% | 12.5% | 17.8% | 13.1% | ‡ | ‡ | 21.7% | 10.8% | 14.5% | 17.6% | 21.2% |
| 36.1% | 31.5% | 28.9% | 24.3% | ‡ | ‡ | 38.7% | 28.3% | ‡ | ‡ | ‡ |
| 32.6% | 38.7% | 37.0% | ‡ | ‡ | ‡ | 37.6% | 31.0% | 41.0% | 32.7% | 24.1% |
| 4.9 | 40.8 | 17.7 | ‡ | 4.3 | 5.9 | 23.1 | 5.4 | ‡ | ‡ | ‡ |
| 12.9 | 24.1 | 34.3 | 6.9 | ‡ | 38.3 | ‡ | ‡ | ‡ | ‡ | ‡ |
| 10% | 13% | 31% | 8% | 9% | 18% | 14% | 11% | 21% | 12% | 4% |
| NOT APPLICABLE | | | | | | | | | | |
| 74.8% | 60.5% | 57.5% | 66.0% | ‡ | 54.3% | ‡ | ‡ | ‡ | ‡ | ‡ |
| 17.8 | 5.7 | 5.8 | 7.7 | ‡ | ‡ | 22.4 | 5.9 | ‡ | ‡ | ‡ |
| 5.0 | 12.2 | 4.8 | 5.0 | ‡ | 9.3 | 8.0 | 5.5 | ‡ | ‡ | ‡ |
| 78.3 [*] | 75.5 [*] | ‡ | 87.0 [*] | ‡ | 75.6 [*] | 74.8 | 80.3 | ‡ | ‡ | ‡ |

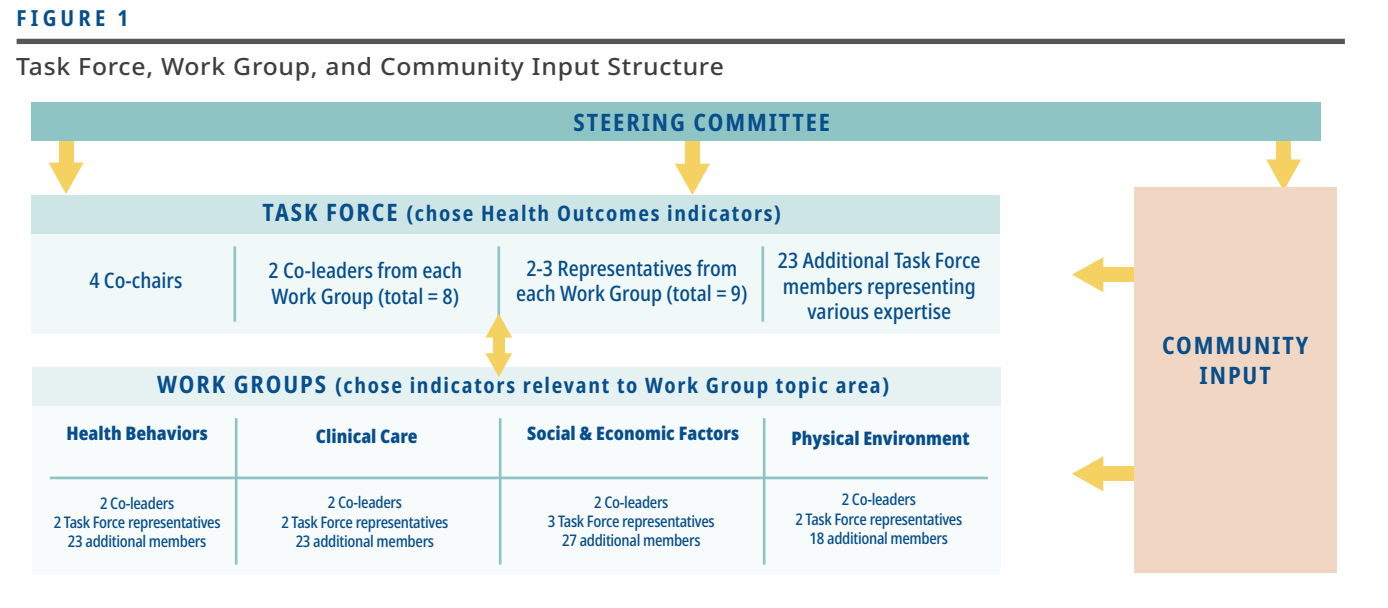
Source: See descriptions of health indicators throughout this report for information on data sources.

APPENDIX B

HEALTHY NORTH CAROLINA 2030
PROCESS DETAILS



The Healthy North Carolina 2030 (HNC 2030) process involved several meetings of an overall Task Force, four Work Groups, and Community Input Sessions, illustrated by the figure below.



Allocation of Indicators Across Topic Areas

The initial goal of HNC 2030 was to select a total of 20 indicators. Using the percentages associated with each health factor topic area of the Population Health Model, the number of indicators was distributed amongst the Task Force to select Health Outcomes and each of the Work Groups. Table 1 below shows the original allocation of indicators and the final allocation with explanations for any changes.

TABLE 1
Number of Indicators Allocated to Topic Areas and Changes Made

| TOPIC AREA | Number of Indicators | | EXPLANATION OF CHANGES |
|-----------------------------|----------------------|------------------|---|
| | ORIGINAL ALLOCATION | FINAL ALLOCATION | |
| Health Outcomes | 3 | 2 | The Task Force decided to select only 2 Health Outcome indicators, leaving 1 extra for a Work Group. The extra indicator was given to Physical Environment. |
| Health Behaviors | 5 | 6 | The Health Behaviors Work Group lobbied the Task Force for inclusion of an additional indicator that they determined to be vital to the state's health. |
| Clinical Care | 4 | 4 | No change |
| Social and Economic Factors | 6 | 6 | No change |
| Physical Environment | 2 | 3 | The Physical Environment Work Group took on the extra indicator that the Task Force did not use for Health Outcomes. |

Timeline and Procedures

The Task Force began meeting in January 2019, meeting a total of four times through August 2019. Each Work Group met three times – once each in February, May, and June 2019. Community meetings were held February through April 2019.

The first Task Force meeting provided background information and set a vision for HNC 2030. Each Work Group first met in February to narrow down larger lists of potential indicators to smaller lists for community input. These initial lists were gathered from HNC 2020, Healthy People 2030, state health improvement plans, and County Health Rankings & Roadmaps. Each Work Group used a process of small group and large group discussion, followed by an online survey. NCIOM staff created the final narrowed lists for community input.

At Community Input Sessions, each participant was given worksheets to provide an individual ranking of the indicators in each topic area.

Participants then discussed in small groups and indicated their top priority indicators in each topic area. Lists of indicators were edited slightly after the first few community sessions to reflect feedback from the participants, such as the addition of a transportation measure in the Physical Environment topic area and the change from “Emergency Department visits for violence” to “Violent crime rate.” Table 2 shows the indicators discussed in community meetings and the average ranking they received.

The Task Force met in March to select the Health Outcomes measures. Work Groups met in May to review the community input and determine the final list of indicators for their topic area. In some cases, with additional data and discussion, the Work Group chose to prioritize some indicators differently from the community input because of data quality, issues related to health disparities or health equity, or choice of an indicator that measures a similar concept.

TABLE 2
Indicators Discussed at Community Input Sessions and Average Rankings of Indicators

| HEALTH BEHAVIORS | | CLINICAL CARE | | SOCIAL & ECONOMIC FACTORS | | PHYSICAL ENVIRONMENT | |
|--------------------------------------|------|----------------------------|-----|---------------------------------|------|----------------------------------|-----|
| Youth tobacco use | 1.6 | Uninsured | 1.0 | Families at or below 200% FPL | 1.3 | Food Environment Index | 1.4 |
| Illicit drug use | 2.0 | Mental health ED visits | 2.1 | Adverse Childhood Experiences | 2.3 | Housing cost burden | 2.3 |
| Physical activity | 2.3 | Early prenatal care | 3.4 | Unemployment | 3.6 | Housing quality problems | 2.6 |
| Unintentional poisoning deaths | 4.3 | Routine checkups | 4.5 | Children in low-income homes | 3.7 | Access to public transportation | 3.8 |
| Teen birth rate | 4.5 | Primary care physicians | 5.0 | Income inequality | 4.6 | Community water safety | 5.2 |
| Adult smoking | 6.3 | Heart disease mortality | 5.3 | Children investigated for abuse | 5.2 | Access to exercise opportunities | 5.3 |
| Excessive drinking | 6.5 | Suicide | 6.5 | 4th grade reading | 5.9 | Blood lead levels | 5.7 |
| Unintended pregnancy | 6.8 | School nurse/student ratio | 7.6 | High school graduation | 7.0 | Air pollution | 6.6 |
| Smoking during pregnancy | 7.0 | Vaccinations | 8.3 | Disconnected youth | 9.0 | Asthma-related ED visits | 7.2 |
| Sugar-sweetened beverage consumption | 7.4 | | | Incarceration rate | 9.5 | | |
| HIV diagnosis | 8.9 | | | Residential segregation | 9.6 | | |
| Breastfeeding | 9.6 | | | ED visits for violence | 9.8 | | |
| Deaths due to falls | 11.0 | | | Violent crime rate | 9.8 | | |
| | | | | Suspension from school | 10.9 | | |

ED = Emergency Department; FPL = Federal Poverty Level
Note: Rankings in table are with '1' rating the highest priority.

The final meeting of each Work Group in June was used to set targets for selected indicators. Work Groups were presented with data on current and past trends for each indicator, a forecasted estimate of the status of each indicator in 2030 (forecast estimates can be found on the NCIOM website with the electronic version of this report) based on past data, and any available data across counties and other states. In target-setting considerations, Work Group members discussed the potential for movement in each indicator, what is currently being done at community and state levels, what political will and public interest exists to create change, and whether there is funding for the work needed to create change. These considerations informed how ambitious the groups were in the targets they set.

Finally, the Task Force met to set targets on the Health Outcomes they had selected and review and approved the decisions made by the Work Groups.

APPENDIX C

DETAILED COMMUNITY SESSION INPUT



The NCIOM scheduled eight Community Input Sessions throughout North Carolina from February 27 to April 9, 2019 to collect input on a narrowed list of potential health indicators under consideration for Healthy North Carolina 2030. At each meeting, participants were given work sheets for each of the topic areas – Social & Economic Factors, Physical Environment, Health Behaviors, and Clinical Care – to rank for importance in their communities. The NCIOM team revised the list of indicators during this process to account for common feedback about missing indicators. Below is a summary of the ranking of indicators in each section.

TABLE 1
Community Session Input on Social & Economic Factors

| HEALTH INDICATOR | Ranking of Indicators by Area of North Carolina* (Number of Participants) | | | | | | | | AVERAGE RANK ^A |
|---|---|----------------|---------------|-------------------|----------------|-----------------|---------------|-------------|---------------------------|
| | GREENVILLE (112) | HENDERSON (25) | PEMBROKE (32) | JACKSONVILLE (17) | CHARLOTTE (56) | GREENSBORO (21) | CHEROKEE (29) | MARION (39) | |
| Families at or below 200% FPL | 1 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1.3 |
| Adverse Childhood Experiences | 2 | 1 | 2 | 2 | 4 | 3 | 2 | 2 | 2.3 |
| Unemployment | 3 | 6 | 3 | 4 | 1 | 2 | 5 | 5 | 3.6 |
| Children in low-income homes ^A | 4 | 3 | 4 | N/A | N/A | N/A | N/A | N/A | 3.7 |
| Income inequality | 5 | 5 | 6 | 5 | 3 | 5 | 4 | 4 | 4.6 |
| Children investigated for abuse ^B | N/A | N/A | N/A | 3 | 9 | 8 | 3 | 3 | 5.2 |
| Fourth grade reading | 6 | 4 | 5 | 8 | 8 | 4 | 6 | 6 | 5.9 |
| High school graduation rate | 8 | 7 | 8 | 7 | 6 | 6 | 7 | 7 | 7.0 |
| Disconnected youth | 9 | 8 | 7 | 9 | 12 | 11 | 8 | 8 | 9.0 |
| Incarceration rate | 11 | 9 | 9 | 10 | 7 | 12 | 9 | 9 | 9.5 |
| Residential segregation | 10 | 10 | 12 | 11 | 5 | 7 | 12 | 10 | 9.6 |
| Emergency department visits for violence ^C | 7 | 12 | 10 | N/A | N/A | N/A | N/A | N/A | 9.8 |
| Violent crime rate ^D | N/A | N/A | N/A | 6 | 10 | 10 | 11 | 12 | 9.8 |
| Short-term suspension rate | 12 | 11 | 11 | 12 | 11 | 9 | 10 | 11 | 10.9 |

N/A=Not Applicable; FPL=Federal Poverty Level | *Rank of 1 for most important. | ^AAverage of rankings across 8 meetings (or fewer if indicator only discussed in first three or last five meetings).
^A This indicator was eliminated after the third meeting due to confusion with Families at or below 200% FPL. | ^B This indicator was added at the fourth meeting to replace "children in low-income homes."
^C This indicator was eliminated after the third meeting due to community interest in discussing violent crime rate. | ^D This indicator was added at the fourth meeting to replace "emergency department visits for violence."

TABLE 2
Community Session Input on Physical Environment

| HEALTH INDICATOR | Ranking of Indicators by Area of North Carolina* (Number of Participants) | | | | | | | | AVERAGE RANK ^A |
|---|---|----------------|---------------|-------------------|----------------|-----------------|---------------|-------------|---------------------------|
| | GREENVILLE (113) | HENDERSON (25) | PEMBROKE (31) | JACKSONVILLE (17) | CHARLOTTE (56) | GREENSBORO (21) | CHEROKEE (29) | MARION (39) | |
| Food environment index | 1 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 1.4 |
| Housing cost burden | 2 | 3 | 3 | 3 | 1 | 3 | 1 | 2 | 2.3 |
| Housing quality problems | 3 | 2 | 1 | 2 | 3 | 2 | 4 | 4 | 2.6 |
| Access to public transportation ^A | N/A | N/A | N/A | 5 | 4 | 4 | 3 | 3 | 3.8 |
| Community water safety ^B | N/A | N/A | N/A | 4 | 5 | 5 | 7 | 5 | 5.2 |
| Access to exercise opportunities | 4 | 4 | 4 | 7 | 6 | 6 | 5 | 6 | 5.3 |
| Blood lead levels ^C | 6 | 5 | 6 | N/A | N/A | N/A | N/A | N/A | 5.7 |
| Air pollution | 5 | 6 | 5 | 8 | 7 | 7 | 8 | 7 | 6.6 |
| Asthma-related emergency department visits ^D | N/A | N/A | N/A | 6 | 8 | 8 | 6 | 8 | 7.2 |

N/A=Not Applicable; FPL=Federal Poverty Level | *Rank of 1 for most important. | ^AAverage of rankings across 8 meetings (or fewer if indicator only discussed in first three or last five meetings).
^A This indicator was added at the fourth meeting due to community interest in discussing public transportation. | ^B This indicator was added at the fourth meeting due to community interest in discussing community water safety.
^C This indicator was eliminated after the third meeting due to limited interest. | ^D This indicator was added at the fourth meeting due to oversight of inclusion for first three meetings.

TABLE 3
Community Session Input on Health Behaviors

| HEALTH INDICATOR | Ranking of Indicators by Area of North Carolina* (Number of Participants) | | | | | | | | AVERAGE RANK ^A |
|---|---|----------------|---------------|-------------------|----------------|-----------------|---------------|-------------|---------------------------|
| | GREENVILLE (117) | HENDERSON (24) | PEMBROKE (29) | JACKSONVILLE (17) | CHARLOTTE (56) | GREENSBORO (21) | CHEROKEE (29) | MARION (39) | |
| Youth tobacco use | 1 | 1 | 2 | 4 | 1 | 1 | 1 | 2 | 1.6 |
| Illicit drug use ^A | N/A | N/A | N/A | 1 | 3 | 3 | 2 | 1 | 2.0 |
| Physical activity | 3 | 2 | 1 | 2 | 2 | 2 | 3 | 3 | 2.3 |
| Unintentional poisoning deaths ^B | 2 | 4 | 7 | N/A | N/A | N/A | N/A | N/A | 4.3 |
| Teen birth rate | 4 | 3 | 3 | 3 | 6 | 5 | 7 | 5 | 4.5 |
| Adult smoking | 5 | 8 | 4 | 11 | 7 | 4 | 5 | 6 | 6.3 |
| Excessive drinking | 7 | 7 | 5 | 5 | 9 | 6 | 6 | 7 | 6.5 |
| Unintended pregnancy ^C | N/A | N/A | N/A | 6 | 4 | 7 | 9 | 8 | 6.8 |
| Smoking during pregnancy | 6 | 5 | 6 | 8 | 10 | 8 | 4 | 9 | 7.0 |
| Sugar-sweetened beverage consumption ^C | N/A | N/A | N/A | 10 | 5 | 10 | 8 | 4 | 7.4 |
| HIV diagnosis | 9 | 6 | 9 | 7 | 8 | 9 | 11 | 12 | 8.9 |
| Breastfeeding | 8 | 9 | 8 | 9 | 11 | 11 | 10 | 11 | 9.6 |
| Deaths due to falls | 10 | 10 | 10 | 12 | 12 | 12 | 12 | 10 | 11.0 |

N/A=Not Applicable; FPL=Federal Poverty Level | *Rank of 1 for most important. | ^AAverage of rankings across 8 meetings (or fewer if indicator only discussed in first three or last five meetings).
^A This indicator was added at the fourth meeting to replace "unintentional poisoning deaths." | ^B This indicator was eliminated after the third meeting and replaced with "illicit drug use."
^C This indicator was added at the fourth meeting due to oversight of inclusion for first three meetings.

TABLE 4
Community Session Input on Clinical Care

| HEALTH INDICATOR | Ranking of Indicators by Area of North Carolina* (Number of Participants) | | | | | | | | |
|---|---|-------------------|------------------|----------------------|-------------------|--------------------|------------------|----------------|------------------|
| | GREENVILLE (116) | HENDERSON (25) | PEMBROKE (32) | JACKSONVILLE (17) | CHARLOTTE (56) | GREENSBORO (21) | CHEROKEE (29) | MARION (39) | AVERAGE RANK^ |
| Uninsured | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.0 |
| Mental health emergency department visits | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2.1 |
| Early prenatal care | 4 | 3 | 3 | 3 | 3 | 5 | 3 | 3 | 3.4 |
| Routine checkup | 6 | 4 | 5 | 4 | 4 | 2 | 6 | 5 | 4.5 |
| Primary care physicians | 3 | 5 | 6 | 5 | 7 | 6 | 4 | 4 | 5.0 |
| Heart disease mortality | 5 | 6 | 4 | 6 | 5 | 4 | 5 | 7 | 5.3 |
| Suicide ^A | N/A | N/A | N/A | N/A | 6 | 7 | 7 | 6 | 6.5 |
| School nurse ratio | 7 | 7 | 8 | 7 | 8 | 8 | 9 | 8 | 7.6 |
| Vaccinations | 8 | 8 | 7 | 8 | 9 | 9 | 8 | 9 | 8.3 |

*N/A=Not Applicable; FPL=Federal Poverty Level | *Rank of 1 for most important. | ^Average of rankings across 8 meetings (or fewer if indicator only discussed in first three or last five meetings).
A This indicator was added at the fifth meeting as an additional measure related to mental health.*

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